Towards Globo sapiens: Using Reflective Journals to Prepare Engineering Students Able to Engage with Sustainable Futures

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by

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Abstract

How do we help students to integrate their tertiary education with their development as “wise” global citizens and professionals? The study engages with this question through exploring the use of Reflective Journals as a central and integrating strategy for learning and assessment for a socially and culturally diverse group of students in a large, compulsory, first year, one-semester Engineering unit [BNB007: Professional Studies] between 2000 and 2004.

The study supports the hypothesis that Reflective Journals can be an effective strategy for improving the often-criticised poor communication skills of domestic and international students in technical fields. For many students, the process of reflection also became a means of learning about their learning. Attitude surveys administered to students pre and post the teaching intervention in the years 2000-2002 showed positive changes in anticipated directions that encouraged further research. If attitude change was occurring in BNB007, what was the nature of the change? The research showed that at a deeper, longer term and more complex level, this new self-awareness supported many students to develop the kind of futures thinking and social learning “that will be necessary to navigate the transition to sustainable futures” (Raskin *et al*., 2002). The study contributes to the literature and to methodology through the first complementary use of two new methodologies, Sense-Making and Causal Layered Analysis. Thirty in-depth Sense-Making based interviews, including four with staff, indicate that ‘meta-reflection’ and transformative learning did take place.

Expressing these qualities in the discourse of internationalisation as “global portability” or even “global competence” is unsatisfactory because these popular terms do not embody the qualities graduates need to create sustainable futures. As

currently used, they mainly serve a market-dominated version of globalisation and its allied internationalisation-as-profit discourse. Raskin *et al* proposed a more appropriate term, "sustainability professionals", emerging from a preferred, values-based globalisation inspired by a vision of humane, sustainable futures that see "rights assured, nature treasured, culture rich and the human spirit animate" (p.70). This more challenging concept of a graduate for the 21st century is expressed here through the term *Globo sapiens*, whose qualities are identified in this study. Such professionals are willing to think critically and to assume responsibility for their impact on communities and the planet. This is the critical-futures oriented, transformative and therefore radical notion connoted by the title *Towards Globo sapiens.*

This research identified some of the terrain and challenges of a post-development vision in a vocational area of teaching in Higher Education. It explained how particular students resisted or reconstructed their worlds when challenged at fundamental levels, but within a supportive atmosphere. Thus the study contributes to what educators might need to know, be and do, in order to teach effectively for the transformations urged by Sustainability Scientists, among others, and upon which any sustainable alternative futures depend. The study is underpinned by transdisciplinary syntheses that help to illuminate each area in new and fruitful ways.

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Kelly, P. (1998). Internationalisation and a post-development vision. *Futures, Vol.30* (No.7), 739-744.

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Abbreviations

AaEe	Australasian Association of Engineering Educators
ACEFS	American Council on Education Fulfilment Service
AFTRS	Australian Film, Television and Radio School
ASDU	Academic Staff Development Unit
ASTEC	Australian Science, Technology and Engineering Council
CFF	Commission for the Future
SAFVC	South Australian Film and Video Centre
CLA	Causal Layered Analysis
ESB	English Speaking Background
GSG	Global Scenario Group
IAU	International Association of Universities
IEAust	Institution of Engineers, Australia
MA	Millennium Assessment
NESB	Non English Speaking Background/s
PCAST	President's Committee of Advisors on Science and Technology
QUT	Queensland University of Technology
SACAE	South Australian College of Advanced Education

SEDA	Staff and Educational Development Association [United Kingdom]
S-M	Sense Making
TALDU	Teaching and Learning Development Unit
TESOL	Teaching English to Speakers of Other Languages
ULSF	University Leaders for a Sustainable Future
UNEP	United Nations Environmental Program
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WFEO	World Federation of Engineering Organisations
WSFS	World Futures Studies Federation

Declaration of Originality

The work contained in this thesis has not been previously submitted for a degree or diploma at any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made. Some of this work has been previously reported in articles and chapters, as listed.

The surveys were conducted by the author, the data were entered by Ms Shirley Neill, QUT and the Descriptive Analysis was done by Dr Adrian Barnett of the University of Queensland and Dr Helen Johnson of the Queensland University of Technology. The interviews were recorded and transcribed by the author during the period from November 2002 and November, 2004. Ms Susan Leggett provided the template and formatted the thesis.

I received timely and helpful advice from Dr Brenda Dervin (Ohio State University), Dr Angelo Coco (University of Queensland) and Dr Kym Madden (QUT) in preparing my Sense-Making Interview instrument and process.

Signed:_____

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My humble thanks to all the students of BNB007, especially those who so generously allowed their journals to be used as the data for this thesis and to those who agreed to be interviewed, offering me insights that helped my learning journey and that of their peers.

Those acknowledgements rightly being made, I dedicate this thesis to my late parents. My father, Alick Behan Kelly, (1903-1951) had to leave school at fourteen and completed his education at night school, working throughout his short life to improve conditions for working people. Above all, it is for my mother, Alice Kelly, (1906-2002). Even her extraordinarily long life wasn't enough to see this completed,

but she insisted on the education that made it possible. Removed from school the day she turned fourteen, she taught me a love of history and of my ancestors and a commitment to social justice that has guided my life, not always down easy paths. Knowing that she was denied the education she so clearly deserved simply because she was a “girl”, kept me at it, as well as knowing she would be saying “If you start a thing, you have to finish it!” Here it is, with love.

Author's Preface: Streams of the River

> *We cannot and should not remove ourselves from the research environment. Rather we should be epistemologically clean, stating up front what we believe to be our value commitments (Inayatullah 2002, p.10).*

Introduction

This study represents the confluence of over thirty years of teaching, learning, writing and committed social action around the ever-changing, intersecting issues of teaching and learning in secondary, further and higher education sectors; multiculturalism; gender; environment; identity, and global responsibility. The autobiographical preface describes the various streams of learning that have contributed and flowed towards the critical futures thinking that now underpins the study and its conclusion. That is, even small scale teaching interventions can bring about the values changes that graduates need in order to lead or contribute to any transition to sustainable futures.

The personal story is a legitimate and integral element of research because it enables us "to explore the ways in which personal and professional journeys are...inextricably bound together" (Hicks, 2002, p.1). Brookfield regards "autobiographical reflection" as the first of four interconnected lenses at the heart of critically reflective practice. The other three are our students' perceptions, our colleagues in critical conversation and the alternative theoretical frameworks available through literature (Brookfield, 1995, p.xiii), all of which contribute to this study. Moreover, "reading about a best practice…makes little sense without an

understanding of the struggle and gaps it was intended to traverse" (Dervin, 1998, p.2/10). The metaphor of the streams came from the title of a marathon drama production I saw some years ago (Lepage, 1996). The drama was complex, covered continents, cultures and time and addressed moral, ethical and political issues, as has my teaching life. "River" offered an integrating metaphor connoting the impossibility of separating the internal and external aspects of our lives and the way streams have of forging channels in unforeseen directions. The use of an overarching metaphor is appropriate as metaphor plays a foundational role in this study and its methodologies. I revisit my story methodologically, including a close analysis of my choice of a guiding metaphor, the "oasis", in Chapter Seven, Researcher as Researched, together with several others which emerged as significant during the study.

The following sections outline some life streams, the last of which summarises my motives and goals. I begin however, with the sources.

The sources

I inherited my commitment to social justice. My father was a founder of the Fabian Socialists in Adelaide, South Australia and my mother's strong, progressive, political stance maintained his influence. His death, just before I started school, I realise, made me "different". I was also instantly labelled by my Irish name[1], although the ethnic reality was more complicated. "My mother had mixed English (Quakers and farmers), Irish and "South Australian German" heritage. This was not unusual, since 10 per cent of South Australia's population were of German origin in 1900, many of whom had emigrated in the 1850s to avoid religious persecution. But her account of the shame her German name caused her at school during World War One gave me some understanding of the

[1] I share a surname with Australia's favourite bushranger, Ned Kelly, which has led inevitably to the wearing question "Are you related to Ned?"

long-term effects of prejudice. Whatever the cause, I was always sensitive to "difference." My first serious personal relationship led me into the world of the Ukrainian (Orthodox) community and at 19, I attended Saturday morning ethnic school at St Nikolai's Orthodox Church in Adelaide, to learn Russian[2]. Thus, my awareness of the complex and traumatic experiences of one ethnic community was already acute when I began teaching four years later. I had also begun to travel overseas, particularly to South and South East Asia.

I did not intend to begin teaching. I went to the Education Department of South Australia to enrol in a Diploma of Education and emerged with a job. I began my working life as a secondary school teacher in the state system in Adelaide, South Australia in 1970, with over-crowded classes of students from very diverse cultural backgrounds. My home class consisted of forty-four students crammed into a "temporary" wooden classroom designed for twenty-five. With no teaching experience or training, I taught four subjects to five different classes at four different levels. This coincided with reading *Limits to Growth* (Meadows & Meadows, 1972) and the inception of the magazine *New Internationalist*, both of which had major impacts on my thinking. By 1973, I was producing eco-dramas with students from my first high school's Eco Club. I began Indonesian language studies in 1972 and with the aid of a Commonwealth grant to study in Indonesia, reached a level where I taught it at South Australian College of Advanced Education in 1975.

My concern for what I saw as the neglect of the learning needs of students from Non English Speaking Backgrounds (NESB) led me to study a post-graduate Bachelor of Education in Applied Language Studies and to a new teaching life as an English as a Second Language (ESL)/ Multicultural teacher with the Education

[2] I was enthusiastic. Most of my fellow (child) students were not. "Do your parents make you come here too?" was the most usual question. I didn't learn Ukrainian, as the family felt that Russian was more useful and that I would pick up the differences!

Department of South Australia. In 1976 I received a national curriculum development grant to develop and teach "World Studies" to Year 8 students in a "Lighthouse" high school in a low-socioeconomic area. I taught this for the next two years, until the Principal and ethos of the school changed, at which point I took up study and teaching opportunities in Greece and the People's Republic of China (PRC). I was selected as a TESOL teacher for the Australian Teachers' Federation in the PRC in 1981, not long after the end of the Cultural Revolution. Consequent to that, I organised several Australia-China Council funded and South Australian government-sponsored cultural exchanges.

I became involved in the feminist movement in the 1970s and 1980s, particularly through street theatre and women's drama productions, including the first joint drama production between Indigenous and non-Indigenous women[3]. Each experience broadened and deepened my awareness of the complexity of cultures, including my own, and of the importance of the environment and other global issues. In 1984, my combination of languages and curriculum development enabled me to gain a position as a curriculum writer for the Multicultural Education Curriculum Committee (MECC) in the Education Department of South Australia. This work helped me to gain skills and confidence in developing culturally responsive curricula in a wide range of curriculum areas, an important basis for later work in Higher Education.

Media work

In 1987, I changed occupation to become the Education Officer for the (then) South Australian Film and Video Centre (SAFVC). While there, I produced (among others) a national visual resource guide with the (then) Commission for the Future (CFF), *Alternative Futures: Visions and Realities* (Kelly, 1989). This helped teachers to use films and videos to support futures thinking in their

[3] "Is this Seat Taken?" (1989)

classrooms. Working with film had already led me to take up formal studies in media. I could not pursue my first choice, Journalism, as in 1984 I became a mother, by choice, and soon after, a single parent. I returned to work. I could however, study part-time. Moreover, university study gave me access to good child care until my son started school in 1989. Having completed a Graduate Diploma in Media under the auspices of the Australian Film Television and Radio School (AFTRS), I began an MA in Literature and Communication through Murdoch University in Western Australia. My dissertation, "*Embassy*: Engaging with Difference" (Kelly, 1994) investigated the changing construction of the Australian nation as depicted in the Australian Broadcasting Corporation's (ABC) controversial 1990-92 television series *Embassy.* My interpretation was based in Social Semiotics and critical feminist theory and I used post-modernist deconstruction methods (Kelly, 1993).

In 1992, I used my TESOL skills to return to work at tertiary level, as the Language Adviser to Overseas Post-Graduate Students at the Flinders University of South Australia (FUSA). However, deconstructing film and written "texts" laid firm foundations for using the constructive potential of Causal Layered Analysis in analysing images of the future and for this study. Writing study guides for documentaries also proved an enduring creative outlet and income source.

Academic staff development

In 1994, work with staff and students at FUSA, including communications skills work with Public Health students and with medical teaching staff, led to an interstate promotion to work in the Academic Staff Development Unit (ASDU) at the Queensland University of Technology in Brisbane, Queensland (QUT), as a Lecturer in Cross Cultural Curriculum Development. My collaborative work in the Faculty of Built Environment and Engineering (BEE) proved to be the most enduring and challenging curriculum development opportunity at QUT. Staff

development is often a contentious and expendable area and 1994-2002 saw dramatic and often difficult changes, as ASDU became the Teaching and Learning Development Unit (TALDU) and was eventually dissolved, despite a series of positive external reviews.

In a volatile and "down-sizing" staff development context, I used strategies including faculty-based workshops; seminars; committee involvement and teaching a core (curriculum) unit in the Graduate Certificate of Education (Higher Education). My duties were assisting lecturers to explore their understanding of diversity and to respond by reflecting on and "internationalising" the methodology and content of their units or courses. Dr Weeks, Dr (now Professor) Ryan and I gained Staff Educational Development Association (SEDA, UK) accreditation for the Graduate Certificate Program. I gained my Fellowship of SEDA qualification (FSEDA) in 2001.

In response to increasing pressures of globalisation and the financial lure of full fee paying overseas students, internationalisation of the curriculum gradually became a priority at institutional level in the 1990s. Consequently, there was increased interest in this area at a management level and more incentives for staff to respond. A booklet I produced in 1999 to introduce staff to Internationalisation issues, teaching strategies and resources, was used by a variety of faculties as they attempted to satisfy the relevant objectives and targets of the QUT Teaching and Learning Plans since 2000, to some of which I contributed.

The past decade has seen an overt increased interest in and policy commitment to Internationalisation, but my concerns about the way this was interpreted, deepened. There is also evidence of resistance to the pressures the current

version puts on higher education (Schapper, 2004; Zeszotarski, 2000; Cain & Hewitt, 2004). This is discussed in more detail in Chapters One and Two.

Why engineering?

The data collection for this research emerged out of nine years' collaborative work in the Faculty of Engineering at QUT. Using reflective journals as a teaching strategy to help engineering students reflect on global issues and their relevance to them personally and professionally, is usually regarded as "daunting". I became involved in 1997, when as a staff developer with expertise in diversity issues, I was invited to work with engineering students by an engineering lecturer with a specific equity responsibility. She wanted to improve what she perceived as students' poor interpersonal and written communication skills and a concomitant lack of awareness of cross-cultural and gender issues and their relevance to engineering.

Our work with smaller groups (30-60) led, in 1999, to the creation of an expanded Professional Studies unit (BNB007)[4]. Until the end of 2005, this was compulsory for all first year engineering students and had enrolments between 350-400 students. BNB007 raised the question, what strategies best support the development of learning and cross-cultural communication skills in such a large, socially and culturally diverse student cohort? I had always resisted a 'deficit' approach to teaching English, in which teachers 'overcome' or 'deal with' the 'problems' posed by 'diversity'. One answer emerged from a combination of my experience and reading (Biggs, 1999; Barnett, 1997; Martens, 1984). I first used Reflective Journals as part of an English through Drama approach in the People's Republic of China (PRC). They proved a powerful strategy in freeing a group of adult post-graduate learners of English to express themselves, to improve their writing abilities and their self-confidence. This positive experience gave me the

[4] An early evaluation example is discussed in Chapter Two.

confidence to use this strategy in a culturally diverse Australian engineering context.

From 2003-2005, a modified version of BNB007 was taught in Brisbane, through a ten day intensive course, to a small (12-14) group of students from a private university in the PRC. In 2005, I also used Reflective Journals as part of a semester-long unit at the Queensland Institute of Business Training, (QIBT), with a group of post-graduate Masters Qualifying students from Asia and the Middle East. In both groups, despite the short time and the pressure on the students to work so intensively in another language, their journals revealed similar indications of improving communication skills as well as personal growth and transformative learning.

Ellsworth (1999) and Jones (1999) rightly challenged the idea of any unproblematic space for "voices", but I took up Volet and Ang's (1998) challenge to create a supportive space for students, bearing in mind Barnett's (1997) insistence that it had to be an active space; passive acceptance is not enough. This issue is discussed in more detail in Chapter Two, in which I engage with legitimate concerns about Reflective Journals (Boud & Walker, 1998). The metaphor these authors used for a supportive environment, the *oasis*, gradually became my guiding metaphor for my work with this class. Moreover, their concerns led me to analysing this metaphor in depth as part of reflexive practice to test my motives and methods. This is detailed in Chapter Seven. BNB007 illustrates both the benefits and the perils of individual-driven curriculum initiatives. The benefits include a certain freedom to take curriculum decisions and to innovate. The perils include vulnerability where there is a lack of systemic and collegial support. I revisit this issue in Chapter Eight, the final chapter.

Futures Studies

After I began work in Academic Staff Development at QUT, I began to search for alternative and deeper understandings of Internationalisation. This was spurred by its co-option for what seemed *solely* economic ends, rather than engaging with the challenges it poses for higher education. Questioning my teaching role had already led to critical education and I had been introduced to the concept of futures thinking in 1989 by (Professor) Richard Slaughter. In 1996, I met (Professor) Sohail Inayatullah, who encouraged me to enrol in a new, although short-lived, single Masters level unit, *Futures Studies, Issues and Visions*[5], which he designed with Dr Paul Wildman, another futurist. This online unit stimulated further learning as well as providing some methodological and analytical tools needed for critical and epistemological futures work (Inayatullah, 1990). My final assignment for this unit became first an article (Kelly, 1998) and then a book chapter (Kelly, 2000) in which I explored how shallow articulations of Internationalisation serve a fundamentally dystopic vision of *one* assumed future. This was expressed well by the concept of "Futurelandia" (Galtung, 2000) in which "threats to our common humanity are concealed beneath a layer of technophilic optimism" (Slaughter & Inayatullah, 1999, p.3).

The search to understand and justify what I saw as a missing ethical dimension in such a future led to futurists such as Jim Dator for whom "[E]thical considerations are critical to futures teaching and futures research" (Dator, 2002, p.6), to Richard Slaughter (2004) and to critical educationists Barnett, (1997); Bowers, (1993); Bowers & Flinders, (1990); Brookfield, (1995); Ellsworth, (1989) and Mclaren, (1995). A critical futures perspective is "risky, demanding and challenging," (Slaughter, 1999, p.3). Risk taking is even an issue in terms of doctoral research (Evans, 2004, p.6) since students may choose "safe" research in their desire to

[5] It was taught in 1997 only, at Southern Cross University, a regional university in the state of New South Wales, as part of a Masters in Workplace Education degree.

obtain the degree. However, a critical futures perspective was appropriate for this research, because it demands and thrives on a variety of approaches, influences, tools and experiences. I realised that my work in BNB007 was engaging with what Slaughter referred to as "the problematics of cultures in change and transformation" (1999, p.10). At its broadest, this study is part of a move towards reconstructing culture as part of a transition to preferred sustainable futures.

Within the critical futures thinking domain, the new concept of Causal Layered Analysis (CLA) emerged from the creative synergy of Inayatullah, devising a layered analytical model that built on and expanded the work of theorists including Galtung, Foucault, Shapiro and Slaughter (Inayatullah, 2004). Its layered approach made sense of many conflations I perceived in the world and in my teaching and helped me to distinguish the symptoms of an issue from its deepest causes. I believed that CLA would allow me move beyond the potential chaos of deconstruction alone into a reinformed and reconstructed picture of what and how change was occurring in the engineering students I taught. A detailed explanation of CLA and its complementarities with my other methodology, Sense-Making, is given in Chapter Three.

Sense-Making

The fifth stream was Sense-Making, an approach based on strong meta-theoretical assumptions about communication as "individual and collective sense-making" (Dervin 2003, p. 345) rather than simply transmission of information. These assumptions guide its methodology and methods. I was introduced to Sense-Making at a 1997 QUT seminar given by Professor Brenda Dervin, visiting from Ohio State University in the United States. She only gave a single seminar, but the concept and her presentation were compelling. Although unsure how I would apply it to my work in academic staff development, some key concepts

stayed with me. Dervin's use of "verbing" (1993), for instance, changed my language and way of thinking. Dervin theorised "communication as practice", the verbings that humans use to individually and collectively construct communicating bridges across any of the gaps we confront (ibid, p.52). Once any noun, for example, "knowledge" with its implied question "whose?" becomes "know*ings*", any assumed "centre" or "truth" falls away, no longer simply admitting or tolerating the periphery but obliged to *engage* with it. The concept of verbing began to underpin my teaching and my thinking about diversity in particular. It complemented and extended the core ideas I was learning from Futures Studies. That is, there is no one future, but possible, probable, preferable and plausible futures, or "futur*ings*" in Sense-Making terms. We are all responsible for helping to create these. Moreover, "since the future is the arena of the possible and of the preferred, rather than of the foregone and predetermined, it is also the arena of dreams and values" (Dator, 2002, p.6). The concept of a preferred future intersects with the concept of sustainability, used in this study to refer to a process, not an end in itself, a view put forward by Wals & Jickling (2002) among others (Clark, Jager, & Kates, 2004; Sterling, 2001). I return to this problematised concept of sustainability and its relevance to this study in Chapter Two.

A picture should now be emerging of how these streams flowed together into this study. Engineering students and the assumed culture of engineering are as far from my Arts-Humanities background as it is possible to imagine. This culture is generally regarded as "white, middle class and heterosexual…those who conformed to the beliefs and values of this group were the most powerful…setting the norms for behaviour and practices and subordinating other masculine styles" (Lewis et al (1998) cited in Godfrey, 2003, p.15). In teaching terms, Tonso described this as a culture "favoring" men or women who used

mainly "drill-and-test, decontextualised principles without substantive applications" (2001, p.161).

The process of changing from supporting small group work to helping to design a course of study, and working in lecture theatres with classes of over three hundred students compelled to study BNB007, was personally and professionally challenging and sometimes painful. Other writers acknowledge this is a common aspect of working on the "borders" (Brookfield, 1995; Giroux, 1991; Horlick-Jones & Sime, 2004; Mclaren, 1995). Gender is regarded as a complicating factor in engineering, as local and international research makes clear (Stonyer & Smith, 1999; Tonso, 1996; Tonso, 2001; Burrowes, 2001; Heyman, Martyna, & Bhatia, 2002; Newhouse-Maiden, 2002; Godfrey, 2003). As teaching females, we were challenging the accepted male majority view (although not the majority of students) on many levels. Some resented it and a few said so vehemently, especially in the early years. With the limited understanding we had, we were only able to keep going because we believed that the journals and the unit offered opportunities for many students to be heard and to listen to *themselves*. It challenged the assumed "culture" of engineering by encouraging both male and female students to grow as people and to meet many of the expressed goals of their chosen profession. The challenge was to respond constructively to the resistance, while trying to develop more appropriate and effective teaching strategies.

This study is part of that on-going process and so it records my growing understanding of "resistance" and the associated changes in my attitudes and responses to students. It also led to questioning the role of Higher Education in the 21st century and to asking what graduate qualities I *did* want to support. These came to be expressed through the concept of *Globo sapiens,* wise global

citizens, whose qualities I summarise in Chapter One and describe in Chapter Eight.

Research motives and goals

The addition of a theoretical stream enabled me to move beyond description into understanding and analysis. Taking up Blaikie's suggestion to make research motives and goals explicit (2000, p.22), the next section summarises how the streams described above have merged into the three main motives and goals that form the "river" of this study.

The educational level

I was dissatisfied with current interpretations of internationalisation in higher education and what I saw as an inadequate response in engineering education. I wanted to develop more effective internationalisation strategies as part of a wider response to calls for educational change, particularly in engineering. The challenges of futures studies and global crises intersected with responses such as the New Sustainability Paradigm (Raskin, Banuri, Gallopin, Gutman, Hammond, Kates *et al*, 2002) during the research. I responded by working on alternative teaching approaches through the curriculum development opportunity in engineering. This enabled me to contribute to preparing graduates able to act as critical beings and sustainability professionals, in a century faced with growing ecological and social crises (Steffen et al., 2004). In this sense, my aim was altruistic because I wanted my contribution to knowledge to serve society.

The academic level

In terms of research and pedagogy, it was clear once the work in the unit began, that *believing* that Reflective Journals were an effective strategy for bringing about change and transformation with diverse student cohorts was not enough, I needed to evaluate. The influence of other scholars and my reading had already

led to two methodologies, Causal Layered Analysis and Sense-Making. I thought that these methodologies might complement each other to illuminate this complex process. My aims were firstly, to contribute to knowledge about educating socially and culturally diverse cohorts of vocational professionals, by seeking theoretically-sound answers to observed transformation[6] or resistance in the reflective journals. Secondly, I thought it was useful to evaluate this teaching intervention. This involved metaphor analysis, since metaphors had become a significant interpretative factor in understanding the deeper levels of the study and my life.

As an academic staff developer, I knew it was important to document and analyse the successes and failures of the unit, for those struggling with similar issues now and in the future. The issue of innovative, transformative, transdisciplinary units or courses being undermined, dying from neglect or being replaced if key, dedicated (in both senses of the word) staff leave, deserves more detailed analysis. Common flaws or problems may be prevented, repaired early or solved to enable successful mainstreaming of similar innovations. Lessons learned from this study may therefore be relevant to others working in vulnerable or unsupportive environments.

The personal level

I wanted to record and value the huge amount of thought and work that had gone into creating and developing the unit. As with other education innovations I have worked on, the experience was a source of both inspiration and disillusionment. After thirty years as a critical educator, I knew that 'border pedagogy' was difficult and that academic credibility was important (Mayer, 2003). It was made clear to me that a doctorate made a difference to being heard across the gaps. Critical author and academic Susan George concluded similarly, stating, "I get myself

[6] As defined on page 79.

announced as "Doctor" whenever I fear a hostile environment" (2004, p.205). The study has also contributed to my growth, since the literature and my on-going work with engineering students continue to be a process of personal conscientisation, "a process of bringing the unsaid and unarticulated into consciousness" (Dervin, 2003, p.158).

In early 2002, my increasing lack of "value fit"[7] (Singh, 2002, p.230) in an academic staff development unit by then reduced from 14 to 3 staff, enabled me to take the difficult decision to leave work as a full-time permanent employee of QUT. I now have no input to any decisions, having joined the growing pool of casual teachers, "piece-workers" [8] of the mind. The stronger term "teaching slaves" has been used to describe the poorly paid and overburdened casual workers in an increasingly "inhumane" United States' system, which undermines "the job of college professor as someone paid to read, write, engage intellectually, and to prepare students to be critical participants in a democracy" (Nelson & Watt (2004) cited in Probyn, 2005, p.40).

Conclusion

The preface has explained the personal context of this study and how and why I embarked on it. The study's significance rests on increasing evidence that within the short term, higher education institutions all over the world will be impelled to change their curricula rapidly in order to prepare graduates with "dynamic qualities" (Posch 1999 in Wals & Jickling, 2002, p.124) as a basis for meeting increasingly frequent and serious ecological, social and environmental crises (Raskin et al., 2002). The most recent global environment assessment, significant because it involved 1360 scientists from all over the world (Millennium

[7] "Academic identities, beliefs and practices that do not willingly accept the discipline of the market no longer have a 'value fit'" (Singh, 2002, p.230).
[8] The term used in Australia to describe the often exploited, low-paid workers who sew items for the garment trade and are paid by the "piece". They are usually immigrant women whose language skills preclude better paid work.

Assessment, 2005), was extremely clear about where past and present decisions are leading the planet. Disturbing global scenarios caution that perturbations of the Earth's ecology on the current scale can lead to extremely rapid "crashes" (Steffen et al., 2004; Lowe, 2004; Diamond, 2005; Meadows et al. 2005). Kunstler recently warned that "we are about to enter an era of tremendous trauma for the human race" (2005, np.) and so professionals who have been educated to exploit rather than to sustain are no use to societies with ecologies and economies in crisis.

The story of how BNB007's students and selected staff progressed towards the academic, pedagogical and personal goals summarised in the Preface, will emerge in the answer*ings*, if not answers, provided by the following chapters. Chapter One, the Introduction, offers a more detailed overview of this study and the questions and concepts with which it engages.

> *The advent of the 21st Century challenges us as educators, consultants, managers, trainers and teachers to engage in life-long learning at a deep level and to make a positive difference in our society, our workplace and our physical environment (Passfield, 1996, p.26).*

Chapter One: Introduction and Overview

> *A critical step to promoting sustainability in higher education involves developing a clearer understanding of how declarations can be implemented effectively at institutions, rather than solely reporting on "best practice" cases. It is also imperative to acknowledge failures and build on lessons learned (Wright, 2002, p.119).*

Introduction: The Research Issue

The Preface established my personal values base and the reasons for embarking on this study. This chapter introduces the research issues. A decade ago McClaren expressed concern that "little attention is paid to the idea of conscripting the idea of metaskills or metacommunication into the service of creating a more just or equitable social order" (1995, p.10). So how do teachers help students to integrate their learning into living as developing, "wise" global citizens and professionals? Allied to this, as university teachers how do we reassert the core value of tertiary education as 'transformative' rather than merely technical training? (Lowe, 1992; Altbach, 2001; Barnett, 1997).

This study reports on the use of Reflective Journals as a core strategy to support large, diverse cohorts of first year engineering students on their journey to becoming critically reflective, responsible, wise global citizens - *Globo sapiens.* Against the complex background described below, the major research question of this study asked, "*What evidence is there that Reflective Journals are an effective pedagogical strategy for transformative learning outcomes in a vocation-based course such as engineering*?" The methodologies, Sense-Making and Causal Layered Analysis illuminated how change or transformation, as described below,

was occurring or being resisted. The resulting insights offer points of comparison for others.

I begin this chapter by explaining the engineering context in which the study took place. I then draw on the identified areas of education, the emerging discipline of (critical) Futures Studies, political-economy, sustainability science and communication theory, in particular Sense-Making, in order to outline the key concepts driving this research: *citizenship, critical thinking, critical futures thinking, Action Learning, reflection, reflexivity, transformation, sustainability professionals, the New Sustainability Paradigm, Global Portability, Global Competence and Globo sapiens*. The integration of these various discourses represents an example of transdisciplinarity, an approach defined as a desirable and essential aspect of 21st century thinking by Somerville (2001) and others in the critical futures area. I explain transdisciplinarity in detail in Chapter Two. I then introduce the second main question that the study set out to answer, which relates to the chosen methodologies. This leads to a discussion of my role as a researcher and a detailed explanation of "reflexivity" and why it is significant in this study. I briefly introduce the role of Higher Education and the significance of this study and conclude with an overview of the remaining chapters.

1.1 The context: Why engineering?

> *Educating Engineers and Architects without including the implications of their work on the natural environment, is like teaching new soldiers to fire rifles without warning them that bullets hurt (Lowe, 1997, p.1).*

As stated previously, my "support" role in engineering gradually evolved into on-going teaching and curriculum design collaboration. I agreed to this because my staff development role was to help academics to work more effectively with diverse students in an internationalising Higher Education environment. I based

my approach in a collaborative model of staff development as identified by Gore (1995, cited by Grundy in Atweh, Kemmis & Weeks 1998, p.42). Moreover, I was critical of group work I had observed in other engineering classes, so it was reasonable to offer and to evaluate alternative and hopefully more effective strategies. This work gave me professional credibility with the lecturers I taught in the Graduate Certificate of Education (Higher Education), since I was able to say that I ***did*** face similar challenges and that certain strategies did or, equally importantly, may not work with students who were regarded as "difficult."

In the late 1990s, the engineering Faculty was under pressure to change the engineering curriculum to respond to the 1996 Australian Review of Engineering Education and the findings of the Review of Continuing Professional Development in Engineering, 1997. As we wrote at that time,

> *A pervasive, compulsory project across the Faculty might have caused resentment, so a pilot project was initiated to implement a responsive curriculum strategy into a less technical first year subject, 'Technology and Society'. This was identified as an appropriate starting point as it was studied by all first year engineering students (civil, mechanical and electrical). The initial objectives were:*
>
> *to introduce study skills required at university*
>
> *to introduce the three major engineering disciplines at QUT and explain their similarities and differences*
>
> *to introduce the other professional groups represented in the Faculty of Built Environment and engineering and explain how these groups interact with engineers and society*
>
> *to develop information retrieval skills*
>
> *to raise student awareness of the codes of ethics relevant to professional practice*

> *to offer opportunities to develop or extend the skills and competencies necessary to become a world class professional* (Messer & Kelly, 1997, p.3).

The feedback from students in the pilot unit BNB004 - Technology & Society in semester 2, 1997, was that, while the introductory communications session we [I and the unit Coordinator] offered was useful, they wanted ongoing discussions and development of the skills needed to be a "world class professional." In 1998, BNB005 - Technology and Society, was restructured to include discussions with academics who, as engineering professionals, had worked overseas. Benefits students reported included "social aspects of engineering, because the degree doesn't prepare you for social and cultural aspects." Other useful aspects included "team work", "supporting colleagues as well as respecting them", "developing communication skills", being aware of different cultures and their rules" and being "humble"[9].

This reassured us that we were meeting some needs not usually perceived as part of engineering "culture" and that changes were taking place in students' thinking. The positive and negative student evaluations from 1997 and 1998, combined with my desire to understand why some teaching strategies were effective and to improve identified weaknesses, led to this study. Papers describing this work from 1997-2005 and written singly, or jointly with the coordinator of the unit, are listed on pages xi-xiii of this thesis.[10]

1.1.1 The engineering profession

The rhetoric was clear on what was expected of engineering graduates in Australia and world-wide. IEAust's review of Engineering Education, Changing the Culture (1996), reviewed submissions from industry, universities, Government, IEAust and its members and overseas engineering Institutions. It

[9] These comments are taken from anonymous evaluations.

[10] Although my formal candidature did not begin until late 1999, I documented this work from 1997.

concluded that the issues driving the agenda for all constituencies were those related to internationalisation, commercial practices and social and cultural interaction. The IEAust realised that the transformation of culture "requires a shift in thinking going beyond wealth creation and economic determinism" to address the effects of technology on "people's lives" (1996, p.21). The generic skills that graduates from an accredited engineering course must demonstrate were revised and up-dated as part of a 2000-2003 Review by the IEAust as its understanding of a "new culture of engineering." These were the:

1. ability to communicate effectively, not only with engineers but also with the community at large
2. ability to manage information and documentation
3. capacity for creativity and innovation
4. understanding of professional and ethical responsibilities and commitment to them
5. ability to function effectively as an individual and in multidisciplinary and multicultural teams with the capacity to be a leader or manager as well as an effective team member
6. capacity for lifelong learning and professional development
7. professional attitudes (Australian Engineering Competency Standards (AECS), 2003, p. 22).

Progressive national and international concern about the nature of engineering in the 21st century called for engineers able to "contribute to a renewal of civil society and take responsibility for the social and human, as well as the technical and economic, consequences of their work" (Lloyd et al. 2001, p.170). Hood, now Deputy Chairman, College of Environmental Engineers, urged engineers to "assume new responsibilities – and 'dare' to speak and act in new ways" asking

questions such as "what" needs to be sustained, before deciding how to do it (1999, p.20). The role of engineering educators is to teach engineers to ask such questions (ibid).

BNB007 responded to these concerns, as is clear from the topics for each week's professional practice lectures detailed in Chapter Two. Although the exhortations were clear, there was a dearth of strategies for "how" educators might bring about any of these changes (Margolis, 2001; Godfrey, 2003). This study describes one approach to bridging the gap between the idealistic calls for change at national and global levels and the realities of working with real students, in imperfect settings, knowing only what we know at any given moment in time (Apple, 2001). Because of its transdisciplinary nature, this study uses concepts from various areas and disciplines. The next sections explain these and why they are relevant to this study.

1.2 Key Concepts

1.2.1 Citizenship

The blurring of work and life caused by the increasing power and influence of trans-national companies means that "the education of the critical citizen…is fast becoming a matter of the education of the corporate employee" (Barnett, 1997, p.129). The concept of critical citizenship is more demanding even than seeing graduates as "citizens first and employable graduates second" (Heath, 1999, p.44). More recently, Brennan warned that "citizenship on its own cannot be the ideal for conscientious environmental commitment" (2005, p.29). It needs a strong moral basis. The desired outcomes of this study therefore supported a concept of citizenship which involves "connection and responsibility for self, for others, for changing what we do not like about our world" (Heath 1999, p.45). This is similar to Barnett's "critical being" (1997) and to transformation in

Mezirow's terms (1996, 2000) since transformation ultimately involves a commitment to action, immediate or delayed. "Action is an observable (productive) activity that human agents engage in to produce an intentional (desired) state of the world" (Ehrenfeld, Conceico, Heitor, & Viera,1999, p.17).

1.2.2 Critical thinking

Barnett was highly critical of academic understandings of critical thinking limited to a "single set of actions, skills, propensities or dispositions" divorced from values-based outcomes of "better life, emancipation, greater understanding" (1997, p.3). He was concerned that critical thinking for economic improvement and for professional self-development merely serves systems rather than challenging them (ibid). Therefore, critical thinking as he used the term, has three bases. It is "potentially emancipatory", leading to students who "realize they are free to build their own cognitive universe." It is "educationally radical" since the teacher must make spaces for students to develop critical thinking and in so doing becomes more a participant in learning than an authority. Finally, it is "radical in social and cultural terms". If higher education helps to form students with "the capacities to think critically…understand oneself critically and to act critically", then these students become change agents, an indirect "formative agency" through practising their critical dispositions (Barnett, 1997, p.4). This explanation has a future dimension in that these qualities seem essential for the "sustainability professionals" needed for any transition to sustainable futures (Raskin et al, 2000, p.56).

1.2.3 Critical futures thinking

Futures Studies is an emerging discipline with varying and competing discourses. It is a "systematic study of possible, probable, and preferable futures including the worldviews and myths that underlie each future" (Inayatullah, 2002, p.1). Types of futures studies include the "predictive", which privileges experts for

whom language is a neutral tool of strategic discourse that enables them to colonise a predicted future (ibid, p.8) and the "interpretive", which aims at increasing insight through comparing different but equally valid mythologies and images of the future. The "critical" tradition aims to "disturb present power relations" so that they are seen in perspective and other future scenarios seem possible. A fourth emerging approach is "anticipatory action learning," in which stakeholders construct their own visions of futures in an iterative process. All can be useful (ibid).

This study builds on research into long-term, alternative futures, patterns of change and transformative knowledge as developed by critical futurists including Johan Galtung, Sohail Inayatullah, Ziauddin Sardar and Richard Slaughter. In this view, the limited and limiting interpretations of critical thinking in Higher Education that Barnett criticised above, respond to and perpetuate a "business as usual", "Market Forces" future premised on "perpetual global economic growth" (Raskin et al. 2002, p.23) or as Daly described it "Growthmania" (2004, p.1). Sardar asserts that this future is "already an occupied territory" (1999, p.9), colonised by the West. I return to this issue in Chapter Two.

1.2.4 Engineering and sustainability

Within Higher Education, engineering is important since it was named as one of the key professions with the potential for contributing to the knowledge integration required for a transition toward sustainability (Kates & Clark, 1999, p.318). There are many definitions of sustainability, a concept I explain in more detail in Chapter Two. Here, I note that I regarded the concept of sustainability as a "critical challenge" and my ongoing work as an "opportunity" (ibid, p.2) to contribute to the less well researched area of how Higher Education can help to achieve a transition from this unsustainable "age of expansion" to an "age of

equilibrium," a process envisaged sixty years ago (Mumford, 1944 cited in Meadows et al., 2005, p.262).

1.2.5 A new sustainability paradigm

This study is also one response to recent and on-going work by a concerned international group of "sustainability scientists." They asserted that the transition has already begun and called for a "New Sustainability Paradigm" (NSP) based on "an alternative constellation of policies, behaviours and values" (Raskin et al., 2002, p.29) as part of a "Great Transition" to a preferred future. What remains contestable is the "character of globalisation" that determines where this transition leads us in the next hundred years or less. This study is not constrained by any single vision of the future but intersects with and contributes to work towards alternative and genuinely sustainable futures, based on a "communicative-inclusive society" (Inayatullah, 2000). What is clear is that this approach to sustainability involves "radical changes in the way we think and act" (Ophuls, 1996 cited in Ehrenfeld et al., 1999, p.12). Considering changes at this level led me to transformative learning.

1.2.6 Transformation

"A mindful transformative learning experience requires that the learner make an informed and reflective decision to act on his or her reflective insight" (Mezirow, 2000, p.23-24). The term "mindful" refers to "the continuous creation of new categories, openness to new information, and an implicit awareness of more than one perspective" (Langer, 1997, p.4, in Mezirow, 2000, p. 7). The educator's role is to help learners become more aware of the context of beliefs, more critically reflective on their own and others' assumptions, more engaged in discourse and more effective in taking action on any reflective judgements they then make (Mezirow, ibid, p.31). Moreover, "Transformative learning involves a particular function of reflection: reassessing the presuppositions on which our beliefs are

based and acting on insights derived from the transformed meaning perspective that results from such reassessments" (Mezirow, 1990, p.18). It may involve what he described as "correcting distorted assumptions, epistemic, sociocultural, or psychic – from prior learning or 'un-learning'" (ibid). Distortions caused by painful experiences are the most difficult to change and several of the student interviews gave privileged insights into this process (Chapter Six).

Transformation is complex and deeply personal. For this reason, educators also need an ethical commitment not to "indoctrinate" students by trying "to convert them to our views" but to be aware of the legitimate opportunity to "foster learner awareness of the need for change through transformative learning" (Mezirow, 2000, p.231). I realise that I have strong values so it is important to state the influence I had in this teaching environment. I helped to design the assessment and the Professional Studies module of BNB007. I designed the Reflective Journal section and collaborated closely with tutors in designing the initial tutorial activities. I also contributed to the unit outline and set the "tone" for the website. From 1999-2002 my teaching contact with students was a one hour lecture, (2 hours from 2003), student-initiated email contact in relation to problems arising with the journals, and assessment duties as stated elsewhere. After completing data collection, in 2003 I managed the online communication aspect of the Reflective Journals and communicated by "global notices" and in response to individual emails. Most of the lectures forming the basis for the journal topics were given by outside "guest" lecturers, who represented a broad spectrum of opinions from government and industry. The tutors and lecturers of the other sections also held diverse views. It was in this sense that I said to students and meant, "there was no party-line". Students occasionally failed the journals because they made no effort, or because of blatant plagiarism, but not because they disagreed with any information or opinions.

Transformation theory in Mezirow's interpretation is a model relating to all aspects of adult learning. I summarise these in the next chapter. The role of reflection is critical because being required to move out of our comfort zones can form a "disorienting dilemma" or disruption. This is one of the ten "phases of meaning" which, if clarified, can lead to transformation (Mezirow, 2000, p.22). These are listed in full in Chapter Two.

1.2.7 Reflection

I used reflection in Mezirow's sense, as "the process of critically assessing the content, process or premise(s) of our efforts to interpret and give meaning to an experience" (1991, p.104). There is a recognition that "[D]eeply reflective writing and understanding does not come readily to graduates of our schools and universities" (Bolton, 1999, p.203). Reflection involves a critique of assumptions to determine whether any belief, often acquired through cultural assimilation in childhood, remains functional for us as adults. We do this by critically examining its origins, nature and consequences (Mezirow, 1994, p.223). The most common site for this is "problem-solving". I revisit reflection in Chapters Three and Five.

Wisely used, this approach should build in critical awareness and "reflexivity", leading to an inbuilt, healthy scepticism in which we are conscious of both being on ever-shifting ground and of the need for on-going growth. Because it is a foundational concept in this study, the next section explores some meanings of reflexivity, their relevance to the study and to my role within it.

1.2.8 Reflexivity: Some days it *is* too hard

At a personal level then, reflexivity is "more than 'self-consciousness'". It involves the "active monitoring" of one's own conduct as well as "the social and physical aspects" of any given contexts (Giddens 1984, p.5 in Blaikie 2000, p.54) or "monitoring of the world by the agent and ability to make assessments about that

world" (Ehrenfeld et al., 1999, p.17). In adopting a role of "active reflexivity", I accept that I can never be objective or neutral but should be willing to engage in ongoing "critical self-scrutiny" (Mason 1966, p.6 in Blaikie 2000, p.55). This applies to every aspect of the research process itself including its design.

In this study, it led to facing questions about the use of reflection and reflective journals, testing my motivations and teaching process and exploring challenges to the concept of reflexivity itself. For example, Sense-Maker Foreman-Wernet (2000) warned that the current emphasis on improvement, through collective and individual monitoring and evaluating, could be an *extreme* form of self-reflexivity. This can be abused by focussing on the quantity rather than the quality of change (ibid, p.3), that is, being "seen" to change or improve quality. More seriously, Singh (2002, p.220) regarded it as a method of control in Education since "new and increasing forms of performance surveillance and control created by the evaluative state intensify teachers' never-ending experience of perpetual manipulation". The core of the problem is that this kind of process "is not based on trust, but on a deep suspicion of the motives and competence of teachers" (Apple, p.51 in Singh, ibid). This pressure can have corrosive effects on teachers' mental and physical well-being.

Reflexivity is integral to the ethnographic approach suggested in Badley's thoughtful notion of any teacher-researcher working towards becoming a "globally competent practitioner" (Badley, 2000, p.248). Sense-Making contributed to understanding the quality aspect of Reflexivity, by adding an element of humility to "self-conscious self-reflexivity" (Dervin, 2003, pp.144-145). Willig regarded reflexivity as one of two related features that differentiate qualitative methodologies, the other being the "role of language" (2001, p.10). She identified two types of reflexivity, "Personal Reflexivity" and "Epistemological Reflexivity"

and introduced a third important element, "Critical language awareness," which is integral to both types (ibid).

Personal Reflexivity involves "reflecting upon the ways in which our own values, experiences, interests, beliefs, political commitments, wider aims in life and social identities have shaped the research" (ibid), as well as reflecting on how the research may affect and change us personally and professionally (ibid). Epistemological Reflexivity involves considering how our research questions and design may define, limit and construct our data and findings, as well as reflecting on our assumptions and their implications for our research (ibid, p.11). "Critical language awareness" (Fairclough 1995, in Willig 2001, p.10) means that "the words we use to describe our experiences play a part in the construction of the meanings we attribute to such experiences." This is also clear in Critical Futures work (Inayatullah, 1990, p.117).

Reflexivity is relevant to this study because it explicitly addresses the role of the individual in making sense of his/her world, however "constrained" it may be. Sense-Making warns against stereotyping individuals on any simplistic basis such as age, gender, ethnicity etc. Stereotyping of minority students in particular, is common in the "shallow" Internationalisation approaches criticised in Chapter Two. Many teachers find comfort in a deficit approach because it is easier to label a group as a problem than to look for answers in teaching methodologies or in their own attitudes. Sense-Making specifically resists approaches that blame the victim and assume that the "information world of the expert is the requisite information world of each and every user" (Dervin, 1999, p.744).

Slaughter's critical futurist is reflexive in the sense of being "fully conscious of his/her immersion in and debt to particular sets of cultural resources" (2002, p.1). Sense-Making similarly challenged me as a researcher to explore my role in

generating and interpreting data. Part of my interviewer's role, supported by Sense-Making's interviewing protocol and its theoretical underpinnings, was to create a situation in which students felt comfortable to share, since "humans can and will talk about their confusions and stumblings if the dialogic interface is conducive to trust" (Dervin 1999, p.734). The mandated interviewing technique required "self-concious, self-reflexivity" (Dervin, 2003, p.144). This meant more than being conscious of my own positioning and my potential to control any interpretation. It meant accepting that I am also a struggling human sense-maker, who must be prepared to see my interpretations and understandings "humbled and tested in dialogue" (Dervin, 2003, p.145). Like other Sense-Making researchers, I found that the interviews helped me "appreciate people better and gave them new communicating skills" (Dervin, 1983, p.14). Critical Futurists also stress the need for "self-understanding", away from any assumed certainty (Slaughter, 2004, p.33). While I set out to support students' growth, I also grew, an issue I return to in Chapter Seven.

Reflexivity is a foundational element in Ehrenfeld et al's (1999) suggested model of teaching and learning. This group of four United States and Portuguese researchers were deeply concerned about the need for transformative change in universities in order to create sustainable futures. Rather than offering "services", they urged universities to provide "authentic experiences, defined as 'memorable' events that engage that person in an individual way, so that they determine and guide transformations" (1999, p.34). Their suggested model of "learning-in-action" explicitly addressed the development of norms as part of the learning process and tied this to a concept of sustainability in which responsibility is central" (ibid, p.33). This approach is consistent with Barnett's explicitly values conscious "reflexive capacity…a critical function bent on understanding, on

enlightening and on improving in every sense society and its changes" (1997, p.6). Both Sense-Making and CLA require this of researchers.

1.2.9 "Action Learning"

At an ontological level, the unit and this study fit within an Action Learning, values-based "paradigm", (Passfield, 1994) as I explain in Chapter Three. There are also pedagogical reasons why Action Learning has emerged from the literature as a relevant framework for this unit. Firstly, students were involved in "authentic assessment" activities. That is, each student was allotted to a diverse group faced with devising an engineering solution and writing a report on a real-life issue (1999-2002) or writing a literature review related to an aspect of the topic chosen each year (2003-2005). Action Learning "stresses the need for someone from a different culture to question our motives, repudiate our assumptions and to search our conscience" (Passfield, op.cit., p.23). The second challenge students faced was writing the Reflective Journals, which were difficult for most students, although for differing reasons. However, this common difficulty created an aspect of "comrades in adversity" (Revans, 1982 in Passfield, 1996, p.24), so they were more able take part in "development of self by the mutual support of equals" (Passfield, ibid). Finally, as a teacher and a researcher, I responded to Action Learning's challenge to "make a positive difference to our society, our workplace and our physical environment" (Passfield, 1996, p.26).

Two Australian engineering academics engaging with the1996 Engineering Review raised the questions, "What does it mean to be a 'professional engineer'" and what criteria do we need to use to judge the success of any engineering program? (Taylor & Johnston, 2001, p.2). In response, I identified three graduate visions that have proved useful in this study. These are expressed as *Globally Portable, Globally Competent* and my preferred version, *Globo sapiens.* They are the focus of the next sections.

1.2.10 Globally portable: *Homo economicus*

When I began teaching engineering students, I searched for a catch-phrase to persuade them that communication and culture were not "a waste of time" and "airy-fairy" as they (and some academic staff) put it (*Bo, Paris* interviews). *Global Portability* appealed because it linked to students' eventual employment and could therefore be "justified" to students and the faculty, as "useful." "Global education implies portable education for activity in a globalising economy" (Morris & Hudson, 1995, p.70). I used a list compiled from a survey of 3000 Chief Executive Officers in 10 Asian countries, for whom the top 5 of 16 "Most important qualities and characteristics" sought in potential employees were: "Leadership skills, Fluency in English, Ability to work with others, Depth of work experience and Communications skills" (Frankenstein, 1997, p.34). The last two qualities were "Good university degree" and "Specialized skills" (ibid).

However, I became increasingly concerned that portability denoted an end "product" in an unproblematic and unquestioned version of globalisation in which borders are porous in relation to the movement of capital and those able to create it, but resistant to anything considered irrelevant, such as refugees, social justice or equity. Moreover, I knew that the obvious or "denoted" meaning is the most accepted of many subsumed connotations. In this sense it operates as the confident, "superior myth" (Barthes in Silverman 1983, p.32).

Some of the hidden limitations of portability are connoted in the neo-Latinate term *Homo economicus,* or knowledge workers "who apply established intellectual and scientific skills in work geared to the ends laid down by the owners or controllers of large scale industrial and administrative complexes" (Sharp & White, 1968, p.15, cited in Kenway and Langmead, 1998, p.30). In this instrumental definition, workers exist to serve the needs of an economic system greater than

themselves. They "apply" their "skills" to "ends laid down" by their employers[11]. Moreover, the system both creates and serves such "needs."

In fairness, Australians Morris and Hudson (1995) actually referred to "planetary portable" education. Their broader concept recommended including history and geography in "basic planetary literacy" as part of a program to reduce Australian students' "racist and monocultural stereotyping" and the implications this would have for "internationally sensitive value education" (1995, p.73), which they suggested should link to ethics education, as we have done in BNB007. This kind of literacy alone will not necessarily bring about transformation. It can be interpreted as merely "learning what" in Ehrenfeld's terms, "factising" in Sense-Making terminology and reflecting at the "content" and possibly "process" level in Mezirow's terms. The missing dimension in such workers and in the term "global portability" is the *integration* of values, ethics and responsibility. Education may engage the head and the hands, but there is no heart. The affective domain is integral to CLA, Sense-Making and transformation and is discussed again in Chapters Five, Six and Seven. However, the addition of values marked a transition from "portability" regardless of purpose, to a more complex and appropriate interpretation of a second term, "Globally Competent".

1.2.11 Globally competent: *Homo globalis*

The search for a student descriptor with more depth led me to consider the concept of "global competence." What do we mean by global competence in any context, or whose global competence is it? This newer term also has a Latinate equivalent, *Homo globalis (global man) (sic)*. In Higher Education, the marketised approach described above has already "colonised" "Global Competence." For example, one US report into global competence urged colleges and universities to "actively seek partnerships with business and

[11] For an extreme, recent example, see Sterngold, (2003).

government to develop new forms of education appropriate to a global economy" (ACEFS, 1998). The authors saw a globally competent citizen base as essential to "America's future" and international education as an "agenda that can ensure America's ability to exercise world leadership is strengthened as the new day dawns" (1998, n.p).

The global dimension in this concept requires students adequately prepared "for the highly interdependent and multicultural world" they live in and will work in (Harari, 1992, p.53). What might "adequate preparation" mean? From global management perspectives a broadened perspective on corporate global citizenship was seen as useful mainly because of its potential for helping businesses avoid some of the risks of operating in a global market (Flournoy, 1994; Guirdham, 1999; Waddock & Smith, 2000; Sullivan & Tu, 1995). Adler & Bartholomew (1992) urged the development of globally competent students in line with seven skills identified for globally competent managers in a USA context as follows:

1. **A global perspective**—Managers must be able to focus beyond the concerns of a single country…
2. **Local responsiveness**—Managers must learn about multiple cultures "in so far as differences in technologies, laws, and customs influence the way business is conducted"
3. **Transition and adaptation**—Managers must be able to live in and adapt to other cultures
4. **Synergistic learning**—Managers must simultaneously work with, and learn from, individuals from multiple cultures.
5. **Collaboration—**In their contact with foreign co-workers, managers must be able to treat them as equals

6. **Cross-cultural interaction**—On a daily basis, managers should be able to use their skills to deal with managers of different nationalities
7. **Foreign experience**—as "a tool for career and organizational development" (Cited in Sullivan & Tu, 1995, pp. 473-474).

Obvious flaws in this list include the implication that foreign co-workers are not usually seen "as equals" (5), the deficit, problem-based view implied in the "deal with" managers (6) and seeing cultural knowledge as useful only when it serves personal and company ends (2).

More useful understandings of global competence include graduate attributes and the concept of graduates as citizens of a civil society (Annette, 2005; Crick, 2005; Nunan, George, & McCausland, 2000; Paranjape, 2000; Cox, 1995; Elson-Green, 2001; Oxford University, 1999). Lambert examined five components of global competence: knowledge, empathy, approval, foreign language competence, and task performance (1993 in Wilson, 1994). Wilson's more sensitive model identified three possible ways of defining Global Competence, in relation to American students:

1. Having attended specific courses and experiences, which is no guarantee of skills or qualities.
2. Describing the "end product" or the globally competent person
3. Attributes of global competence (Wilson, 1994, p.41).

The first represents a "tick the box" approach, which in pressured higher education environments, remains a popular response to institutional demands to show that, in line with policy, staff or students have been "made aware" of the issues. This does not usually offer time for reflection, which Wilson acknowledged was "critical" to the process (ibid, p.39). She also suggested that reflective journals are a good way to achieve this. In the second, Wilson adapted

a 1957 list of characteristics which reflected its era in its use of the exclusive "he", "his", "family of man" and references to the Cold War. It did however, include "empathy"; a reflexive element relating to "the strengths and weaknesses of his own culture" (sic); and an "awareness" of what unites rather than divides people (ibid, pp.40-41). Wilson expanded and up-dated this list to include "state of the world awareness, including awareness of human choices" and a values-based "commitment to working for a better world" (ibid, p. 41). In her third, preferred approach, Wilson built on research into students with international education exchange experience and translated the positive outcomes they identified into five attributes of global competence. She listed and explained these as:

- substantive knowledge
- perceptual understanding
- capacity for personal growth
- ability to develop international interpersonal relationships.
- ability to act as a cultural mediator (ibid).

Substantive knowledge. This includes a basic level of "knowledge of other cultures and languages" and a higher level of "awareness of world issues, global dynamics, and human choices" (ibid, p.42). These make spaces for global issues such as the environment and global health and should take discussion into a critical dimension.

Perceptual understanding. This has a basic level of "perspective consciousness – the recognition that one has a world-view not universally shared" (ibid, p.42). It can move into complex and critical thinking, defined as "an inclination to be discriminating and sceptical of stereotypes and a tendency not to accept things as they appear on the surface" (Hansel, 1983, p.7 cited in Wilson 1994, p.43), and into reflective thinking.

Capacity for personal growth. This includes "independence, autonomy and personal growth" (Wilson, 1994, p.43). Building on work into education as change or transition, Wilson rather apologetically made a case for including "personal as well as cognitive aspects" (ibid).

Ability to develop international interpersonal relationships. Having this capacity for personal growth leads students to the capacity for improved communication skills and better and new relationships (Kauffmann, Martin and Weaver (1992) cited in Wilson, 1994, p.44).

Ability to act as a cultural mediator. Two thirds of the exchange students studied used their enhanced qualities of "world-mindedness, self-confidence, and adaptability' into cultural mediation of various kinds in their work and personal life" (ibid, p. 44). These attributes provided a basis for forward thinking about "what our students should know and be able to do...in the 21st century" (ibid, p.48).

While helpful, Wilson's Global Competence is limited to a human-dominated vision, whereas Ehrenfeld (1993, cited in Passfield, 1996, p.15) called for "social transformation through integrity, honesty and recognition of our "evolutionary interdependence." Moreover, Wilson did not take the next step to the awareness that Globally Competent students imply Globally Competent teachers (Badley, 1999). So while these concepts were useful, the perceived gaps led me to develop the preferred graduate vision in this study, *Globo sapiens*.

1.2.12 Wise global citizen: *Globo sapiens*

This study contributes to a more explicitly values-based concept and vision, that of reflective, reflexive professionals united by a common sense of global responsibility. The term that best supported this was *Globo sapiens,* one of two

pivotal metaphors for this study, the other being "oasis." This section explains its origin and how I have limited its use.

Finnish futurist Pentti Malaska's original term, which I heard at the 1997 World Futures Studies Federation (WSFS) International Conference in Brisbane, was *"Global persona sapiens"* (Malaska, 1997*).* The Antipodeans at the 1997 WFSF conference found Malaska's full term too unwieldy and shortened it to *Globo sapiens*[12]. The term appealed immediately because it used the inclusive 'persona' (person), rather than "homo" (man). His more grammatical, neo-Latinate original saw beyond humankind, since it described the end product of a process by which new humans and non-humans would eventually coalesce into a new hybrid internet progenitor "Grandpa and Grandma Internet", a "global mind with superior intelligence and wisdom" (Malaska, 1997).

I limit my use and exploration of his term to the human branch, for several reasons. My study was grounded in a time and human-bound teaching reality. More significantly, "the future…emerges from the level, capability and integration of the consciousness that is creating and directing it" (Slaughter, 2004, pp.18-19). Thus any future, hybrid creature would share the defects of its human creators, many of whom would be engineers. I concluded that insights I offered into educating the human form of *Globo sapiens* could contribute positively to whatever futures, possible, probable, preferable, or plausible, await us and whichever form of consciousness may guide them.

[12] As reported to me (Lowe, Pers. Com., 2000).

Table 1: The attributes of three possible graduate visions

Globally Portable: Homo economicus	**Globally Competent: Homo globalis**	**'Wise' Global Citizen: *Globo sapiens***
Gendered - male	Gendered - male	Gender inclusive
Attributes	Attributes (subsumes those of Global Portability +)	Attributes (subsumes those of Global Portability and Global Competence +)
Leadership skills Fluency in English Ability to work with others Depth of work experience Communication skills Creativity (Frankenstein, 1997, p.34).	Substantive knowledge Perceptual understanding Capacity for personal growth Ability to develop international, interpersonal relationships Ability to act as a cultural mediator (Wilson, 1994)	S/he will be "…sensitive to the different ways we learn from each other and know the world" and "able to exercise imagination in order to "feel for and with the other" (Inayatullah, 2002), Brennan,2005) S/he will show evidence of global consciousness. S/he will be able to contemplate changes to their current way of life, rather than taking its continuation for granted. S/he will be capable of trans-generational thinking S/he will be a person of courage/ "Critical being" / "Parrhestiastes" (Foucault in Sidhu, 2003, 2006) S/he will work towards healthier futures, from personal to the spiritual. (Inayatullah, 2002)

I adopted and adapted Malaska's term in a higher education context, to mean graduates not simply with the skills and attributes of Global Portability and Global Competence, but with qualities and understandings that will prepare them to

engage in thinking, dialogue, multi-logues and action around preferred sustainable (critical and multicultural) futures. The core of this term is the quality and significance of "wisdom" itself. I explore some theoretical implications of this ostensibly simple word in Chapter Two, the Literature Review and develop the qualities of "wise" graduates as they emerged from the literature and were exemplified through student journals and interviews. These are presented in detail in Chapter Eight, but Table 1 (above) offers a summary of the attributes of these differing graduate visions for a preliminary comparison.

1.3 Research Question 2

I have now described the main terms and guiding concepts. This section introduces the second main question that the study set out to answer. Assuming that transformation in the sense I have defined above was a desired outcome, I needed to know what was happening to these students, and how it was occurring or being accepted, resisted or rejected. I had already tentatively identified three emerging categories as "Resisters", "Accepters" and "Converts." The qualities of these categories are described in detail in Chapter Five and the categorisation itself is problematised in Chapters Six and Eight. Exemplar journals are provided in Appendices 11-13). The search for appropriate methodologies led to the second major research question:

> *Are Causal Layered Analysis and Sense-Making methodologies complementary and useful in understanding paradigm shift or resistance to change as expressed through reflective journals and interviews?*

Answering this question contributed to further refinement of Causal Layered Analysis (Inayatullah, 1998); (Slaughter, 2002) through its methodological interaction with Sense-Making (Brenda Dervin, 2003) in a teaching and learning

context. I introduce these methodologies briefly below but give a more detailed description in Chapter Three.

1.4 The methodologies

How can one map transformative learning? There needs to be some comparison of meaning perspectives over time. Meaning perspectives "are made up of higher-order schemata, theories, propositions, beliefs, prototypes, goal orientations and evaluations" (Mezirow, 1990, p.2), the way we interpret experiences at different life and learning stages, and "the criteria for making value judgements and for belief systems" (ibid). Therefore I needed methodologies which could help me do this. CLA and Sense-Making were appropriate concepts and methodologies because their complementarities include a critical metatheory which guides their methods. Metatheory involves "philosophical assumptions about the nature of reality and of humans, about knowledge, and about observation" (Foreman-Wernet in Dervin, 2003, p.12). Their meta-views are based on inherent commitment to *levels* of understanding and to engaging with social and cultural diversity. They are appropriate methodologies for contexts in which students and academic staff are engaging in the difficult work of facing our respective areas of silence or contest. They are also relatively new concepts and methodologies and have not, to my knowledge, previously been used as complementary methodologies to help design for and to evaluate learning.

1.4.1 Causal Layered Analysis (CLA)

Causal Layered Analysis emerged from critical and epistemological futures work. CLA is both a new futures research method and a theoretical framework that offers a way of understanding better how the levels of empirical reality and cultural reality work together to produce our world-view. It analyses issues at four levels or layers, the Litany; Social Causes; Discourse/World-View and

Myth/Metaphor (Inayatullah 1998, p.820). This enables underlying discourses to be “shaped” as explanatory scenarios.

The Litany or Pop Futures level is the most common expression of problems or issues. It is often oversimplified, exaggerated, devoid of analysis and rarely questioned (Inayatullah, 2002, p.30). The Social Causes level identifies problems and short term causes (economic, cultural, political and historical) and offers practical responses, often based on policy or regulation. This is the focus of most futures work but it is deficient because it "lacks the depth and critical power to do much more than rehearse existing patterns and structures" (Slaughter 2002, p.14). The Discourse or worldview level delves deeper and more widely to show how "the discourse we use to understand is complicit in framing the issue" (Inayatullah 1998, p.820). The fourth layer, Myth/Metaphor, is usually ignored. "These are the deep stories, the collective archetypes, the unconscious dimensions of the problem" (Inayatullah, ibid). Slaughter uses slightly different terms; Litany becomes *Pop Futurism*, Social Causes becomes *Problem Oriented* and he combines the third and fourth levels of Discourse/World-View/ Myth/Metaphor into the term *Critical and Epistemological*.

Each level is significant and the aim is to identify and integrate analyses. Thus, CLA moves beyond deconstruction to reveal otherwise hidden ways of thinking and seeing the world. This can yield insights that can be used to *re*-construct any given problem or issue. The reconstructive aspect fits well with Mezirow’s concept of transformation and Ehrenfield et al's model of "reflexive learning," which, with Action Learning, informed the basis for desired outcomes for the students of BNB007. Using Causal Layered Analysis on the Reflective Journal data was intended to produce a meta-understanding of these processes and of the underlying metaphors and world-views driving student (and staff) learning and resistance in the unit during the semester. This enabled me to identify and

describe the education scenarios and futures allied to each of the three graduate visions, as depicted in Tables 29-31, Chapter Eight

1.4.2 Sense-Making (S-M)

Sense-Making is a meta-theory which guides a methodology and methods. It is important to note that "Sense-Making (capitalized), refers to the approach; sense-making (not capitalized) refers to the phenomenon of the making and un-making of sense" (Dervin, 1983, p.1). In the Sense-Making approach, information seeking and use are not seen as 'transmitting' activities, "but as 'constructing' activities – as personal creating of sense…. Information sharing is seen as the successive modifications of internal pictures of reality – a series of constructings and reconstructings" (ibid, p.5). Sense-Making informs many elements of the research process, especially the "designing" of interviewing as described in Chapter Three.

The next section explains how I saw my role as researcher in this study.

1.5 Researcher's role

The post-modern research role that most suits this kind of research is that of a "dialogic facilitator" (Blaikie, 2000, p.54). This aims to maximise chances for a "polyphony of voices"[13] (Fontana, 1994, p.214 in Blaikie 2000, p.54). The notion of "voices" is itself problematic, raising issues including "the contradictory and partial nature of all voices" (Ellsworth, 1989, p.312); the issue of power relationships; trust; the choice to stay silent and the fact that some "knowings", for example, indigenous knowings, are *not* open to be accessed in all forums (Jones, 1999; Jones, 2001). In the case of Australian Indigenous cultures, this is usually because the individual's right to know must be earned over time and by being "tested" and proven worthy to hold such knowings on behalf of a community.

[13] I realise that this is a tautology, since *polyphony* already means many voices.

Such respectful awareness is integral to a globally competent practitioner's socio-cultural competence.

The dialogic facilitator role provides another theoretical justification for my choice of methodologies, defined as "a general approach to doing research" (Silverman 1993, p.1, in Willig, 2001, p.8) and methods, defined as "a specific research technique" (ibid). Carspecken (1996, p.42, in Badley 2000, p.252) urged "dialogical data collection", meaning "conversing intensively with the subjects under investigation through interviews and discussion groups" as a democratic way of generating data "with people" rather than merely writing *about* them. Both Sense-Making (S-M) and Causal Layered Analysis (CLA) either demand this approach of the researcher, or open spaces for this to happen. Adopting this dialogic facilitator stance also requires the demanding feature of reflexivity, outlined above.

1.6 The role of Higher Education

Universities are a critical site of contest because they play a key role in creating any futures. There have been many international and professional body exhortations and allied pressure on tertiary institutions to work for desired sustainable futures. Since the 1990s in particular, there have been "urgent" calls from UNESCO, the International Association of Universities (IAU, 1998) and professional bodies, for Higher Education to prepare university graduates who can work effectively in national and international contexts. The IAU expressed concern about the important role universities play in contributing to globalisation through advances in knowledge and technology and through the graduates they prepare and who benefit from it. They saw curriculum as one of the "least visible"

but most fundamental of the dimensions of internationalisation of Higher Education (1998, p.3)[14].

These documents challenged universities to produce graduates who understand the huge social and economic changes facing the world and can work effectively *within* and *outside* their immediate environments to build sustainable futures. Sustainable futures and multicultural futures are linked since "sustainability is about community and connectedness at the core" (Ehrenfeld 1999, p.32). Appropriate pedagogies may help to create a global civil society in which "the paradigm of development" would ensure that "the basic needs of people are met under conditions of justice, equity, participation and sustainability" (Toh in Elson-Green, 2001, p.12). See also Annette (2005) and Crick (2005). While there is an expressed need for a variety of "approaches to learning how to navigate the transition" to sustainability (Kates & Clark, 1999, p.319), there is little guidance, support or recognition for tertiary educators trying to integrate this thinking into their teaching. This study aims to contribute to "the emergence of a new body of theory about how to ask integrative questions, acquire and integrate knowledge and apply that knowledge using adaptive approaches" (ibid, p.318).

Some resist even a leisurely debate, but others warn that changes will be forced on higher education by impending crises. Many agree that we are in a time of transition that may last two generations, during which time we must make progress towards sustainability if "interactions between the earth's human population and life support systems are not to significantly damage both" (ibid, p.3). See also Raskin et al, 2002; Paavola & Lowe, 2005; Eckersley, 2005. It may already be too late. "Whether or not ecological modernisation, including the

[14] They identified the others as Academic Mobility, Joint Study and Research programs, Development Cooperation, International Education as a Source of Revenue and International Electronic Communications.

emergence of new consciousness, norms and practices, is taking place at all or is occurring at a rapid enough rate to counterbalance the threats to sustainability is arguable" (Ehrenfeld et al., 1999, p.24).

Critical Futures Studies offered a way of understanding why current approaches may be insufficient and suggested ways of thinking, tools and techniques to help do better. "The ultimate purpose of futures work at this level is to open out productive mind-spaces, to design in-depth social innovations and to prefigure more advanced stages of civilized life" (Slaughter 2002, p.12). One of these more advanced stages is the realm of neo-humanism, a vision based on understanding human connectedness with and an interdependent relationship with Nature. An education on such principles would be doing very different things, as work by futurists Inayatullah, Bussey (2004), and Milojević (2000; 2004) shows.

1.7 Significance of the study

Using the concept of *Globo sapiens* as the focus of this research means that it is "productive" futures work, in Slaughter's sense (2004, p.45), since it contributes to envisioning and working towards sustainable, multicultural futures for humankind and the environment which sustains all life. Such work is acknowledged as demanding and profoundly radical (Ehrenfeld et al 1999; Passfield, 1996; Inayatullah, 1996), for various intersecting reasons. Firstly, it challenges the assumptions that Western civilisation and linear, profit-based models of unlimited development are the basis for one inevitable, universal, future. The concept of *Globo sapiens* calls for values and behaviour changes that are deeply threatening to some students, (as well as academics and administrators) on personal and/or professional levels. The ethical or values perspective is the point at which this study moves beyond and challenges much of the current Internationalisation rhetoric and practice.

This challenge is made more difficult by the common images of "pop futures" (Slaughter, 2002) which formed and sustain current and comforting but limiting world views. My paper *Futurelandia: Cuckoo in the Nest,* (Kelly 2002; Kelly, 2004) used Causal Layered Analysis to create a detailed analysis of how images can work in this way. Written as part of my methodological work, revised and republished several times, it illustrates how CLA intersected with and informed this study.

Secondly, this study contributes to the issue of what sorts of strategies and attitudes are involved in moving beyond multicultural tokenism to "actively incorporate "Other definitions" into our work with students", as Sardar urges. What kinds of support are useful? Can they cross gender and culture? How do we know if they are useful or successful? What do academics have to know, be and do to teach effectively? If Reflective Journals are contributing to a process of perspective transformation in one semester, can we learn something useful from this process to inform changes in Higher Education of the kind urged by UNESCO and the authors of the New Sustainability Paradigm among many others? Thirdly, as the issue of transformation became a stronger theme, some questions raised by Taylor became relevant. "When during the transformative process are supportive relationships most helpful? What do helpful relationships look like?" (Taylor, 2000, p.308) and "How [do] adult educators establish these conditions within classes that meet a few hours each week?" (ibid, p.314). I engage with these questions in Chapters Five, Six and Seven and some responses are included in Chapter Eight, the conclusion.

Fourthly, although this study is not primarily about Internationalisation and globalisation, the work took place in the context of and in active engagement with these pressures for change on Higher Education. This led to a subsidiary objective of this research: to identify and, through the emerging discipline of

Futures Studies, critically engage with intersections and links between globalisation, Internationalisation in Higher Education and education for sustainable futures, as they impacted on my study. These issues are considered in Chapter Two and revisited in the conclusion as policy implications of the research in Chapter Eight.

Fifthly, educators concerned about the increasing social and economic inequities in the 21st century and their ecological consequences, need to be willing and able to help students engage with complex, intersecting issues including globalisation, culture, environment, gender and sustainability. A number of engineering academics have expressed dissatisfaction with the limitations of globalisation and internationalisation as currently expressed, neither of which "address, in a sustainable way, the global technical, cultural and economic issues we need to face" (Johnston, 2001, p. 3). See also Ehrenfeld, (1999); Beder, (2005), Hood, (2005). Johnston was unequivocal. The engineering profession has "a fundamental ethical responsibility to assist in local, national, regional and global moves towards a more socially and ecologically sustainable society" (2001, p.5). Any course which aims to prepare students for this kind of world would include, as a minimum, the building blocks of cross-cultural communication and life-long learning. Effective internationalisation would therefore be an integrated, foundational element of any sustainable education program.

1.8 Conclusion and thesis overview

The Preface explained my "cultural resources" (Slaughter, 2002, p.1), that is, how this study flowed from the experience and knowledge I had acquired in various teaching areas and roles and from life. This introductory chapter has explained the context for this study, introduced and explained the key terms used in the study and offered a rationale for the study's significance. As part of answering the questions posed above, Chapter Two, the Literature Review, provides a discussion and

synthesis of the literature and concepts relevant to this study, as well as the gaps it intended to address.

Chapter Three foregrounds my world-view before briefly describing my debt to Grounded Theory. I then describe the context for the Pre and Post Questionnaires, the structure of the Reflective Journals and the journal topics. I next consider Reflective Journals as a method, including how I "scaffolded" learning through introductory activities, particularly the Peer Interview and the Personal Learning Agreement. I introduce the theory and practice of the Sense-Making Interview Process. The rest of the chapter describes the chosen methodologies and methods, Causal Layered Analysis and Sense-Making, offering the first analysis of some complementarities and providing a rationale for their appropriateness for this study.

Chapter Four introduces the data sources for this study, that is, the Pre and Post-Questionnaires, the Reflective Journals and the Sense-Making interviews. It describes them and explains why they were chosen and how the data was collected. It provides detailed evidence from the questionnaires. It also describes the diverse nature of the cohorts, the unit structure and the teaching strategies relevant to this study. The questionnaire evidence showed that changes in desired directions were occurring in students' attitudes to engineering and global issues. There were also indications that increased support for learning led to increased student retention.

In Chapter Five, Part One of a two-part Data Analysis, the Reflective Journals are used to engage with the first main question of this study "*What evidence is there that Reflective Journals are an effective pedagogical strategy for transformative learning outcomes in a vocation-based course such as engineering*?" The Reflective Journals from over 300 students from three cohorts (2001, 2002, 2004)

showed that as a strategy, they were effective at several levels. Firstly, they improved the often-criticised poor communication skills of domestic and international students in vocational fields. For many students, the process of reflection also became a means of learning about their learning or "metacognition". Some journals also indicated that "meta-reflection" and transformative learning did take place. At this deeper, longer term and more complex level, there are strong indications that this new self-awareness supported students to acquire "the social learning that will be necessary to navigate the transition to sustainability" (Ehrenfeld et al. 1999, p.27). I conclude Chapter Five by using two metaviews to assess the claims that transformative learning occurred through the journals. These are Rogers' model of Global teaching (1996) and a Causal Layered Analysis.

Part Two is presented in Chapter Six, in which I applied Sense-Making to the interview data to provide a deeper understanding of the process as well as to answer an implied aspect of the main research question, "If through BNB007, such learning was occurring, then *how* was it occurring?" The first section of Chapter Six focuses on two aspects of the Sense-Making metaphor, Gaps and Uses. The gaps in students' learning were expressed in the questions they asked. It is useful for others wishing to use Reflective Journals to know what these questions were, when they were asked and what issues particularly concerned them about the journalling process. The other aspect I considered was how students used the new meanings they created. This revealed some new "Help" categories which reinforced the findings from the journals that a transformative learning process was in train for many interviewees. As well as many "Help" categories already identified in previous Sense-Making research, particularly "got connected", the interviewees reported outcomes that I identified

as “got respect”, “got insight”, “got inspiration”, “got courage”, “got healing” and “got transformation”.

These outcomes confirmed the relevance of the qualities of *Globo sapiens,* which I list, with examples from student writing that clearly expressed the identified qualities. I conclude Chapter Six by explicitly addressing the criticisms made of such “soft skills” units by students and staff, using the interviewees’ own “before” and “after” comments to show that the teaching environment and strategies provided *precisely* the personal, academic and professional benefits about which students and staff were most dubious.

Chapter Seven, Researcher as Researched, revisits and analyses my actions methodologically, using metaphor analysis on my chosen metaphors, the Oasis and others, a mandated Sense-Making self-interview and interviews with four co-teachers, to gain other perspectives on my aims and how well I met them. This data illustrates the complexity I needed as a reflexive practitioner seeking to explore my role in generating and interpreting that data (Mason, 1996 in Blaikie 2000, p.55). From this point on it should be clear that the multi-faceted understanding of reflexivity described above informs and underpins every aspect of this study and the thesis that has emerged from it.

Chapter Eight concludes the study by drawing out some implications of the findings for further development of transformative pedagogy in Higher Education, sustainable education, Internationalisation of the curriculum in Higher Education, and consequent academic professional development. It also identifies some limitations of the study.

In the next chapter, I develop further some of the issues raised in this chapter, beginning with Transdisciplinarity.

While it may seem improbable, a transition to a future of enriched lives, human solidarity and a healthy planet is possible (Raskin et al., 2002, p. ix).

Chapter Two: Literature Review

> *[S]ustainability is a deeply cultural issue rather than a technical challenge, and therefore EFS [Education for Sustainability] must be transformative (Sterling, 1996, p.210).*

Introduction

This chapter expands the general overview of Chapter One, providing "a background and a context for this study and a bridge between the project and the current state of knowledge" (Blaikie, 2000, p.71). This study is not *about* globalisation as such, nor about internationalisation. It is one example of engaging with these concepts as part of a "transformative" (constructive, participative) mainstream pedagogy in Higher Education (Sterling, 2001; Apple, 2001, Singh, 2002). The findings therefore contribute to work around what *kinds* of globalisation and internationalisation are more appropriate for the 21st Century and how differing paradigms constrain or support them in Higher Education.

The Preface established my values base and Chapter One explained some reasons why values are critical in creating any sustainable alternative future (Barnett 1997, Brennan, 2005). Slaughter saw the growing attention to values and metaphor as evidence of a growing "congruence of insight" in response to global concerns (2004, p.11). This work is significant because the results of past and on-going "perturbations" of natural systems, on which growth-based globalisation depends, have emerged as major global issues if not crises. Increasingly well documented examples are Global Warming and its lesser

known corollary, Global "Dimming"[15], the growing oil crisis, water shortages, over-population and resulting loss of habitat and bio-diversity, the rise in carbon dioxide levels and a disturbed nitrogen cycle. Each of these issues is globally highly significant and all impact on the role of sustainable education in creating preferred, sustainable futures, an umbrella concept for this study. They will also impact on what we teach and how we teach it. However, they are not the topic of this thesis and detailed, recent literature is available and relevant to every educator (Steffen *et al.* 2004; Paavola & Lowe 2004; Archer & Beale, 2004; Coleman et al. 2004; Neilson 2005; Meadows, Randers & Meadows 2005; Millennium Assessment, 2005).

It was not possible to become an expert in all of the complex areas which have informed and re-formed this study. Despite the admitted limitations, transdisciplinarity's strengths helped to create the integrated engineering unit upon which the project was based, as well as the conceptual synthesis of this thesis. For this reason, transdisciplinarity introduces the following overview of the main concepts of this study. It opens the way to exploring the other core concepts, globalisation, Higher Education responses, internationalisation of the curriculum, reflection and transformation, the concept of "wisdom", sustainable education for sustainable futures, transmodernism and the role of metaphor, for which I give examples in later chapters. The chapter concludes with an introduction to the concept of transmodernism and a description of Rogers' global education model (1996), which I use as one of several final checks on transformation in Chapter Five.

[15] This term refers to the "protective" effect caused by particulates in the atmosphere. These reduce the amount of UV rays that would otherwise reach the Earth as a result of the thinning of the atmosphere's ozone layer – by pollutants released into it (Lowe, 2005, pers. com).

2.1 Core concepts

2.1.1 Transdisciplinarity

The term "transdisciplinarity" describes a recent and developing alternative to the reductionism which has been criticised as an unhelpful aspect of Higher Education.

> The cutting up of knowledge into a myriad of disciplines and sub-disciplines has led to an explosion of details about smaller and smaller parts of the world but at the same time to a serious diminishing of the ability to understand the whole (Ehrenfeld et al.,1999, p.6).

Transdisciplinarity aims at "embedding various streams of knowledge in one another and seeks to re-create integrated knowledge through doing this" (Somerville, 2000, p.285). Somerville criticised most current work claiming to be transdisciplinary as in fact interdisciplinary, which she contrasted as "parallel disciplinary activity" with "ethics as an 'add-on' after the 'real work'…is completed" (ibid p. 285-286). Her transdisciplinary approach called for "an integrated and integrating language" prepared to use literary forms such as "metaphor and narrative… to help us identify ethically important emotions and intuitions, to integrate what we know with what we feel, and then to critically examine, from the perspective of ethics, the knowledge that results" (ibid, p.286). Ramadier similarly saw transdisciplinarity as "at once between disciplines, across disciplines and beyond any discipline, thus combining all the processes of multidisciplinarity and interdisciplinarity" (2004, p.400).

Somerville's work is relevant since integrating affective and cognitive knowings and metaphor is central to Sense-Making and CLA methodologies and to transformative learning. I revisit metaphor in Chapters Three and Seven. The students' metaphors are considered in Chapter Five as part of the analysis of the

Reflective Journals. The next section explains why metaphor is a significant aspect of this study.

2.1.2 The role of metaphor

Metaphors are "the means of understanding something in terms of something else" (Bowers & Flinders, 1990, p.34). In transformative learning they are important "because they exert forceful, immediate, unobtrusive influence over our lives" (Deshler, 1990, p.310). In this study, the over-arching concepts of sustainable futures and sustainable education, are based on the core metaphors for "stable eco-systems…connectedness, community, and cooperation" (Ehrenfeld et al., 1999, p. 34). Futures thinking and CLA in particular, value metaphors as sources of understanding at a deep level and as potential barriers or bridges to change or growth. For Inayatullah, deconstructing conventional metaphors and articulating alternatives can be "a powerful way to critique the present and create the possibility of alternative futures" (Inayatullah, 2002 p.30). Metaphors are also part of any unlearning process because "Sometimes we have to emancipate ourselves from others' naming of the world before we can exert our own power to do so" (Deshler, op. cit., p.311).

Inayatullah consciously works at being a reflexive futures practitioner and encourages workshop participants to identify metaphors based in their own cultural experiences. Working in this way creates spaces for rich cultural differences and varying preferences for visual or storytelling metaphors (Wildman & Inayatullah, 1996, p.728) which may have been swamped by the mass media's current limited and limiting repertoire. Analysis may also lead to *retaining* an original choice of metaphor, but with a deeper understanding of its implications and potential impact, as my example the *oasis* shows in Chapter Seven. The "oasis" (Boud & Walker 1998, p.7/14) was a term that represented an ideal environment that I was trying to establish for the students in BNB007. Close

analysis certainly illustrated the complexity involved in finding common ground beyond the surface layers of culture.

> One of the challenges of multiculturalism, pluralism and, indeed, globalization is to find a language and vocabulary that will cross the boundaries of religion, ethnic and national origin, and culture, and capture the profound shared realities of the human spirit that can give meaning to our lives (Somerville, 2000, p.286).

Engineering writers have also argued for challenging Western mythologies that emphasise "controlling nature" with "cautionary" mythologies, or replacing them with mythologies in which "humans and nature collaborate" (McIsaac & Morey, 1998, p.115). Given the pervasive influence of the dominant "control" mythologies, this work is necessary across cultures. It is a familiar understanding for Indigenous Australians (Sharp, 2005, p.18) and other indigenous peoples. Tao's recent work on Confucian values offered insights about "reciprocity and care" (2004, p.76) that could enlighten any sustainable future[16]. These examples illustrate the important cultural work of "reappropriation" of language "colonised, exploited and corrupted by capital" (Singh, 2002, p.229). He cautioned that any alternatives suggested must be seen as "wiser" than those they seek to replace. Alternatives also need to be heard or visible, which is difficult given the dominance of Globalisation in its current form.

2.1.3 Globalisation

"Globalization…is a unitary phenomenon with an array of reinforcing economic, cultural, technological, social and environmental aspects" (Raskin *et al.*, 2002, p.5). While not a new phenomenon, what is new is the "scale, scope and

[16]. The People's Republic of China (PRC), whose decisions are critical to any sustainable future for the planet, has already adopted a metaphor from its cultural past, "The Five Balances", to guide its next Five Year Program (2005). This is at least a formal commitment to a more healthy vision than unlimited "development" along Western lines. See Worstall, (2005) for actions being taken towards sustainability in the PRC.

complexity“ (Cornwell & Stoddard, 1999, p.125). It is “not only a process but also a discourse, defining, describing and analysing that process”, with “neo-conservative ideology” as the “most prevalent influence in this debate“ (Riggs in Cornwell & Stoddard, ibid, p.126). Moreover, the current version of globalisation, based on “growth” without limits as “an unquestioned norm”, (Slaughter, 2004, p.67), is backed by the economic, technological and military power of the West, particularly the United States of America.

Dating from the 1980s, Raskin et al (2002) identified five main aspects of global transition to a new Planetary Phase emerging out of the Modern Era. This current phase, based in the various elements of globalisation, is about twenty years into its predicted 100 year cycle. They explained the urgent need for a transition to a healthier paradigm and identified three very different world views in relation to it. These were “the evolutionary, the catastrophic and the transformational”, for each of which they developed several possible and self-explanatory global scenarios (ibid, p.9).

1. **World View: Evolutionary.**
    a. Scenarios: Conventional Worlds: 1) Market Forces, 2) Policy Reform;
2. **World View – Catastrophic**
    a. Scenarios - Barbarisation: 1) Breakdown, 2) Fortress World
3. **World View: Transformationist**
    a. Scenarios – Great Transitions: 1) Eco-Communal 2) The New Sustainability Paradigm.

Their work is useful in making clear where various choices will lead the world. Problems associated with the Conventional Worlds scenarios are illustrated by the two different models below.

The dominant "*Pig-headed*" model (Figure 1) is driving the Market Forces paradigm (Lowe, 2005, p.125). In this model, the economy is the main circle, with Society and Environment seen as two minor, subsidiary circles with only minimal influence. It implies that any problems encountered in Society and Environment will be solved by economic means. In CLA terms, solutions are limited to the instrumental or social problems level. By contrast, the *View from Space* (Figure 2) changes the perspective by highlighting a paradigm in which the economy is innermost, existing as a wholly-owned subsidiary of the second concentric ring, "Society", which itself is contained within the Earth's natural eco-systems, the outer ring, "Ecology" An alternative descriptor for this model is "Eco-nested" (Inayatullah, 2005, pers. com.). This repositions and reinforms the economy so that it is no longer the main driver, to the detriment of all other elements, or at worst, a black hole into which all resources vanish. It takes a more sustainable position as one important sub-set within the ecology.

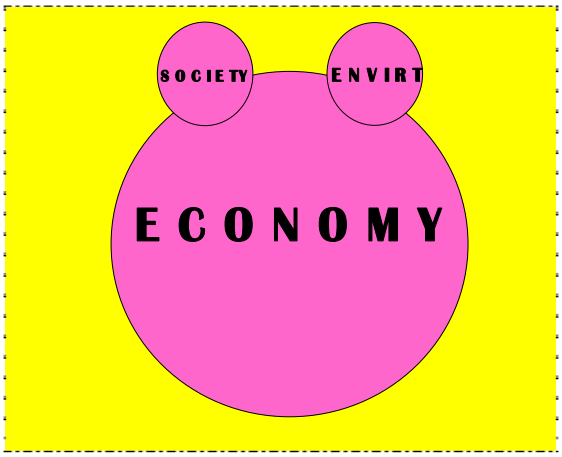

Figure 1: "The Pig-Headed" model (Lowe 2005, p.125)

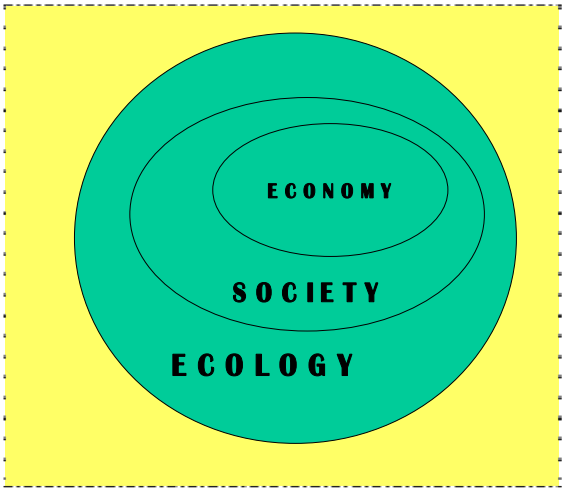

Figure 2: The View from Space model (Lowe, 2005, p.125)

2.1.4 Higher Education responses

Calls for universities to respond actively to identified and emerging global problems have been growing since the early 1990s, (ULSF 1990; UNESCO, 1997; IAU 1998, PCAST, 1998; OECD-CERI, 2004) with little obvious impact to date. For example, in 1998, it was already regarded as

> imperative that higher education offer solutions to existing problems and innovate to avoid problems in the future. Preparing future leaders and citizens for a highly interdependent world, requires a higher education system where Globalisation promotes cultural diversity and fosters intercultural understanding, respect, and tolerance among peoples. (IAU, 1998, p.1)

Wright (2002) analysed a series of international university agreements, beginning with the Stockholm Declaration of 1972, all of which identified the leadership role that higher education should play at all levels, local, national and international. The mandate of UNESCO's International Commission on Education for the twenty-first century was to reflect on "the major turning-points in human development on the eve of the twenty-first century and the new demands these…will make on education“ (Delors, 1998, p.254). The most relevant of their

six underlying principles to the overarching area of sustainable, educational futures is number five:

> while existence of a wide variety of economic, social and cultural situations clearly calls for differing approaches to educational development, all approaches must take into account basic and agreed-upon values and concerns of the international community and of the United Nations system: human rights, tolerance, and understanding, democracy, responsibility, universality, cultural identity, the search for peace, the preservation of the environment, the sharing of knowledge, alleviation of poverty, population control, health. (ibid, pp.254-5)

Since "[K]nowledge and knowledge creation is an inherently social process" (Rooney & Hearn, 2000, p.92), change takes time and work in this space is recent and radical. Authors such as Inayatullah (2000), Spies, (2000) and Sterling, (2001, 2003) have challenged the knowledge that universities produce and the students that they educate, seeing these as helping to *cause* and perpetuate current problems. "[T]he basis for university development should center on finding solutions for the complex problems that were produced by two centuries of rampant reductionism in thought and in scientific development" (Spies, 2000, p.28).

Alternative economic approaches to growth have been proposed. US economist Daly (2004, p.16/17) detailed a steady-state economy based on the "wholeness" metaphor of ecology. He warned that "unless the physical, the social, and the moral dimensions of our knowledge are integrated in a unified paradigm offering a vision of wholeness, no solutions to our problems are likely" (ibid).

Education generally, is a site of struggle. I took a critical perspective in *engaging* with intersecting aspects of globalisation and internationalisation as they emerged in the context of teaching first year engineers. Schoorman regards this

perspective as a "counter-hegemonic" approach to Internationalisation which moves beyond the current education system to "facilitate a knowledge base, skills and attitudes among students that prepares them for work and leadership in the context of global interdependence" (2000, p.5).

The hegemony it challenges is "the limited range of cultural perspectives represented in the curricula, instructor-dominated pedagogy that values passive, unquestioning learning behaviour" and education whose purpose been subordinated to "narrowly defined economic and instrumental conditions" (Aronowitz & Giroux, 1991, p.118 cited in Schoorman, ibid, p.5). Speakers at a recent Independent Scholars Association of Australia conference expressed strong concerns about the threats posed to the hard-won public domain and the ever-vulnerable concept of 'public good' by "free market barbarism of all against all" and "incessant marketisation" (Marquand cited in Wood, 2004, p.37). In responding to economic globalisation, universities are "linked more to the market and less to the pursuit of truth" (Stromquist & Monkman, 2000, p.14)[17]. Others have articulated this criticism (Lowe, 1992; Cain & Hewitt, 2004). Johnston, an engineering academic, warned that three ideological constructs, "globalisation, economic rationalism and corporate managerialism" are playing an increasing role in defining work not just for professional engineers but for universities generally (2001, p.2).

The problem with this, as critics of rationalised, corporatised and marketised universities point out, is that in becoming an industry, universities are fast losing their role in "providing a public service with intangible social benefits, as a source of enlightenment, and as a contributor to the critical, cultural, aesthetic and liberal democratic sensibilities of the state" (Kenway & Langmead 1998, p.30). See also

[17] The Higher Education Funding Council for England (HECFE, 1996, p.6, in Elliott, 1998, p.33) summarised the purposes of Higher Education as "civilisation, developing, storing and transmitting knowledge; meeting the needs of the economy and industry; serving the aspirations and needs of students; serving local and regional communities; *HE as a tradable activity"* (italics mine).

Cain & Hewitt, 2004). Not only have Higher Education institutions become a central part of modern society, but "their role has shifted from being a *reflection* of social, cultural and economic relationships to being a *determinant*" of them (Sadlak, 1998, p.106) (emphasis in original). Sadlak felt that the growing role of science in all aspects of life would increase this trend. However, this may also have had a positive effect, as is evident in alternatives such as Sustainability Science and the recent Millennium Assessment report (2005).

I concur with Sterling's comment that concerned educators are driven by a combination of "frustration with mechanistic education and by awareness of the real needs of people and the planet" (2001, p.62). Many realise that global issues call for more innovative approaches to solve them than the narrowly specialised certainties which helped to produce them (Lawrence & Depres, 2004, p.398). These tensions also create "trying times" (Singh, 2002, p.221) for educators wanting to contribute to the "transformative learning process" of creating an "alternative sustainable education paradigm" (Sterling, 2001, p.11).

Globalisation continues to be expressed in Higher Education through changing approaches to Internationalisation. The next section offers a very brief summary of Internationalisation in Australian Higher Education and how it intersects with this study.

2.1.5 Internationalisation and Higher Education – rhetoric and practice

Higher Education is widely regarded as always having had an international dimension, beginning with the wandering scholars of mediaeval Europe. Scott (1998, p.126) saw this as a convenient myth, since the majority of universities are not ancient but the creations of modern nation states, funded to serve national, rather than international purposes. Although the university is an age old institution, "Three-quarters of the extant universities…have been established

since 1900, half since 1945“ (Scott, 1998, p.122). The Internationalisation of Higher Education has been well documented in the USA (Knight, 1995; Ellingboe, 1999), and in Australia (Sidhu, 2003, 2006; Patrick, 1997; Smart, Volet, & Ang, 2000; Rizvi, 1998, 2000; Welch, 2002). Knight (1995, p.9) identified three phases in international education since World War Two ended in 1944-5. Phase One was the immediate post-war period with a "strong, idealistic connotation of peace and mutual understanding”. Phase Two**,** 1950-85, was marked by North-South relations dominating, with students going to the North and faculty and funds to the South, with the “negative effect of brain-drain and the positive effect of better understanding and knowledge.” Phase Three was “the end of communism and the superpower hegemony, emphasising on (sic) economic arguments to promote international cooperation and exchange in higher education“ (ibid).

In Australia the history of Internationalisation is commonly seen in two periods, the “Education as Aid” period, which lasted from the 1950s to the mid 1980s and the “Education as Trade” period, initiated in response to two Commonwealth Committees of Enquiry. Both were initiated by the Liberal (Conservative) Fraser government but reported to the Hawke (Australian Labor Party) government in 1984. The practice of Full Fee Paying Overseas Students, (FFPOS) was introduced by John Dawkins, Federal Minister for Education in the Hawke government.

The “trade” aspect of Internationalisation was clearly and critically assessed in Sidhu’s detailed work on the marketisation of higher education, which examined five country case-studies in detail, the UK, the USA, Australia, Singapore and Brazil (2006). Sidhu analysed the discourses that selected universities used to “sell” education, their genealogy and how they positioned international students and international education. She concluded that “the primary rationale which informs international education in the exporting nations is national interest to

secure competitive advantage“ (2006, p.297). Only the focus varies between countries. For the United Kingdom and Australia, where the main aim is earning money, international students are “objects of trade”, whereas in the USA they are seen as “human capital” who can advance America through the “global talent race” and through promoting America’s interests overseas (2003, p.310). The combination of serving national interests, combined with “neoliberal governmentality has steered universities into imperializing and instrumental expressions of international education” (Sidhu, 2003, p.285)

The question then arose, what might an alternative framework of values and practices *be* in undergraduate engineering education and whose version of a changing world was driving the skills and literacies the teaching team sought to develop? My work was informed by a more complex understanding of internationalisation of the curriculum, expressed at a theoretical level as “a framework of values and practices oriented towards the politics of difference as the basis for developing the necessary skills and literacies for a changing world” (Rizvi & Walsh, 1998, p.11). Such a definition challenges the predominant view of Internationalisation since it highlights “a worrying tendency for the global reach and impact of engineering to be mainly based in North American and European perspectives” (Johnston, 2001, p.2).

According to critics of Internationalisation, Higher Education needs to respond more effectively than current expressions of Internationalisation of the curriculum, which mainly consist of cosmetic tinkering with curriculum and offering students cultural electives or travel as a ”fraction of their study program for the tiny elite that can afford it” (Carter, 1994, p.51). This is important work, because regardless of whether students stay in their home country or work abroad, 21st century graduates can expect to work in increasingly socially and culturally

diverse environments (Gale, 1997; Crowther, Joris, Otten, Nilsson et al., 2000[18]). I explained my concerns in relation to Internationalisation of the curriculum earlier (Kelly, 2000). One concern related to assumptions in the rhetoric that cultural diversity was a synonym for an internationalised curriculum. I knew from reading and experience that much more was involved.

There is good evidence, from Australia (Biggs, 1999; Volet & Ang, 1998, 2000; Chen, 2002) and from the USA (Mestenhauser & Ellingboe, 1998), that increased diversity on campus does not, of itself, lead to students mixing and learning from each other. Despite this, the official rhetoric of Internationalisation uses this as a main publicity attraction (Sidhu, 2003, 2006). Moreover, one-off lectures on "diversity", although useful catalysts, cannot pose a sustained challenge to dominant groups or to dominant discourses (Volet & Ang, 1998; Smart et al., 2000 ;Biggs, 1999; Rizvi & Walsh, 1998; Harari, 1992). This was evident in feedback we received in the 1998 precursor unit to BNB007 when our only input was an introductory lecture based on group work. As reported in the following excerpt from a previous paper, some students thought introductions were unnecessary and the negative comments were similar[19].

> *"It helped to introduce me to people within my course: the group is no more diverse than the real world. Discussions like these create racism"*
>
> *"Personally, I enjoyed it, but I can work with, and speak to most types of people anyway. I don't think that people should need to be taught to work with diverse groups. They should treat everyone equally"*
>
> Such comments really indicated that activities that do include all students, may threaten some Australian students' power base.

[18] " 'Internationalisation at Home' means the knowledge and attitudes about international relations gained at the home university by the majority of students who will not be able to study abroad" (Nilsson, 1999).

[19] Anonymous comments from class evaluations.

> It meant they had to share a space that they are accustomed to dominating in thought, word and deed. They were asked to abandon stereotypes and begin to deal with each other as peers and equals, just as they will in the work place. This culture shift was uncomfortable and they resented it. 'I treat everyone the same', really means 'I don't need to question whether my behaviour is appropriate' and silences the questions, 'How do you treat everyone?' and 'How do you know if this is appropriate?' (Kelly & Messer, 1998, p. 4).

Smart et al.'s (2000) research confirmed Volet & Ang's (1998) findings that the lived experience for most domestic and international students in our universities is learning "in parallel streams…with little or only superficial contact and interaction" (2000, p.9)[20]. Moreover, it seems that in both Australia and the USA, "patterns of self-segregation are more prevalent among white students, contrary to widespread reports of this pattern among students of color" (Smith, 1998, cited in Firebaugh & Miller, 2000, p.30. Smart et al. (2000) warned that this has led to "disillusioned" international students returning to their home countries with a degree, but little real contact within or real understanding of the host culture.

These authors expressed their concern in terms of economic consequences, because dissatisfaction can "damage future recruitment and export income." They continued, "If our central mission is to prepare Australian and international students for a global workforce, then it is crucial that they better understand each other's cultures, learn to communicate, socialise and work together and to network" (Smart et al., 2000, p.10). This education "*for* a global workforce" [emphasis mine] can signal an instrumental use of multiculturalism not as an 'opening up' of knowledge but as a strategic advantage. "Tertiary institutions in Australia now see it as their duty to export unregulated neo-liberal market

[20] This was also true of my campus experience as a language student in Greece in 1980.

rationality, enterprise culture and techniques of corporate governance around the globe“ (Singh, 2003, p.230).

Simply accepting that students need new or expanded technological and communication skills in order to be more globally portable is a shallow vision. It is encapsulated in the criticism that “the economic/technological engine of Western society is more interested in providing information to produce smooth functioning (efficiency, effectiveness, productivity) than knowledge to promote questioning, critical individuals“ (Robottom, 1993, p.47). This is allied to increasing pressure to “vocationalise” the curriculum in response to identified workplace needs and to “produce” employable graduates for a global marketplace. In the haste to respond to industry, the societal values or ethical dimensions of generic attributes are often missing or underdeveloped.

There has been little noticeable response to Volet and Ang’s (1998) related research conclusion that academic staff are responsible for creating environments which support cross-cultural communication, or to research showing that genuinely inclusive or, preferably, responsive teaching is good teaching for *all* students (Biggs,1999; Heath, 2000). Inclusive can simply imply a centre prepared to tolerate or admit a periphery whereas "responsive" allows for "reciprocity...the development of a two-way flow of ideas and values between communities" (Barnett, 1994, p. 20).

Under current funding arrangements, Australian universities have come to rely on income from international students. The fear of declining international student numbers may be enough to create support for improved approaches. A more compelling reason should be that all students deserve the personal and cultural benefits that a mix of domestic and international students could and should provide (Smart, 2000, p.10). “Opportunities for serious engagement of diversity

in the curriculum positively impact racial attitudes, interactions among students of different racial and ethnic backgrounds, cognitive development, and institutional involvement" (Smith, 1997, in Firebaugh & Miller, 2000, p.30). This positive finding was supported by Antonio et al.'s research (2004, p.507) at Stanford University, which

> found that conditions of racial diversity increased integrative complexity – as, to a lesser extent, did the presence of a student whose opinions on the topics under discussion were at odds with those of the other participants.

The critical factor is "serious engagement", since the most advanced phase of responding to diversity in the curriculum is far more than a course in anti-racism or broadening of an existing course. It is a transformation of the curriculum, including those who teach it. Seen from this point of view, Internationalisation of the curriculum must move beyond

> merely representing cultural diversity to… the creation of new learning spaces in which the politics of difference in relation to histories of knowledge and power can be explored, in which the dominant values and other competing values can be interrogated and in which new patterns of identity formation, meaning and representation can be negotiated. (Rizvi & Walsh, 1998, p.10)

There is evidence for an emerging fourth phase of Internationalisation, towards a more globalist and less market-based approach. This study seeks to extend the concept of public good that mark this emerging phase. The findings related to appropriate pedagogical processes are summarised in the concluding chapter. This phase involves more than global portability or even global competence and could advance beyond the concepts of "sustainability professionals", (Raskin et al., 2002) to graduates who have a "permanent capability" for change (Slaughter, 2002) or *Globo sapiens*. My approach is similar to the third of three rationales

identified by Schechter (1993), as the "pragmatic, liberal and civic" (in Schoorman, 2000, p.7). In the "civic" model, "internationalisation efforts are seen as the means to facilitate among students a sense of caring, as citizens of a globally interdependent society, whose goals would be to make the world a better place for all its citizens" (ibid).

Such qualities are integral to the "fundamental changes in our values and national social institutions" (Lowe, 1998, p.1) that we need in order to create sustainable futures. This study showed one way that value-based generic attributes can emerge from and contribute to a more thoughtful and integrated process of internationalisation and a more equitable concept of globalisation. This led me to consider the contested concept of sustainability itself, particularly in relation to Higher Education in the 21st century. This is the focus of the next section.

2.1.6 Sustainability: What does this mean and how is it relevant to this study?

The term Sustainability was defined in the Brundtland Report (WCED, 1987, p.8) as meeting "the needs of the present without compromising the ability of future generations to meet their own needs". It has since been co-opted by many discourses to mean various and sometimes incompatible things. Wals & Jickling's eleven understandings of sustainability, below, offered a useful summary and at various points in this study, most of these different emphases have influenced my work.

> "Sustainability as (socially constructed) reality (and as such a phenomenon to be taken seriously).
>
> Sustainability as ideology and therefore political.
>
> Sustainability as negotiated, the result of (on-going) negotiations.

> Sustainability as contextual, its meaning is dependent on the situation in which it is used.
>
> Sustainability as vision to work towards.
>
> Sustainability as a dynamic and/or evolving concept.
>
> Sustainability as controversial and the source of conflict (both internal and with others).
>
> Sustainability as normative, ethical and moral.
>
> Sustainability as innovation or a catalyst for change.
>
> Sustainability as a heuristic, a tool-to-aid thinking.
>
> Sustainability as a (temporary) stepping stone in the evolution of environmental education and of environmental thought" (2000, p.127).

The surrounding debates can be seen as healthy and positive because "participation in such a dispute is an excellent opportunity to learn about a highly relevant, controversial, emotionally charged and debatable topic at the crossroads of science, technology and society" (ibid, p.123). Ehrenfeld et al. (1999), an international team writing in an engineering context, suggested a practical model of "reflexive learning in practice", which "explicitly addresses the development of norms as part of the learning process and ties this to a revised concept of sustainability in which responsibility is central" (1999, p.1). Their understanding of sustainability requires "radical changes in the University" (ibid) and in "the way we think and act" (ibid, p.11), if humankind is to survive.

Sustainability is a possible way of living or being in which individuals, firms, governments, and other institutions act responsibly in taking care of the future as if it belonged to them today, in equitably sharing the ecological resources on which the survival of human and other species depends, and in assuring that all who live today and in the future will be able to satisfy their needs and human aspirations (ibid, p.12).

Their use of the key word *responsibly* returned "a normative dimension to economics", casting "the actor (agent) as much more than a utilitarian maximiser" (ibid). It is significant that they also widened the definition to include other species, on which we depend.

They also argued convincingly for engaging critically, in a deep and constructive sense, with sustainability as a driver of change, but not as an exclusive "aim" or "product" which could exclude alternative evolving ideas. In response, I changed the title of this thesis from the prescriptive "using Reflective Journals to prepare engineering students able to contribute *to* sustainable futures", to the more open and reflexive connotations of "able to *engage with* sustainable futures". "If the integration of sustainability in higher education is closely connected to the development of emancipatory qualities, it will need to provide students with a way of understanding and transforming the complex world of which they are part" (Wals & Jickling, 2002, p.125).

Sustainable futures. As the study progressed, it became clear that what lies beyond internationalisation involves "the struggle…over the character of globalization in the coming decades" (Raskin et al., 2002, p.69). The group known as Sustainability Scientists have warned that the "global transition" has already begun (Raskin et al., 2002, p.ix)[21]. We are determining its outcome by our individual and collective human actions since "Every day we do things that make some futures more probable and others less likely" (Lowe, 2005, p.22). Raskin et al. (op. cit., p.*x*) asserted that the responses to the need for sustainable development since the 1992 Earth Summit have simply "muted the symptoms of unsustainability". Nothing less than a "New Sustainability Paradigm" will bring about changes on the scale needed. This is a "push" for change. Sustainability

[21] "Sustainability Science" is dedicated to highlighting the "integration, uncertainty and the normative content of socio-cultural problems" (Kates et al., 2001).

Science's "pull" towards change is "a positive vision of a civilised form of globalization for the whole human family" (ibid). Their suggested new model "would challenge both the viability and desirability of conventional values, economic structures and social arrangements" and its success will depend on major agents of change acting synergistically, "intergovernmental organizations, transnational corporations and civil society acting through non-governmental organizations and spiritual communities" (ibid). This in turn requires "wide public awareness of the need for change and the spread of values that underscore" their vision (ibid, p.2).

Young people are obviously essential to this because they are "a huge demographic cohort whose values and behaviour will influence the culture of the future" (ibid, p. 53) positively or negatively. The authors described the current values driving Market Forces and Conventional Worlds' trends as "shackles on humanity reaching its full potential" (ibid, p.55). Seen in this light, profit-driven interpretations of Internationalisation of the curriculum serve and justify unsustainable forms of Globalisation. This has resulted in growing dissatisfaction, expressed across disciplines and national boundaries. Daly identified one cause.

> "Growthmania" is an insufficiently pejorative term for the paradigm or mindset that always puts growth in first place, the attitude that there is no such thing as enough, that cannot conceive of too much of a good thing. (2004, p.1)

It is unfortunate that the term "sustainability" has been linked with words such as "growth", "consumption" and "development", which have caused many of the problems. This has led to "technocentric environmentalism…. Notions of sustainability developed from this values base cannot contribute to long-term solutions to environmental problems" (Chapman, 2004, p.9). Sustainability

Scientists have suggested that a more appropriate ethic is “interconnectedness,” based on responsibility for “the well-being of others, nature and future generations” (Raskin et al., 2002, p.56). Accepting this ethic challenges education and educators “to develop appropriate methodologies, train a new cadre of sustainability professionals and build institutional capacity” (ibid, p.57). This puts a further onus on institutions of higher education “to encourage, support and professionally reward this kind of research” (ibid).

Support in this sense implies that an institution has understood the need to change and has made a commitment to a changed paradigm along the lines suggested above. These writers are among many seeking to redefine a role of the university as a conscience, as public intellectual and with a social justice dimension. This is radical because it challenges the current discourse of the corporatising university. It "calls for imagining new grounds whilst destabilising old forms" (Heath, 2000, p. 44). See also McLaren, 1995; McLaren & Fischman, 1998; Cain & Hewitt, 2004; Sterling, 2001, 2003; Lowe, 2005. Challenging the education system of which we are an integral part, is not for the faint-hearted. We need

> to be honest; to expose the contradictions and myths in our culture, to call injustice injustice, to identify lies as lies and to call a spade a spade. This is difficult, unpopular and painful and requires courage and endurance, moreover it calls for action (Chapman, 2004, p.11).

In terms of the critical tradition, this research takes the critical theory path to post-structuralism and critical futures studies.

One new framework: the New Sustainability Paradigm

> Sustainability provides colleges and universities an opportunity to confront their core values, their practices, their entrenched pedagogies, the way they program for student learning, the way

> they think about resources and allocate these resources and their relationships with the broader community (Wals & Jickling, 2002, p.129).

Values change underpinned this project and formed the basis of a new framework for drawing these threads together. This led to asking what a model for values change might be. Because values are culturally conditioned, they are "neither inherent nor inevitable" (Raskin et al., 2002, p.55). These authors depicted cultures as existing on a values continuum ranging from antagonism, individualism, and materialism at one end to tolerance, solidarity and a concern for deeper meaning at the other (ibid). So the values transition required by their suggested New Sustainability Paradigm (NSP), for example, would "alter wants, ways of life and behaviours" (ibid).

This brings it into conflict with the dominant Market Forces paradigm and those who depend on it and perpetuate it. However this study fits within the third strand of a "research" pathway called for by Sustainability Science in that it is research into "ways of promoting the social learning that will be necessary to navigate the transition to sustainability" (ibid, p.4)[22]. This statement is still problematic as it assumes sustainability as an *end product* rather than a process.

Fien's work in the relatively new area of working for sustainability in higher education was useful because he supports an eclectic selection of methodologies as appropriate to the diverse and complex nature of the issues (2002). He considered the relative merits of the empirical-analytical, interpretive, critical, and post-structuralist approaches in researching sustainability in higher education before suggesting that the most appropriate world-view for this area is the emerging "ecophilosophical" as argued by (Robottom and Hart, 1993). This

[22] The Sustainability Science workshop took place in October, 2000, at Friibergh Manor, Orsundsbro, Sweden.

> …encourages individuals to be autonomous, independent, critical and creative thinkers, taking responsibility for their own actions and participating in the social and political reconstructions required to deal intelligently with social/environmental issues within mutually interdependent and evolving social situations (cited in Fien, 2002, pp. 51–52).

In the UK, the Crick report (2000) paved the way for a "civic renewal" program involving "social and moral responsibility, political literacy and community involvement" (Annette, 2005, p.329) in which Higher Education should be playing a major role (Crick, 2000b, p.145, in Annette, ibid, p.333). Deakin, Crick et al. (2002, 2004 in Crick, 2005, p.365) identified seven dimensions of "learning power", which they defined as "a complex mix of dispositions, values and attitudes that characterise effective learners". These are based on "learning identities, learning stories, learning capacities and learning relationships" (ibid, p.366). Crick cautioned that this kind of learning requires us to (re) engage with language that can express character and virtues, rather than the language of "accountability", which cannot "nourish and refresh" in the ways this kind of education requires (ibid).

2.1.7 A role for Engineering

In an increasingly globalised world, the group most likely to be interacting with international others, and making decisions about futures, sustainable or not, are university graduates in various professional areas. Engineers are seen as particularly influential, through the impact they continue to have on so many key aspects of the global environment (Johnston, 2001; Beder, 1998; Lloyd, 2001; Ehrenfeld et al., 1999). Graduates could also work as much needed "agents of change" (Singh, 2002). To do this they need more than fluency in the languages of flexibility, adaptability, change and multiple perspectives. These fluencies need to be grounded in a reflexive sense of global responsibility and civic

awareness (Ehrenfeld et al., 1999; Elson-Green, 2001; Wisker, 2000; Wood, 1991).

Clear messages to this effect have emerged from numerous global conferences. These include the International Transdisciplinary Conference, Switzerland, 2004 and the International Conference on Sustainability Engineering and Science, New Zealand, 2004. An Australian conference, "Science and Ethics: Can Homo sapiens survive?" was unequivocal, warning that "civilisation as we know it will not survive beyond a few decades unless there is a radical change in human culture, from a society driven by pursuit of material wealth to one focused on human well-being" (Fenner, Boyden, Green, Glikson & Clark, 2005).

The increasing evidence should persuade academic staff and university managers that these *are* issues in that "real world" for which they believe their courses are preparing students and which they assert as a main driver or "push" for the courses they teach. The most likely, if not the most appropriate response, will be the rapid creation of ad-hoc, add-on courses in "Sustainability" which will attract publicity and funding and show that faculties are "responding" rather in the same way as universities responded to Internationalisation. Eckersley identified hope for the future as resting on "crucial developments" such as

> a potent synergy between scientific and spiritual understandings of the world and life; our unprecedented potential as individuals to make our own moral choices and to accept responsibility for our choices and the evidence that the necessary cultural changes are already taking place (2004, p.255).

For example, a business recruiter at the 2004 New Zealand conference, claimed that many of the best and brightest graduates already want to work for companies that understand the triple bottom line and are making genuine efforts towards sustainability. (The "quadruple" bottom line goes further, adding Future

Generations to economy, society and the environment). There were examples of such decisions in the Reflective Journals and the interviews, described in Chapters Five and Six. Up to 50% of graduates in some North American institutions now wear a green ribbon at graduation as a symbol of their pledge to try to improve the social and environmental aspects of their work-places (Parkin, 2005). Pressure to change is spreading[23].

Engineering intersects with Internationalisation and Sustainability because International students are a significant presence in already culturally diverse Engineering cohorts in Australia and all engineering students should benefit from an Internationalised approach to curriculum design. "If engineers are to be leaders and facilitators of sustainable development, they will need to be broadly knowledgeable and capable of negotiating among a diversity of approaches, cultures, and values" (McIsaac & Morey, 1998, p.111). US engineering, by contrast, was reported as mainly "comprised of males of Northern European descent" (ibid). This led to what these authors described (after Triandis, 1994) as a "tight" culture, "suspicious of outsiders and relatively intolerant of deviation from accepted norms" (ibid, p.114). This is not compatible with sustainability, which thrives on connections and transdisciplinarity. This in turn requires effective and sensitive communication, including between and among cultures.

Changing to such a "loose" culture is not easy, but challenges to the "tight" culture continue. In Australia, some engineers have phrased their criticisms as questions:

> Are engineering people to continue as technical functionaries, doing the bidding of masters imbued with the ideologies of

[23] Australian Business schools were criticised in a recent report as "a long way from international best practice" in relation to education about "sustainable development" (Lane, 2005, p.32). Consequently, five "top business schools" have "begun working out how they can build the concept of sustainability into MBA courses" (ibid).

> economic rationalism, or will they contribute to a renewal of civil society and take responsibility for the social and human, as well as the technical and economic, consequences of their work? (Lloyd et al. 2001, p.170).

More recently, the Deputy Chairman of Engineers Australia's College of Environmental Engineers criticised the lack of response in the decade since the 1997 Review of Engineering Education in Australia. He queried "how education is preparing our graduates to face the coming crises…and have we achieved the cultural turnaround called for ten years ago? I don't think so" (Hood, 2005, p.2). Further, he warned that the publication of "Climate Change" (2004) and the MA report (2005) "pose a particular challenge for engineering, and are a call for us to rethink the whole culture of engineering education and practice" (ibid, p.1). This moves the discussion to what is involved in cultural turnaround and rethinking, or transformation. Understanding the complexity of this process and its associated vocabulary is an essential foundation for engaging with the data in Chapters Five and Six in this study.

2.2 Transformation

I did not begin by studying Transformative learning, but the observed changes in student attitudes in the Reflective Journals led to the work of Mezirow and Taylor (2000) on Transformation theory. This study meets an expressed need for more empirical research in this area by contributing to the limited number of "personal descriptions of various processes of transformative learning" (Taylor, 2000, p. 287).

> Transformative learning refers to the process by which we transform our taken-for-granted frames of reference (meaning perpectives, habits of mind, mind-sets) to make them more inclusive, discriminating, open, emotionally capable of change, and reflective so that they may generate beliefs and opinions

> that will prove more true or justified to guide an action (Mezirow, 2000, p.8).

It is regarded as the highest level of learning because it is "deeply engaging and touches and changes deep levels of values and belief through a process of realisation and re-cognition" (Sterling, 2003, p. 94, in Crick, 2005, p. 361). In a formal education setting, "Transformative learning is not a private affair involving information processing; it is interactive and intersubjective from start to finish" (Mezirow, 1990, p.364). Moreover, it "involves a particular function of reflection: reassessing the presuppositions on which our beliefs are based and acting on insights derived from the transformed meaning perspective that results from such reassessments' (Mezirow, 1990, p.18). It may also involve what he described as "correcting distorted assumptions, epistemic, sociocultural, or psychic – from prior learning" (ibid) or 'un-learning'. Mezirow identified ten phases of meaning, which if clarified, often lead to transformation. These are:

1. *A disorienting dilemma*
2. *Self-examination with feelings of fear, anger, guilt, or shame*
3. *A critical assessment of assumptions*
4. *Recognition that one's discontent and the process of transformation are shared*
5. *Exploration of options for new roles, relationships and actions*
6. *Planning a course of action*
7. *Acquiring knowledge and skills for implementing one's plans*
8. *Provisional trying of new roles*
9. *Building competence and self-confidence in new roles and relationships*

10. *A reintegration into one's life on the basis of conditions dictated by one's new perspective (Mezirow, 2000, p. 22).*

These are not to be regarded as a series of compulsory linear steps, but according to various studies, are now seen as part of a "recursive, evolving and spiralling" process of perspective transformation (in Taylor, 2000, p.290). Actual transformation occurs at the third or "epistemic" level of Kitchener's three levels of cognitive processing. At level one, we "compute, memorise, read and comprehend" (1983, p.230 cited in Mezirow, 2000, p.4). Level two is "metacognition," at which point we can "monitor" our own progress and products as we engage in these first level cognitive tasks. The third level, "epistemic cognition emerges in late adolescence although its form may change in the adult years" (ibid, p.5). This level explains "how humans monitor their problem solving" when they face, as the students in this study did, problems with no "absolutely correct solution" (ibid). As the highest level, "epistemic cognition" involves reflecting "on the limits of knowledge, the certainty of knowledge and the criteria for knowing" (ibid). For this reason, it is "often an intensely threatening emotional experience in which we have to become aware of both the assumptions undergirding our ideas and those supporting our emotional responses to the need to change" (Mezirow et al., 2000, pp.6-7).

Learning to make meaning depends on our meaning structures or "frames of reference". Mezirow defined these as having two dimensions, "Meaning Perspectives" and "Meaning Schemes" (1994, p.223). Meaning perspectives are "broad sets of predispositions resulting from psychocultural assumptions which determine the horizons of our expectations" (ibid, p.224). These occur through three sets of codes which shape and limit us. Sense-Making theory rejects the powerlessness connoted by the word "limit" and would use "constrain" instead. The codes are:

- *Sociolinguistic codes (Social norms, ideologies)*
- *Psychological codes (personality traits, repressed parental prohibitions which continue to block ways of feeling and acting)*
- *Epistemic codes (learning styles, preferences, holistic versus reductionist approaches)* (ibid).

Our meaning perspectives create and are manifested in specific Meaning Schemes, which comprise the second dimension. Meaning Schemes are the "sets of "expectations, beliefs, feelings, attitudes and judgements" that "determine what we see and how we see it" (Mezirow, 2000, p.18). They are expressed as our points of view. "Transformative learning pertains to both the transformation of learning schemes through content and process reflection and the transformation of meaning perspectives through premise reflection" (Mezirow, 1991, p.117). At this point, there are three levels of reflection, content, process or premise (ibid, p.224). Premise reflection usually involves asking "Why?" or seeing alternatives. Although there is a human inclination "to resist learning anything that does not comfortably fit our meaning structures" (ibid, p.223) we have a parallel need to understand it. So, within our "limits" (Mezirow) or "constraints" (Dervin, 2003, p.143), we move "toward viewpoints which are more functional; more inclusive, discriminating and integrative of our experience" (Mezirow, 1991, p.223).

Mezirow identified two paths to perspective transformation, *"incremental* or a progressive series of transformations in related points of view" (2000, p.21) and "*epochal",* the sudden and dramatic changes that offer

> a profound insight into the premises or suppositions which have distorted or limited our understanding, often triggered by a disorienting dilemma, and involving a broader view of the origin, nature, and consequences of our actions (Mezirow,1994, p. 230).

Another important aspect of Transformation is "reframing" since transformative learning can occur through either "objective" or "subjective" reframing (Mezirow, 2000, p.23). Objective reframing has important links with Action Learning as described in the next section because it "involves critical reflection on the assumptions of others encountered in a narrative or in task-oriented problem solving" (ibid). "Subjective reframing involves critical self-reflection of one's own assumptions about the following:

- A narrative – applying a reflective insight from someone else's narrative to one's own experience
- A system - economic, cultural, political, educational, communal or other…
- An organisation or workplace…
- Feelings and interpersonal relations - as in psychological counselling or psychotherapy
- The way one learns, including one's own frames of reference…" (ibid).

Mezirow defined Reflective Discourse as a "specialized use of dialogue devoted to searching for a common understanding and assessment of the justification of an interpretation of belief" (2000, p.10). This search for "collaborative thinking" is not supported by the current "dominator" culture, or "argument culture" (Tannen in Mezirow, 2000, p.11). This is based on "winners and losers," rather than searching for common ground while allowing for dissenting views (ibid). The educator's role is to help:

> learners to become more aware of the context of their problematic understandings and beliefs, more critically reflective on their assumptions and those of others, more fully

> and freely engaged in discourse, and more effective in taking action on their reflective judgements (Mezirow, 2000, p.31).

Gaining access to "the meaning schemes and perspectives of the subjects of the research" is a main problem "facing researchers who want to study transformational learning" (Mezirow, 1991, p.221). Open ended interviews and learning journals are regarded as accepted research methods for doing this (ibid, p.224).

2.2.1 Reflective journals and transformation

Kember et al. (1999) were Hong Kong based researchers, working with undergraduate students from various health professions. They wanted to use Reflective Journals but could find no evidence of any widely accepted procedure for "determining whether reflection took place or at what level" (1999, p.19). They considered other reflection models, before building a scheme based on Mezirow's (1991) criteria of reflective thinking. They presented their coding categories for reflective thinking in the form of a hierarchical diagram with the categories being, in order of importance from the lowest to the highest, Non-Reflective (habitual action; introspection and thoughtful action) and Reflective (content reflection, process reflection, content and process reflection and the highest level, premise reflection. (1999, p.25) as depicted in Figure 3 below.

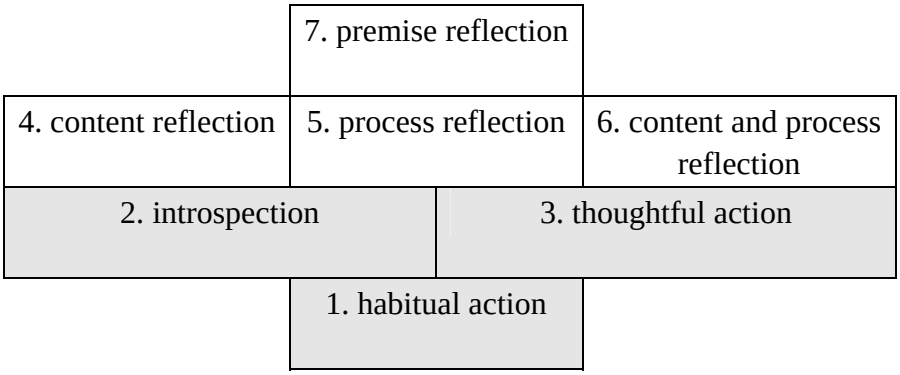

Figure 3: The coding categories for reflective thinking (Figure 1, from Kember et al., 1999, p.25)

They detailed their method and invited further testing in "authentic contexts" to see if it proved useful "as a means of determining whether the various teaching and learning strategies for encouraging reflective thinking are succeeding" (ibid, p.29). The Reflective Journals of BNB007 are an authentic context. Kember et al. felt that "premise reflection" was "unlikely to be observed frequently" in student journals because "for writing to be coded as premise reflection, there needed to be evidence of a significant change of perspective" (ibid, p.24). "Premise reflection" is regarded as the highest level of Reflective Thinking since it is through this that "we transform our meaning frame-work as it opens the possibility of perspective transformation" (ibid, p.33). In assessing their Reflective Journals, they "categorized according to the highest level of reflection shown by the student" (ibid, p.28).

As they summarised Mezirow's reflective thinking, reflective action differs from non-reflective action. Non-reflective action consists of "habitual action, thoughtful action and introspection" (ibid, p.20). Habitual action is an action learnt so well that it is performed automatically, so it is not relevant in this context. Thoughtful action they summarised as a "cognitive process", which "makes use of existing knowledge" without questioning "pre-existing meaning schemes and perspectives" (ibid, p.21) They classified "Bloom's taxonomy categories of knowledge, comprehension, application, analysis, and synthesis" (ibid) within this category as well as most of our daily professional work.

Thoughtful action is "cognitive" but "introspection lies in the affective domain" (ibid, p.21), because they are "thoughts and feelings about ourselves" that remain "at the level of recognition or awareness" (ibid) and do not "re-examine or test the validity of prior knowledge" (ibid). The affective level is important as feelings need to be expressed and students supported to "turn their emotional response into a positive learning experience" (ibid, p.22). Significant for this project, recent

studies collated by Taylor (2000) showed that feelings, including anger and resentment, are a critical aspect of any transformative process. Unless any person can acknowledge and express their feelings, they cannot begin to leave "past resentment" behind in order to engage with new realities and begin "critical reflection" (ibid, p.291). This helps to explain why an effective reflective process must be well-supported and mentored. I return to Kember et al.'s work in relation to the data in Chapter Five.

2.2.2 Resistance

I have written elsewhere (Messer & Kelly, 1997; Kelly & Messer, 1998) of the resistance the team experienced from Engineering students when we introduced new learning approaches. The issue of oppression and control in relation to transformative teaching is a serious one. This is addressed methodologically in Chapter Three and is revisited in the conclusion as part of the responsibility of the globally competent practitioner. There has to be a "fit" between our methodologies and our approach since "discourse always reflects wider patterns of relationship and power" (Mezirow, 2000, p.11). In relation to learning environments, Mezirow summarised the bases needed for learners' effective participation as:

> More accurate and complete information
>
> Freedom from coercion and distorting self-deception
>
> Openness to alternative points of view: empathy and concern about how others think and feel
>
> The ability to weigh evidence and assess arguments objectively
>
> Greater awareness of the context of ideas and, more critically, reflectiveness of assumptions, including their own
>
> An equal opportunity to participate in the various roles of discourse

> Willingness to seek understanding and agreement and to accept a resulting best judgement as a test of validity until new perspectives, evidence, or arguments are encountered and validated through discourse as yielding a better judgement (2000, pp.13-14).

There was also a conflict between some students' idea of an engineering curriculum and the personal learning approaches we were using, particularly the core strategy, Reflective Journals. These formed a useful reference for assessing my aims to improve the "fit" and to establish a learning "oasis" as described in Chapter Seven. Ernest (1995) offered another possible reason for resistance (in Beveridge, 1997, p.36). Post-formal thinking is mature adult development and some students may not yet have reached this level in their thinking. The indicators of "post-formal" thinking relate to openness to new thoughts, willingness to accept ambiguity, etc. It may be even be gender-linked with "men being more stuck in an absolutist view of knowledge" (ibid).

2.2.3 Reflective Journals

Reflective journals are not new but are seldom used in an engineering context, particularly at undergraduate level. One criticism from staff and students of using Reflective Journals with First Year engineers was that this was too "soon" and it should be left to the final year. I maintained that, on the contrary, it was vital to begin it early in order to develop skills and while students were in a transition stage where they were more open to new approaches. Palmer (2000) introduced Reflective Journals as one of a range of assessment activities trialled in a final engineering unit. In that study, support for Reflective Journals as an activity dropped during the semester. What was missing was the element of support for the journal process. Other researchers acknowledged problems arising from lack of appropriate support (Boutin, Thibault et al., 2002). This indicated lack of preparation and/or lack of understanding of Reflective Journals, since they were

not aware of this need when they began using the strategy and had therefore not built it in.

The support we built into BNB007 was grounded in my TESOL and staff development understandings. Lack of formal teaching qualifications remains a general problem in Higher Education although there are increasing pressures for lecturers to acquire them. Several Australian universities (Monash, Deakin, University of Canberra) are mandating a formal teaching qualification for academics new to university teaching. Under current working conditions, this is often seen as just another burden on already pressured lecturers. In this sense, this study contributes to practical knowledge for teachers as well as support for courses to prepare academics appropriately for increasingly demanding teaching and curriculum development roles (Boud & Walker, 1998, p.11/14).

The literature concerning Reflective Journals showed that, although they should be used with care, they have the potential to support and assess transformation, as well as contributing to improved communication skills. One acknowledged problem was that "Deeply reflective writing and understanding does not come readily to graduates of our schools and universities" (Bolton, 1999, p.204). For those unfamiliar with it, it can be “alien and daunting” and the process is acknowledged as “problematic and complex” (Maloney & Campbell-Evans, 2002, p.40). Criticisms included the student complaint that it is time consuming and that it can be misused by lecturers for oppression and control (Teekman, 1999). Reluctance to reflect can be seen as part of a general “hurry sickness” that “underlies a widespread malaise as the Western economic paradigm intrudes into one of the rest of the world’s most sacred areas, the ability of the individual to reflect” (Gleick, 1999, cited in Tonn, 1999, p.1).

Others reported that the complexity and labour-intensive aspects of some journalling processes would make it impractical for a class of three hundred plus (Arredondo & Rucinski, 1994). Atkins & Murphy, (1993) reviewed literature from a nursing perspective and found three topics into which student Reflective Journals fall when students were given an open brief. These were managing feelings, processing content and controlling the learning environment. They also raised the idea of Post-formal thinking and its links to maturity and gender; and the widely observed tension between the pressure for journals to be assessed and avoiding such detailed criteria that they destroy students' creativity and spontaneity (Boud, 1998).

Beveridge (1997) confirmed positive effects on self-esteem, as did El-Hindi in researching the use of Reflective Journals in a pre-university course with students who were considered at potential risk of failure (1997). Fisher's social psychology students reported that journal assignments helped them to relate the course material to everyday life, and almost fifty percent reported that the journals had helped their self-understanding (1996). In terms of international relevance, there were also reports from various Asian countries on using Reflective Journals successfully (Yoo, 2001;Wong, 1995). Tuan and Chin (1999) reported dramatic changes in teachers' perceptions regarding the Nature of Science as a result of journalling. This is relevant in the light of the diversity of the BNB007 cohort, which includes many students from various Asian countries, particularly Singapore, Taiwan, India and the PRC.

Against this complex background, the first major research question concerned using Reflective Journals with first year engineering students for desired outcomes at varying levels, including ultimately, transformation. I chose this teaching and learning strategy because I believed it would meet a variety of needs for these students at this time. As I explain below, these needs were on

various levels, and all were important, although to different constituencies. They included basic competencies including written and oral communication skills, metacognitive thinking skills and supporting the perspective change needed for transformation of paradigms. Walker and Finney (1999) reported a more sophisticated understanding of issues and a growing self-awareness from post-graduates required to engage in reflective writing as part of a mandatory generic and transferable skills module in a Masters of Research degree. "Rigorous inquiry into, and consideration of one's own experience in relation to what is implicit and considered largely self-evident can put significant pressure on the set of conceptions that provide a framework for interpretation of that experience" (ibid, pp.535-6).

In responding to these expectations at differing levels, I identified desired student outcomes in this study at two levels, Competencies, and Abilities and Qualities.

Competencies:

Enhanced oral and written communication skills (Burrows, NcNeil, Hubble & Bellamy, 2001)

Enhanced intercultural communication skills and understandings.

Abilities and Qualities:

A “learning ability towards sustainable societal development” (Ehrenfeld, 1999, p.2; Maloney & Campbell-Evans, 2002)

A “permanent capability to create viable forward views” (Slaughter 2001, p.5)

Movement on a continuum from critical thinking to critical being, to critical action (Barnett, 1997).

I saw that all these qualities and capacities eventually coalesced into an overarching values-based, reflexive capacity to function as wise global citizens -

Globo sapiens. I explain below what I meant by these competencies and qualities.

Competency 1: Enhanced written and oral communication skills. Developing communication skills is a core responsibility of an internationalised education. A growing body of evidence from a variety of countries demonstrated that Reflective Journals are one significant strategy for enhancing content learning and improving metacognitive skills in varied cultural and learning settings (Maloney & Campbell-Evans, 2002; Tuan & Chin, 1999; Boutin et al., 2002). Metacognitive skills "refer to the capacity of students to interrogate their own learning styles" (Barnett, 1997, p.71).

I identified over seventy articles, from 1991 onwards, relating to using Reflective Journals in a variety of areas and countries in a variety of disciplines including mathematics, nursing, engineering and particularly education (Angelova, 1998). Useful findings included the differing writing conventions that pose difficulties for students operating in a second or other language and bringing multiple social, academic and social perspectives. Engineering cohorts in Australia are extremely diverse (Johnston, 2001) and writing is perceived as a problem for and by many students. Previous findings offered useful insights for supporting, critiquing and (re)designing the Reflective Journal process. For example, Beveridge (1997), working in Mathematics, offered a good historical overview of why reflection is a good pedagogical strategy and supported the strategy of students reflecting on their reflections, which I adopted in Semester 2, 2002 as the theme of the final journal, with positive responses.

In ideal conditions, Reflective Journals could be the foundation for a planned, developmental, critical thinking program that would become more open and collaborative each semester of a course. Students would be encouraged to write

more freely using increasingly more demanding techniques. These could include stream of consciousness, response to a critical incident and group discussions (Bolton, 1999) or using "patchwork texts" (Scoggins & Winter, 1999, p.488). The last strategy requires students to respond to a variety of texts, share their reflections and then review their work to find a theme which they make sense of "within an interpretive reflective framework" (ibid). As Walker and Finney urged "the development of skills and knowledge can occur in an integrated and synergistic way" (1999, p.532). These authors moved critical thinking in research and pedagogy to include Gallo's (1994) dimensions of "empathy and imagination" (ibid, p.533). All these approaches assume scaffolded learning, formative assessment and experienced, skilled markers who can respond with tact and empathy to any problematic issues that emerge.

Competency 2: Intercultural communication skills and understandings. This competency marks another fundamental intersection with the issue of Internationalisation of the Curriculum in Higher Education. I referred earlier to highlighting cross-cultural skills as useful only in so far as they help business succeed rather than as issues of personal growth. This approach is part of a "selective, token multiculturalism" rather than "genuine engagement with other cultures and the other sets of values and purposes that they embody" (Slaughter, 2004, p.73). Engagement is not easy because it is both a strategy for learning and a space in which to learn. It often demands unlearning, re-learning and coming to terms with usually hidden issues such as race privilege and oppression of various groups. It is important to create opportunities for "shared talk" between and within groups (McClaren cited in Jones, 1999, p.307). Jones made the critical point that dialogue does not simply involve making spaces for the "other," but ensuring that the other is "heard" since the dominant group is used to hearing

only itself. It is they who are excluded from the experiences of the marginalised by their own inability to hear (ibid).

Teaching intercultural communication skills intersects with the broader issue of what sort of world we are teaching students *for?* Regardless of what country students are in, whether they stay at home, travel or meet in cyber-space, very few will be able to avoid the "other" whoever that "other" is in their context. "Every one is someone else's Other" (Gentile in Ellsworth, 1989, p.322). All groups are capable of insensitivity to other populations, within and outside their own countries. For example, Australia is not the only country beginning to think about what it means to live respectfully with Indigenous peoples and learn from their wisdom, if they are generous enough to share it. The broader issue is how can our work support the personal development of each student in relation to concepts such as courage, global awareness and responsibility, intercultural understanding and racism resistance?

2.2.4 Abilities and qualities

A "learning ability towards sustainable societal development" (Ehrenfeld 1999, p.2; Maloney & Campbell-Evans 2002)

As noted earlier, Ehrenfeld et al. (1999) provided a useful, direct link between sustainability, reflective thinking, engineering education and the role of universities in the 21st century. Universities need to help students go "beyond" technical know-how to a "learning ability towards sustainable development". They proposed a model of "Reflexive learning in practice" to achieve this.

They criticised previous approaches, contrasting content-focused traditional "learning-by-learning" or "learning what", with "learning-to", which is observable improvement in "competence" to perform. A focus on "learning-what" resulted in disinterest or even lack of ability to understand anything beyond one's limited sphere of knowledge or expertise, so that "taking care of the world becomes

someone else's problem" (p.9). While they did not challenge the concept of "growth", they were concerned that we have a lot of knowledge but "its application has led to consequences that may be threatening our very world" (1999, p.6). They also engaged with the broader concern that the service role of universities has broken down under pressure from dominant forms of political economy. Orr went further to criticise a "whittled-down version of education" useful to societies "whose interests are well served by a docile, but technically competent, public, otherwise unable to think critically or to act as citizens" (in Sterling, 2001, p.7).

Ehrenfeld et al. (1999) acknowledged both potential resistance and the huge changes involved for universities. Since "Universities produce knowledge and educate students… they must take some responsibility for the unintended negative results, particularly environmental and social stresses" (ibid, p.3). Moreover, this kind of learning assumes positive outcomes of any action, ignoring the unintended consequences that the preferred alternative "precautionary principle" does take into account.

They suggested instead, a "learning in action" or "learning-by-living" model in which the university learning experience would be a microcosm of "sustainable thinking, norms and practices" (p.33). It would provide students with disruptive experiences to stimulate reflexive thinking as well as teachers who could "coach" how to do this and "mentor" students through the experience. This addressed Taylor's concern that individual-focused change theory may neglect the positive and negative influences of context and the "effect of teachers or role models in speeding up or slowing down the individual's change" (2005, p. 9).

An ability to be part of a new cohort of "sustainability professionals" at a global level (Raskin et al., 2002, p.56)

Ehrenfeld et al. (1999, p.2) urged as a preferred alternative, even if only a pragmatic one, that "the university should plan its strategic positioning facing the needs of society, which include rapid and unforeseeable changes in the structure of the employment market, and the need to furnish its graduates with new skills beyond purely technical ones, in particular the "learning ability towards a sustainable societal development." This may be seen as level three of four progressive levels of learning put forward by Sterling, (2001, p.11) as responses to the challenge of sustainability, that is a "reformatory response (reflective adaptive learning, paradigm modified)." He, like Ehrenfeld et al. (1999) concluded that the highest level is the "transformatory response, (critical and creative learning, changing paradigm)" (ibid). It is to this level that this study aims to contribute. David Orr referred to the "Great Work" (Berry) of equipping a generation able to "respond with energy, moral stamina, enthusiasm, and ecological competence" as "*the* challenge of education" (in Sterling, 2001, p.9).

A "permanent capability to create viable forward views" (Slaughter, 2001, p.5)

The work of Raskin et al. (2002) was useful in clarifying various global futures. However, it neglected the critical area of *how* individual humans would develop the "higher order moral, cognitive and other capabilities" needed in order to understand the problems we face and to take action for positive change (Slaughter, 2004, p.234). This is work at the inner level of human and global development. Slaughter summarised work by Hayward (2003). Hayward used Loevinger's (1987) stage development theory to argue that the capability of any organisation to understand future implications is as good as the individual capabilities of any member of that organisation. This also seemed to depend on Schumacher's concept of "adequateo", (1997 in Slaughter, 2004, p.69) where "there must be some capacity in the knower that is adequate to that which he/she

wishes to know." In terms of stages, Hayward asserted that the capacity for foresight only emerged when the individual became Self-Aware, a state with qualities I discussed under the heading of Reflexivity. He labelled several previous stages as "pre-foresight". He considered that the ability to appreciate multiple possibilities and being able to be self-reflexive evolve together, which supported our aims in challenging students to move out of personal and intellectual comfort zones.

He also identified higher stages. The "Conscientious" is characterised by "powers of self-evaluation, self-criticism and self-responsibility" at which point "conscience" is fully developed (Hayward, 2003, in Slaughter, ibid. p.233-4). Beyond that are shifts from formal to post-formal foresight in which the individual accepts contradictions and conflicts as part of the complexity of life and another "Integrated" level which transcends acceptance (ibid). Transformation of this kind requires stimuli and support not found in many organisations or educational environments and adds complexity to the need for "active" engagement and active spaces as called for in Barnett's model of critical development (1997).

Movement on a continuum from critical thinking to critical being, to critical action (Barnett, 1997) Why is a permissive space insufficient?

"Finding one's own voice and expressing it – in thought and in action - requires the moral virtues of courage, independence and persistence" (Barnett, 1997, p.173). He argued that a "critical space has to contain the three orientations of "epistemological space, personal space and practical space" in order for students to develop critical perspectives (ibid). Moreover, students must be *actively* encouraged, a "permissive space" is insufficient (ibid). This may help to explain the reported lack of higher order reflection in the students in Kember et al.'s study (1999).

Barnett distinguished three domains of critical being and their associated forms of criticality; the Knowledge domain and Critical Reason, the Self and Critical Self-reflection, and the World and Critical Action. Students need not just critical thinking skills, but "*metacritical capacities*" that is, the "reflexive capacities" that mark a "self-monitoring capability" (1997, p.71). The concept of reflexivity was explained in Chapter One. These capacities go beyond "metacognitive skills", which link to students understanding their own learning styles, to a permanent understanding of the "essential contestability of all knowledge claims" (ibid). Those who achieve this have a "critical stance", similar to Slaughter's "permanent capability" for change.

There are various, suggested reasons why we face such complex problems. One is that "[T]he world system today overlays an emergent planetary dynamism onto modern, pre-modern and even remnants of Stone-Age culture" (Raskin et al., 2002, p.3). This is amplified in the next section.

2.3 A transmodern world

Futurist Luyckx suggested that we are currently negotiating our way into a time of "transmodernity" (1999, p.971). He proposed a:

> double hypothesis: that we are in transition to a transmodern way of thinking that combines intuition and spirituality with rational brainwork; and that 21st century conflicts will likely be not between religions or cultures but within them, between premodern, modern, and transmodern worldviews.

Inward-looking communities such as fundamentalists of any persuasion, are one aspect of the pre-modern dimension which exists in most societies. Dervin explained the current situation as:

> A disappearing public sphere erased by big business and capital, and natural community spheres implemented in a new

> kind of feudalism…of like-minded souls who have no…interest in communing with others who are not like-minded (Dervin, 2003, p.343).

She suggested changing our practices to "communicating for peace" as a daily practice (ibid, p.344). This is not about improved, faster communication devices or making spaces for 'difference' to speak (even if no-one is listening). Communicating for peace is a reflexive approach, "a matter of developing new ways, in the globalized electronic context, of helping people hear themselves and each other and express themselves in ways that make hearing possible" (ibid, p.345). This approach searches for and acknowledges the many different ways human beings "make sense of and navigate" an ever-changing and gap-filled reality. This is very different from communication based on finding more detailed ways of capturing and labelling 'others' and in this way building on their "inflexibilities" and "rigidities" (ibid p.346).

Transmodernism could mean "keeping the best of modernity but going beyond it" (Luyckx, 1999, p.972). He argued for an increasing role for individual and collective spirituality, not religiosity, and noted similar aspirations in transmodern citizens in both the East and West. He suggested a transmodern vision or paradigm based on a circle where "The Truth is in the center, with each individual converging toward it along his/her own path, via his/her own culture. No one owns the 'Truth' and women and men are brought together …around the same table as equal citizens of the world to decide about their common future" (ibid, p.981). Together, these provide a base on which to build respectful communication, between and within cultures and genders.

The unspoken difficulty in this vision may be resolving values conflicts. Somerville's (2000) ethical circle approach may help, adding another tool to the "infinite toolbox" of critical Futures Studies. In discussing the ethics of science,

she suggested putting any issue under discussion at the centre of a circle made up of the people who should be involved in the decision making. Each person shines a light on the issue that makes their perspective visible. In her ideal outcome, the various colours of the lights would combine to make a “white light of ethical insight.” If there are dissenting perspectives that cannot be integrated, “we must identify the values each “lit-up area” represents and put these values in order of priority” (2000, p.290). She acknowledged that this may cause “values conflicts and ethical distress…[since] some of us must live with a situation in which values that are important to us are being breached” (ibid).

These approaches are useful contributions to alternative futures to those colonised by Western technology-based visions, for example, *Futurelandia*; a land "effectively colonised by scientists or technologists" (Galtung, 2000). For Sardar, the future is "already an occupied territory" (1999a, p.9). He identified four, hidden assumptions of futures studies that have only recently been challenged and which I summarise:

> The only worldview, and the associated metaphysics and values, worthy of attention is the Western civilisation’s worldview
>
> There is only one science of nature, that is objective, positivist and universal
>
> 'Reality’, however it is defined, is constructed in the image of the white man
>
> Cultural differences will fade away as people discover the superiority of rational Western culture (Sardar, 1999b, n.p.)

Figure 4 below, an example of this predetermined future and the past it confidently subsumes, was the focus of the detailed, CLA-based critique mentioned earlier (Kelly, 2002, 2004).

Figure 4: *Cosmic Evolution* by Robert McCall[24]

2.4 Education and change: Rogers' Global Education model

Hicks suggested that "we need to begin with a socially critical approach to learning that recognises the importance of changing both self and society" (2002, p.24). This different kind of education will be "designed to heal, connect, liberate, empower, create and celebrate" (Orr 1992, cited in Hicks, 2002, p. 39). Table 2 below summarises the key points of two models of education, Global Education (Rogers) and Futures Education (Hicks, 2002). These are complemented by the elements of Futures Generation Thinking (Inayatullah, 2002) which illustrate the extended notions involved in his transmodern and transformatory approach to education.

[24] Reproduced with kind permission of the Foundation for the Future (FFF). The image can be viewed in context at http://www.futurefoundation.org/

Table 2: Summary of key points of three bases for education

Global Education	**Futures Education**	**Futures Generations Thinking**
"Enables people to understand *the links* between their own lives and those of people throughout the world;	1 "Enables pupils to understand the *links* between their own lives in the present and those of others in the past and future"	Commitment to an extended concept of family, beyond nuclear and extended to the planetary family
"Increases understanding of the economic, cultural, political and environmental influences which shape our lives;	2 "Increases understanding of the *social, political and cultural* influences which shape people's perceptions of personal, local and global futures";	Expanded notion of being to include all sentient beings – plants and animals
Develops the *skills, attitudes and values* which enable people to work together to bring about change and take control of their own lives; and	3 "Develops the *skills, attitudes and values* which encourage foresight and enable pupils to identify probable and preferable futures"	Extended Intergenerational approach (ancestors/futurecestors)
Work towards achieving *a more just and sustainable world* in which power and resources are more equitably shared" (Hicks, 2002, p.126)	4 "Works towards achieving a more *just and sustainable future* in which the welfare of both people and planet are paramount" (Hicks, 2002, p.128)	Values-based (any culture) rebalancing physical and spiritual worlds
		Repeatability (ensuring the survival of Future Generations keeps our ancestors' dreaming alive)
		A spiritual and collective view inclusive of other ways of knowing, intuition, spiritual awareness.
		Pedagogy with strong focus on enhancing wisdom (conscience issues)
		Sustainability (not stealing from future generations) Critiques "progress" without limits.
		Global focus, Seeks similarities amidst differences (a Gaia of cultures) (Inayatullah, 2002, p.61)

Hicks synthesised and tested studies showing how learning about global issues is complex and challenging for both learner and teacher (2002, p.98). He applied Roger's model of the five stages or dimensions of futures-based learning to a small group of volunteer students learning Global Studies for a complete academic year. Rogers' stages were:

1. The Cognitive level: This is stage one, at which students are learning new facts, ideas and concepts about the global situation
2. The Affective level: This encompasses the "emotional response…when there is a shift from intellectual, detached knowing to a personal, emotional and connected knowing"
3. The Existential level. At this existential level or "stage of the soul", Rogers found evidence that it "caused people to question their values, sense of meaning and purpose in life, faith, spirituality, life goals, or ways of living"
4. The Empowerment level: If this questioning stage is resolved, students begin to feel sense of personal empowerment, a clearer sense of responsibility and "commitment to do something" - cautious optimism
5. The Action level: "If the first four dimensions of learning questions have been met, students can make personal, social, political choices and action. Some students report significant reorientation of personal/professional lives" (Rogers, 1996, pp.493-494).

Rogers developed this model through her PhD research with a group of adult learners studying a one year self-contained course. The strength of her work is the way she unpacked the complexity of the learning process and its effects at personal levels. Her model of effective Global Education identified three major "'awakenings' – of the mind, the heart and the soul" (in Hicks, 2002, p.102).

Hicks regretted that his detailed research was limited to four volunteer students. Since strategies that work with small self-selected groups are not necessarily transferable to large first year cohorts, BNB007 addresses this research gap. This study was based in and therefore relevant to large cohorts of students, particularly those who may not choose or want to study a course including a values-based, global dimension. This is significant because such cohorts are the *most* likely norm if Higher Education responds rapidly to the need for global education and education for sustainable futures. In Chapter Five, I use Rogers' model as a final check on the depth of reflective thinking in the selected Reflective Journals.

2.5 Wisdom

Any alternatives we suggest should be seen as better than those they seek to replace or augment. I described a broad understanding of reflexivity in Chapter One, but even concepts like "global citizenship" and "reflexivity" are insufficient unless grounded in "imaginative reflection and acts of conscience" (Brennan, 2005, p.29). Since wisdom is the qualifying virtue of *Globo sapiens*, it is useful to look at what this neglected concept might contribute to a new century. Slaughter, after Polak (1961), regarded "a wise culture" as a strong focussing concept for "a future worth living in" (2004, p.30). One justification is the contrast between the "practical or strategic cleverness" of modernity and wisdom or "sapentia", which is more "a form of moral imagination" (Brennan, 2005, p.28). He suggested "five pillars" for a wiser vision, summarised as:

1. the rediscovery of subjectivity and dignity upon which ethical and environmental agenda depend
2. the awareness of the historicity of values and the ensuing recognition of memory as the explanatory background to human actions…

3. dialogic imagination, which goes beyond reflexivity in its capacity to get inside the situated and historical experience of another
4. the importance of articulating and recognising limits and boundaries, without which there is no difference between fair and foul, truth and lies (ibid, p.28)
5. conscience, a moral awareness…derived from an autonomous, inner voice (ibid, p.29).

Any struggle towards wisdom could be supported by Somerville's three stage model of "doing ethics in relation to new scientific developments" (2000, p.288). She suggested that we pass from a stage of True simplicity – when we may make ethically correct responses based on moral intuition but we really "do not know enough to be confused about what is ethically right or wrong" to a stage of Chaos. At this point, we know enough to be confused, but we have to "structure this chaos" in order to "identify clear ethical approaches" for Phase Three, Apparent Simplicity. Now, we may make similar decisions but they are on "based a deep understanding of the ethical issues involved" (ibid). Simplicity may be unseated and unsettled as part of an ongoing creating and renewing of understandings. This applied to many students' learning journeys, the study itself and my role in it.

Sterling described sustainable education as "a change of educational culture which both develops and embodies the theory and practice of sustainability in a way which is critically aware" (2001, p.22). This transformative paradigm "values, sustains and realizes human potential *in relation to* the need to attain and sustain social, economic and ecological wellbeing, recognising that they are interdependent" (ibid). Inayatullah adds another dimension. "What is missing in modernity is an understanding of the very real global physical limits and a lack of

appreciation that Nature, Gaia, is more than alive, it is actively living" (Inayatullah, 2002, p.62).

Sterling, like others, identified either "breakthrough" or "breakdown" scenarios for humanity. Whichever eventuates, people will need qualities such as:

> flexibility, resilience, creativity, participative skills, competence, material restraint and a sense of responsibility and transpersonal ethics to handle transition and provide mutual support. An education oriented towards nurturing these qualities would help determine a positive and hopeful "breakthrough future" (2001, p.22).

2.6 Conclusion

This chapter traced my own journey through the literature and the way it changed my view of this study. I began by thinking that the study related to improving Internationalising the curriculum in an engineering context. The shallow expressions of Internationalisation in curricula concerned me because they naturalised and perpetuated an unsustainable, globalised world. I found that in current global circumstances, effective Internationalisation of the curriculum was one aspect of a more dramatic change agenda. Given that conclusion, I then considered possible meanings of sustainability and sustainable education and what roles Higher Education and individuals within it could play in an expanded vision.

The next chapter turns to the second main question of the study, could my chosen methodologies work together to help me to understand the changes or transformation I observed in the Reflective Journals?

> *Ecological overshoot [is] a much more important concept in the twenty-first century than free trade. But it is far behind in the*

fight for public attention and respect. (Meadows, Randers & Meadows, 2005, p.xxi)

Chapter Three: Methods for Meaning

> *[R]esearch design and methods cannot be separated from the paradigm or underlying assumptions upon which the research is based (Fien, 2002, p.146).*
>
> *We cannot and should not remove ourselves from the research environment. Rather, we should be epistemologically clean, stating up front what we perceive to be our value commitments (Inayatullah, 2002, p.10).*

Introduction

The previous chapter summarised my journey through the literature informing the study. Chapter Three addresses the study's second main question, "What features of Causal Layered Analysis and Sense-Making methodologies could prove complementary and useful in understanding paradigm shift or resistance to change as expressed through reflective journals and interviews?" This study is "empirical" research since it involved collecting and analysing data. It is qualitative in that it is "interested in how people make sense of the world and how they experience events" (Willig, 2001, p.9). It took place in a naturally occurring setting – the compulsory first year Engineering Unit, BNB007 (Professional Studies), at the Queensland University of Technology in Brisbane, Australia. The "people" were the 2001, 2002 and 2004 cohorts, and to a lesser extent, 2003, although I draw on earlier cohorts back to 1997 and the last and most recent cohort, 2005, where indicated.

Research design and methods constitute our ontological or world view, which in turn produces our epistemological position. Therefore, I begin this chapter by clarifying my worldview. The chapter has a short section explaining how Grounded Theory was useful in this study. I then briefly introduce the main data

sources, explain the Reflective Journal assessment item structure and topics. I next consider Reflective Journals as a method and how I "scaffolded" student learning. This section includes a detailed description of successful, supportive learning strategies incorporated into the Reflective Journal process, including the Personal Learning Agreement and the Peer Interview. The rest of the chapter explains the chosen methodologies Causal Layered Analysis and Sense-Making, assesses their complementarities and in doing so, explains why and how they were appropriate for this study. I conclude with one answer to the question, "Why do we need this kind of work?"

3.1 World View

My methodological choices are not a value-free zone. As a teacher and a researcher wanting to make a positive difference, I place myself within an Action Learning (AL) paradigm by agreeing with the "basic belief that we can transform our lives, our workplaces and society if we act with integrity in concert with others and nature" (Passfield, 1996, p.14). This definition of Action Learning appealed because Passfield clearly stated human values and integrated them with respect for nature. This discourse marks the study as part of a struggle towards a "partnership" society, based on an understanding and appreciation of the interconnectedness of all life (Eisler, 2001; Hollinshead, 2002) as opposed to a "dominator" approach.

The terms "partnership" and "dominator" "describe systems of belief and social structures that either nurture and support – or inhibit and undermine – equitable, democratic, non-violent, and caring relations" (Eisler, 2001, p. 144). These values underpin and influence my work, but I am sensitive to Judge's warning to "proponents of new paradigm thinking" to avoid falling into the "old paradigm" trap of labelling those who disagree with them as "regressive adherents to 'old

paradigm thinking'" (2001, n.p.). My methodological counterbalances include the rigorous reflexivity inherent in Sense-Making and Causal Layered Analysis. As a Sense-Maker, while not devaluing my own voice, I must "include myself as a subject of my own examination" as well as how those I study "interpret my interpretations" (Dervin, 2003, p.128). In working as a futurist, I also need to be explicit about my "value basis", the "future realities" I want to promote; and the "underlying presuppositions" upon which I base my work (Slaughter, 2004, p.40). I explored the limits of my role in Chapter One.

Both Sense-Making and CLA can be seen as part of a wider search for alternative ways of understanding the world. At the ontological level, Sense-Making criticises our current communication, information and knowledge management systems as based on "assumptions of order and certainty, human beings as cognitive and rational; reality as fixable; information and knowledge as describing that reality" (Dervin, 1983, p.7). There are similar criticisms in Management literature. Villiers, for example, challenged mechanistic approaches to communication as "information moving" and urged readers "to become meaning managers, understanding how we make sense of doing things, taking responsibility for the results of our communicating behaviour, and building trust by working with people's different mindsets" (2000, p.7). However, we need to ask how will this trust be used and for what ends?

Shank suggested, similar to Sense-Making, that "effort after meaning is a fundamental human process and the principal way that we as humans see the world" (1998, p.856). He criticised approaches that simply tinker with basic inductive reasoning, urging that since "our culture is looking for new ways to understand the world…we need to be able to synthesise patterns of ordinary meaning; not to create new truth claims but to generate new insights that then

lead to more sophisticated levels of meaningful understanding" (Shank 1994, in Shank 1998, p.846) and to "…a continually growing basis of insight into what it means to be a human being" (ibid, p.856).

Sense-Making provided a response by seeking out and including "ideas and cognitions, feelings and emotions, questions and muddles, angst and hunches, dreams and wishes" (Dervin 1998, p.42). Dervin identified lack of attention to the "'hows' (how do individuals connect to and make sense of self, other, culture, institutions; how do societies, cultures, institutions connect with individuals and with each other)" as a serious limitation of current democratic communication (2003, p.165). In the area of culture, Inayatullah made the significant point that there is a place for both cultural sensitivity and "insensitivity". That is, we need the skills to know "when to respect boundaries and when to push boundaries" (2002, p.52).

3.2 Methods

As it evolved, this study involved a suite of complementary qualitative and quantitative methods for gathering, analysing, synthesising and evaluating the data. These were Pre- and Post-questionnaires, Reflective Journals and Sense-Making Interviews, each of which is introduced below and addressed in detail in following chapters. The questionnaire was designed and intended as a minor, inductive (exploratory) "moment" to determine if there were changes in students' attitudes in relation to the challenging aspects of the unit, such as culture and the environment. As Chapter Four demonstrates, there was sufficient evidence to warrant continuing research.

Before continuing with the chosen methodologies, I acknowledge that while Grounded theory is not my guiding methodology, it was useful in ways I summarise in the next section.

3.2.1 Grounded theory (GT)

This method was devised by Glaser (1978) and Strauss & Corbin (1990), sociologists who wanted to develop "new contextualised theories … grounded in the 'data' from which they had emerged" (Willig, 2001, p.33). Competing versions have since developed. The positivist tendency of Grounded Theory was not considered useful to this research as it assumes that 'potential knowledge is out there and can be captured by the researcher" (ibid, p.47). The Social Constructivist version of Grounded Theory challenged that assumption and asserted that "categories and theories do not emerge from the data, but are constructed by the researcher through interaction with the data" (Charmaz 1990, cited in Willig, 2001, p. 44). Grounded Theory also offered a number of practical strategies to "identify, refine and integrate categories, and ultimately to develop theory" (ibid, p.33). So it is a method in that it provides "guidelines on how to identify categories, how to make links between categories and how to establish relationships between them" (ibid). In its theory form, it provides "an explanatory framework with which to understand the phenomenon under investigation" (ibid). It also has the potential to change research entirely or to indicate that the questions are not appropriate.

How was Grounded Theory useful for this work? The papers I wrote documenting each phase of the research process, practised reflexivity by showing how "the researcher's assumptions, values, sampling decisions, analytic technique, interpretations of context have shaped the research" (Willig, 2001, p.45). This social constructivist version of the role of the researcher was most compatible with my world view and with my methodologies. In other Grounded Theory versions, the researcher is a "witness" and "uncovers" (Willig, 2001, p.47).

Several other Grounded Theory building blocks proved useful as noted below, summarised from Willig (2001, pp. 33-36).

1. Category identification. In Grounded theory categories emerge from the data and evolve throughout the research. The broad categories of Accepters, Resisters and Converts emerged from my original reading of the Reflective Journals while my understanding and responses to these categories has evolved with the research.

2. Coding. Coding is the process by which categories are identified. The labels should be *in vivo*, that is, taken from words and phrases used by participants. I found this useful in unpacking the initial categories, which "emerged" as I read the journals. This kind of labelling formed the initial 'free nodes' that are the basis of analysis in the QSR soft-ware data analysis program N-Vivo (QSR, Version 2.0.161). This software package was considered complementary to this process because it enabled rapid access to and searching of large amounts of text-based data as well as the benefits described in the next section.

3. Constant comparative analysis. Having identified a common feature, Grounded Theory suggests refocussing on differences within a category to identify emerging sub-categories. N-Vivo helped this process because I could create sub-categories as I coded the data in "Children" or "Sibling" categories. So for example, I had an initial free node of "language". This became a "Tree" node, with "Child" nodes that included "metaphors", "proverbs" and "writing". The node "metaphors" in turn accrued "Children," including "healthy", "military", "final metaphor" and what emerged as a key finding, "open eyes" and "open minds". The "final metaphors" were significant because they were mainly metaphors of health and personal growth. They were "final" because I took them from the final journals.

Another example is “Feelings”. This node accrued the “Child” nodes, “Positive” (love, motivation, touched, encourage, confidence, respect, passion, inspired and humble) and “Negative” (disappointment, anxious, fear, upset – at oneself and others, confused, overwhelmed, helplessness, nervous, disturbing, embarrassed). These alerted me to the volume and the broad spectrum of feelings that these students had experienced.

4. Theoretical sampling. This term refers to collecting further data in the light of identified categories in order to check emerging theory against reality by sampling incidents that may challenge or elaborate its developing claims. I checked across the Reflective Journals of various cohorts to see if new information or attitudes were emerging.

5. Theoretical saturation. The process of data collection and data analysis continues until Theoretical Saturation is achieved – a set of categories and subcategories captures most of available data. However, it is always provisional, since situations and contexts continually change and evolve. This proved only too accurate in light of the dramatic changes which have occurred in the students’ social and political context, beginning with the attack on the World Trade Center Towers on September 11, 2001.

6. Memo writing. Writing memos to keep a record of theory development is an important part of Grounded Theory method. Because this study shared the iterative process that characterises Action Research, my published articles and conference papers were a detailed, public form of memos, in which I responded to data as it emerged. I offered these responses for peer review of my emerging “understandings”. They trace my pedagogical, methodological and theoretical development across the candidature and are integral to it. The next sections introduce the Data Sources.

3.3 Data sources

3.3.1 Pre and post questionnaires

1999 was the first and only year that students submitted in hard copy and I helped to mark their journals. As I read, I was struck by the process of change that seemed to be occurring. I believed that the changes were genuine, but a common opinion was that students "wrote what they thought we wanted to hear" (Kelly, 2004, *Paris* interview). My formal research began in 2000 with the pilot questionnaire designed to measure changes, if any, in student attitudes between the start and end of the one-semester unit. The initial results assured me *that* significant changes in attitudes were taking place in desired directions. The next source of data, the Reflective Journals, illustrated *what* sorts of changes were taking place.

3.3.2 Reflective Journals

The second and major source of data was consenting students' Reflective Journals. Two related assignments, Reflective Journals and a team-based project, were the way the team developed assessment as a "tool for learning and growth" (Heath 2000, p. 46). The coordinator described the team project in detail at the 2001 AaEe conference[25] (Messer, 2001), but a brief summary follows. From 1999 to 2003, students worked in randomly assigned teams of between five and ten students, to negotiate, create and complete a small practical engineering project and an accompanying written report, based on the United Nations focus in each particular year. So for example, in 2002, students had to respond to the International Year of the Volunteer; 2003 was the International Year of Fresh Water; and 2004 was the International Year of Rice. These projects were presented and assessed by a panel of three including a lecturer, a member of the

[25] AaEe is the Australian Association of Engineering Educators.

IEAust and a member of the public at a public EXPO. This was an all-day event, held in display booths set up in a large space at the bottom of one of the university buildings. Figure 5 is a map of the structure of BNB007 showing how the various modules fit together. My study was based only on Module One, Professional Practice and Communication, although all modules worked together contribute to students' skills, which they demonstrated in the group Projects and their oral and written Reports. The tutors played a significant part in the effectiveness of all modules, since they were the interface between the content and the students.

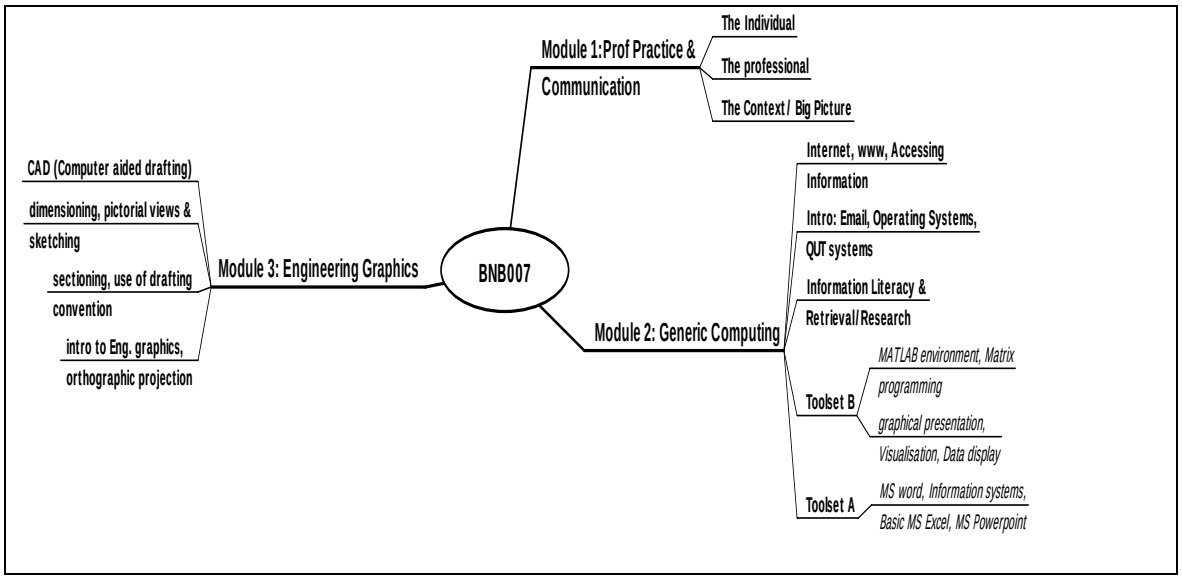

Figure 5: An overview of BNB007 unit structure (Visimap, 4.0)

I did not include Project Reports as data in this research because they represented a group effort and therefore were not as relevant to the personal transformative aspect. They would also have added to an already heavy data base. Many related issues emerged through the teamwork topic of the Reflective Journals and in the interviews.

The journal structure. Each cohort from 1999 to 2002, wrote twelve reflective journals (12 entries, with a 500 word limit), related to the lecture topics in the "Professional Practice" module of the unit BNB007. The topics have changed slightly over the years and have been rearranged in response to interview and journal feedback. From 2000, students sent the journals electronically for formative feedback in Week Six. The marker/s[26] used the same assessment criteria that were to be used in the Summative Assessment in Week Twelve. As shown in Table 3 below, this was kept simple, in an effort to give guidance but to avoid excessive criteria. Each section is worth 5% making a total of 15% for this assessment item.

Table 3: Reflective Journal marking criteria for Formative and Summative Assessment

Criteria	Comments
Shows evidence of having engaged with the topic for each week, including at least one of the set readings	
Shows evidence of your own values and attitudes as part of reflective writing	
Shows attention to presentation Shows attention to spelling and grammar Shows evidence of consistent entries each week	

Given the lack of support staff, it was easier, and more resource friendly, to receive, keep secure and return electronic journals than hard copy documents[27]. Commenting using the "Track Changes" facility enabled fast and legible feedback as well as providing an opportunity to develop a personal and trusting relationship

[26] From 2000 – 2003 there was one marker for the journals. From 2003-2005 there were either two or three. In the latter period our “turnaround” aim was 10 working days.
[27] It also meant that students received two lots of comments on their journals, rather than sending off a final assignment and learning only their marks but not what they did well and where their weaknesses were.

with students. In all excerpts from students' journals, I have left the writing as submitted, since a corrected version would have changed the personae behind the journals and given a false impression of individuals' writing abilities. Those with advanced skills in any area, such as computing, could apply for exemption from a module if they could demonstrate that they already had these skills.

In 2003, in response to student complaints about the heavy workload, we changed the requirement to eleven rather than twelve journals, with a 300 word limit. In response to interview feedback, the journals were also submitted for earlier Formative Feedback, in Week 5. Students submitted all Reflective Journals, as one Word attachment, by email, for Summative Assessment in Week 12. Week 13 was a study week with no formal teaching.

Table 4: Reflective Journal Topics 2000 & 2004

2000	**2004**
Introduction: Learning Agreement, skills and abilities etc Learning in Your Profession Teamwork and Interdisciplinary Nature of Engineering Problem Formulation and Critical Thinking Professional Ethics Appropriate Technology and Awareness of Technological Choices	Introduction: Personal Learning Agreement, Personal Perspective on Learning Problem Formulation / Critical Thinking Intercultural skills, Cultural Sensitivities and International Responsibilities Peer Interview / Journal review
Journal Review and Formative Assessment	**Formative Assessment**
Environmental Principles and Sustainable Engineering Practice Cultural and Intercultural Sensitivities and International Responsibilities, Negotiation and conflict resolution Appropriate Technology and Awareness Communication skills. History and Heritage engineering Project Presentation skills Final Reflection and Overview of journals	Environmental Principles/Sustainable Engineering Socially Responsible Technology Professional Engineering Ethics Project Progress and planning/Teamwork Negotiation and Conflict Management Globalisation and Professionalism Final Reflection / Self Interview on Learning
Summative assessment 15%	**Summative assessment 15%**

The journal topics. Table 4 above compares the Reflective Journal topics in 2000 with those of 2004. The main change was to move the lectures on problem solving and intercultural skills and cultural sensitivities to earlier in the unit. This came about in response to Reflective Journal feedback and the first interviews. Students needed the problem solving theory in order to help them with their projects and the cultural sensitivities to work to help them work more effectively in their groups. The Formative Feedback was also moved to two weeks earlier in order to provide earlier guidance and reassurance.

The next section takes a more detailed look at Reflective Journals as a method or pedagogical strategy.

Reflective Journals as a method. As a method, Reflective Journals have some of the benefits listed for diaries, which are regarded as a useful but difficult means of data collection (Willig, 2001, p.28). Common benefits, as summarised and adapted from Willig (ibid, p.29), are that they:

1. *offer access to information otherwise hard to obtain*
2. *provide temporally ordered data, revealing how events unfolded over time, in this case, a thirteen week semester.*
3. *avoid problems of retrospective reporting, retrospective interpreting of events, and forgetting*
4. *facilitate access to personal information.*

This optimistic list assumed that people are diligent in keeping diaries. BNB007 students felt free to confess that it was common to write the Reflective Journals retrospectively, in batches of two or three, and often in haste when assessment was due. This impacts on numbers two and three in the above list particularly. Another more significant issue was the concern that journals, like diaries, may "prompt" respondents "to reflect on aspects of their lives that they feel unhappy about" (ibid, p.29). With this warning in mind, I tried to minimise the

”confessional” effect by making clear from the outset that these journals were a reflective *process* related to specific topics. I urged students in writing to include only information that they felt ‘comfortable’ to give, reminding them that these Reflective Journals were not a private diary but a semi-public document. Students knew from the outset that their journals would be read by the marker/s and, from 2002, by a peer as well.

However, I came to realise and respect the fact that students make their own choices. Reflective Journals can serve as a life-belt for students with serious personal issues and who, for various social and/or cultural reasons, feel they have no-one else to turn to or are using the journals to work through the issues affecting them. They would only do this in a situation of trust, or possibly, desperation.

In this light, Willig’s warning about the “confessional” may also be an example of the way “emotions, hunches, wishes, dreams” have been “marginalized by being relegated to the therapeutic” (Dervin, 2003, p.158). The affective aspect is particularly significant for the many vulnerable students in large, first year cohorts. I give examples in Chapter Five and I revisit the issue in Chapter Eight as part of the issue of teachers’ responsibilities, because such journals can be disturbing and require immediate, sensitive and appropriate follow-up. The findings endorse Boud & Walker’s persuasive arguments that Reflective Journals are not a process to adopt in the hope it will be ’set and forget’ (1998).

Scaffolding learning. Many Engineering students were resistant when we introduced new assessment strategies including the Reflective Journals. Journalling can be “alien and daunting” and the process is acknowledged as “problematic and complex” (Maloney & Campbell-Evans, 2002, p.40). The word “daunting” certainly emerged in the journals and the interviews as one emotional

response. Critical thinking and writing requires confidence both in writing and in what one has to say. For various reasons that are explained in Chapters Five and Six, many undergraduates had neither. Engineering students particularly, need to appreciate how such writing and thinking is relevant to their learning in the engineering profession.

One pedagogical response, through the BNB007 web-site, was to use a "scaffolding" approach to student learning based on a language development perspective. Based on Vygotsky (1962), the teacher's role is "to offer information, modelling, guidance, observation, correction and encouragement" (Palmer, Cozean & Olson-Dinges, 1999, p.82), taking more responsibility initially and gradually shifting it to students as they become more confident" (ibid, p.83). In this instance, it began with an optional template for the first journal, with open-ended sentences to help students write the first reflection (Appendix 8). Most students used and adapted this template. Oral Skills were developed throughout the unit, through pair and group work, particularly the Peer Interview about learning in Week Four. Presentation practice was built into tutorials and culminated in the presentation of the final project. For various reasons, this final presentation was downgraded from a presentation to a panel from 2000-2003, to an in-class presentation in 2003-2004.

I built Sense-Making elements into the focussing questions I provided as part of the guide to writing journals on the unit website. Students were not obliged to follow these. They were there as part of the "scaffolding" for students who had difficulty beginning their journals. Sense-Making-guided examples include:

> *What do you find helpful or challenging about …..[a topic, video, resource?]*
>
> *What gaps are there in your intercultural skills/knowledge?*

If you had a Magic Wand, what would be most helpful to you now?

Sense-Making-based questions like these led to Reflective Journals which explained not simply what change was occurring but, to some extent, *how* change was occurring. Journals, whenever completed, are labour intensive, although better guidance and structuring may guide students into more effective time-management.

Introductory activities. Journal One, *Thinking about Learning*, for example, was a pivotal journal based on the activities of the first tutorial and the first set reading. The tutorial began with the ice-breaker, *Find a Person Who…* (FAPW) (Appendix 10). In this 10-15 minute activity, students were given an A4 sheet divided into squares. The task is to find a person who matches the statement in each square and write their name in the space provided. Each person's name can only be used once, which maximises opportunities for meeting different people[28]. I advised tutors to do the exercise with their students and to set a time limit. All participants may have to move outside their zones of comfort.

The activity shifts responsibility for this move from students to teachers, as Volet and Ang recommended (1998). It challenges students at various levels. "Getting To Know You" activities are not part of the Engineering culture described in Chapter One by (Tonso 2001, p.161) and others. When female teachers use these, they can be seen as part of "efforts to reshape campus culture" and thus as a threat to what Tonso described as the preferred "hegemonic, male-centered, academic science form of practice" (ibid, p.162). This indicates why it takes courage and confidence for tutors to use such strategies and why it is easy for lecturers to disregard them as a "waste of time" in a pressured curriculum.

[28] In the case of a student in a wheelchair or with a disability that prevents them moving around, mobile students are advised to move to him or her.

FAPW seems simple but there are pitfalls. It should incorporate the diversity of the group in the statements which students must find a person to match. Since I introduced FAPW through staff development, I have seen other versions of it, but the "human" and the "cultural" elements have often been removed. Any accompanying images are equally significant and should support the idea of inclusive, supportive, collaborative learning with healthy connotations. I hesitated before I replaced the ClipArt picture chosen by one tutor, Figure 6, with the picture of a child's hands holding flowers below, Figure 7, but several students chose to end their journals with this picture, suggesting that my intended self-censorship was an unnecessary response to my fears of how engineering students might react to a "fluffy", that is, "sensitive", image.

Figure 6: Climbing the stairway to success

Figure 7: The Flowers

The ice-breaker set the scene for a written task, "Thinking about Learning", in which students answered a short quiz designed to help them analyse their own learning styles and oral and written communication strengths and weaknesses. This has consistently encouraged most students to be proactive, to identify common and often ongoing problems such as procrastination, etc. and to take steps to improve.

The first journal also required that students wrote their own "Personal Learning Agreement" (PLA), based on QUT's Code of Student Conduct and a suggested Code of Conduct for the unit (Appendix 9). Most students wrote that this activity was very helpful in setting their expectations for themselves and the unit. This is one of the Critical Learning Points or Stepping Stones described in detail in Chapter Four. The PLA was designed to help set a respectful environment for learning, to help students see the role that each of them played in this and hopefully, to take responsibility for it. Taking responsibility on this micro-level proved good practice for taking responsibility at broader community, national and global levels. It also helped students plan for the semester, since it was a week 1 activity. It required students to look back and to look ahead, to take responsibility for learning and communicating and to become conscious and aware (Ehrenfeld, 1999) or "mindful"[29] learners.

For some, combined with the tutorial exercises *Getting to Know You* and *Thinking about Learning*, the PLA proved a major and sometimes transformational step towards change. This may be because the unit is conducted in second semester. Most students, apart from the mid-year intake and a few students from later years, have had only one semester of study. Good monitoring and support is particularly important for first year students. Many students said they found first semester to be "frightening", "challenging", "lonely" and "heavily content dominated". They identified their lack of learning skills as a problem and many said they wished BNB007 had been a first semester unit. As the Reflective Journals made clear, the unit content and process challenged their expectations about Engineering, learning and social issues and their responses to these.

Peer interview. Another critical aspect of the Reflective Journal process was the Peer Interview, in which students were asked to share their journals with a peer

[29] This term was defined on p. 25.

partner "from a discipline or background different from their own", about their learning to that point in the unit. It was designed to:

- Encourage students out of their comfort zones to meet and interview someone from a different gender/background
- Help them to engage with another, possible, alternative view of the lecture and reading material to that point
- Require them to explain their own learning and in that way engage with it differently
- Give them an opportunity to learn or to improve how to give and receive constructive feedback.

This, coupled with the teamwork required by their project, encouraged students to focus on "how people connect; how they construct bridges and what accounts for differences in observations" (Dervin, 2003, p.7). From a Sense-Making perspective, the Peer Interview offered one way of putting difference "into dialogue" (ibid). It encouraged students to respect that different view as equally valid. It also enabled students to ascertain how others saw them and their work and equally importantly, how others saw themselves. Detailed journal analysis is the focus of Chapter Five.

The preceding sections introduced the first two data sources, the questionnaires and the Reflective Journals, the content and process of BNB007 and some of the key teaching strategies. The next section introduces the Sense-Making interviews and explains Sense-Making's mandated interviewing process. The interview outcomes are analysed in Chapter Six.

3.3.3 Sense-Making interviews

The third form of data was a set of thirty-one interviews, around 60 hours of taping, which I conducted and transcribed. The interviews were conducted at various times from late 2002 to late 2004. Twenty-six were with students and four were with other members of the teaching team. These were the coordinator, "*Georgia",* with whom I collaborated in Engineering from 1995-2005; a tutor/marker "*Fluffy*" who was with the unit from 2003-2005; "*Kym"*, who marked journals and coordinated tutors in 2003 and "*Paris*", a marker for whom 2004 was her first experience of marking Reflective Journals. The majority of interviews, 21, were with willing students from the 2002 cohort. There were four interviews with students from the 2001 cohort and one (*Fiza*) from 2003. Three of the four interviews with the 2001 students were conducted one year after they completed the unit and one was sixteen months later. These add an interesting longitudinal perspective. I interviewed *Fiza* because she was a recent school leaver, a female and a practising Muslim, with whom I developed a warm relationship after she approached me for individual help with the journals. I did not mark her journals and I interviewed her after she had completed the unit. The final interview was a self-interview, using the mandated Sense-Making protocols and conducted at various times during the candidature.

The Sense-Making interview process. Sense-Making, like CLA, is a theory that also informs a methodology and methods. There are three core elements in the Sense-Making metaphor of a person moving through time-space, "situation-gaps-uses" (Dervin, 2003, p.256). "Sense-Making assumes that people have gaps in situations, that they bridged these gaps, and that they put their new sense to work in guiding their behaviour" (ibid). This is depicted in the Sense-Making Triangle, Figure 8 below, from Dervin, (2003, p.278).

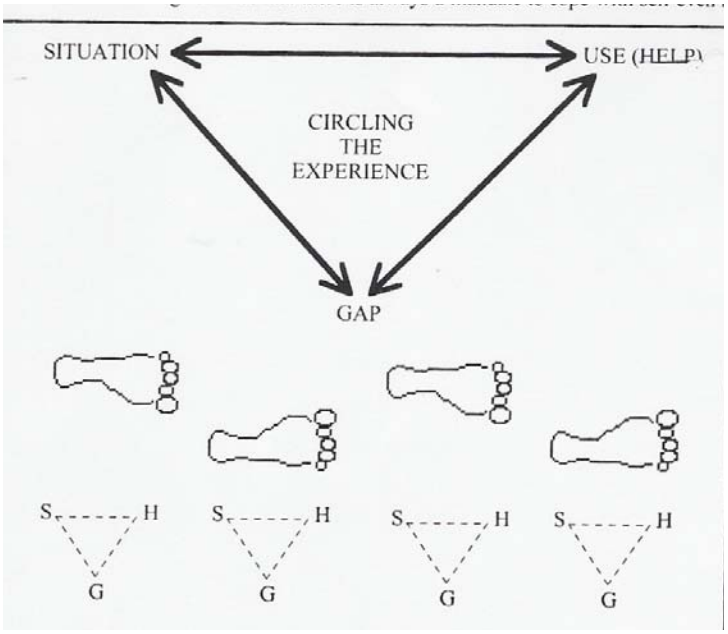

Figure 8: The Sense-Making Triangle (Figure 14.2, Dervin, 2003, p. 278)

Situations are "the time-space contexts in which sense is constructed", in this case the one semester (13 week) unit BNB007;

Gaps describe "where the individual sees something missing in his or her sense. New sense is created when the individual sees a gap as bridged";

Uses are "the ways in which the individual puts the newly created sense to work in guiding his or her behaviour" (ibid, p.256)

This model guided the development of alternative interviewing approaches, the core of which is the Micro-Moment-Time-Line-Interview, the method I used with my interviewees. The interviewer is guided by a "tight theoretic structure" which "asks respondents to talk about their worlds in the context of the situations-gaps-uses assumptions of Sense-Making" (Dervin, 2003, p.257). On Professor Dervin's advice, I told the interviewees in the pre-interview email to think about any struggles, constraints, questions or hinderings relating to the Reflective

Journals, as well as any ways that they thought the Reflective Journals had helped or facilitated their learning.

Using a model developed by Dervin and others, my interview began with background information. Interviewees were given the opportunity to choose a pen-name to be used in the research. All but one did so. The interview began by asking interviewees to "detail what happened in the situation step-by-step" (ibid). Basing my wording on the research of previous Sense-Making researchers, I asked each interviewee

> *to think back on your learning journey in BNB007 in Semester 2, 2001/2/3, focusing particularly on the Reflective Journals and how they related to your experience. Focusing particularly on these tell me what happened for you, things others did or said or thought, things that just happened. Tell me the things that stand out most for you.*

The time-line steps were chosen by the interviewees and after feedback from Professor Dervin, I checked that interviewees agreed with my summary of their main time-line steps. Interviewees were very keen to correct any gaps or mistakes on my part. The interviewing process then turned attention to the "Gaps" by asking for each of these steps or for the most significant steps, what questions interviewees had or what confused them, what feelings or thoughts they had at that point. "Each of these elements is triangulated with the Sense-Making metaphor (situation, gaps, uses, outcomes). For example, What led to this question? How does it relate to your life?, Did you get an answer? How? Any barriers or constraints? Did the answer help? Hinder? How?

Figure 9 below offers one complete time-line, in which I summarised the main questions asked at each step by *Andrew*, a bi-cultural Australian who entered university from school.

STEP 1: I actually missed the first week, (did it in the second)

Q1: How would things work out?

Q2: Is the group too big?

STEP 2: "K" gave a very inspiring talk about creative thinking

Q1: What do we do in our groups?

Q2: How can a bunch of electrical engineering students contribute to a project on Ecotourism?

Q3: Why was it important?

Q4: Why were we doing it?

Q5: Why had they chosen us to do that sort of thing?

Q6: What were the students who didn't like BNB missing?

STEP 3: B's talk on project management.

STEP 4: I actually asked him for a bit of help at this stage

STEP 5: A Professor … came out and spoke to us about the responsible use of technology

Q1: What am I going to specialise in later years?

Q2: What am I going to do in the workforce?

Q3: Should we really do genetic engineering? Is it really right and responsible of us to do these sorts of things?

Q4: Should we produce nuclear energy when we have all of these dangerous waste products?

Q5: is it right that Margaret Thatcher did it for political purposes?

Q6: What am I going to be doing later down the track?

STEP 6: Sustainable engineering by the ARAP representative.

STEP 7: The lady who was talking about ethics.

STEP 8: Talk on entrepreneurship was very good

Q1: Who came up with the idea of drains and aqueducts?

Q2: How's an idea going to help other people?

Figure 9: The Time-Line Steps (Andrew)

Appendix 16 offers two short excerpts to show how this interview method worked in practice. Sense-Making interviews require longer than average interview times, but are usually rewarded by high interest and involvement (Dervin et al., 2003). The average interview lasted one and a half hours. The longest interview was three and a half hours.

The Sense-Making "circling" technique described above, is designed to allow the respondent to circle or "repeatedly engage with, the given phenomenon or situation" (ibid, p.8). I felt self-conscious applying this built-in redundancy, but it did allow students to bring hidden aspects of issues to the surface. It presumes that respondents are capable of self-reflection, even when they are struggling with the language itself. The "Circling" of the experience and the "Helps/Hurts Chaining" process as part of that, led to many students finding deeper understanding as part of the interview process itself. The following excerpt exemplifies "chaining". I used the "Straight Line Chaining" technique in which I continued to ask how something helped (or how it hurt) until the respondent thought the connections had come to an end. In "complex chaining", the interviewer can switch between "helps" and "hurts".

In the following example, I followed to a natural conclusion how the Reflective Journals had 'helped' *Sirocco*.[30] I did not realise until the interview, that *Sirocco* had been granted exemption by the coordinator from completing the journals because they had triggered past issues he had no way of solving. The interview provided an opportunity for these to be aired and for him to reach greater understanding of his situation.

> *S: I think they're a good idea. It's helped me a hell of a lot, um, as has this session, um.*
>
> P: How has that helped?
>
> *S: Er, makes me feel better, makes me feel as though it's, … takes away the sense of futility in, oh, in having done that unit. At the beginning I thought why am I here? Well I'll sit through it anyway, got to be here and in the end, I learnt not just a little but a lot, er, a little about the work, a little about project management and engineering but a lot about myself and how I,*

[30] Sirocco was a mature age male student for whom English was a first language and yet he had complex cultural issues related to his family of origin, which impacted dramatically on his life.

how I do and how I can affect the rest of society and the world in general.

P: And how does that help?

S: Um, I hope it helps my personal development and also helps in the development of engineering and any effect I have on it. As I've only realised since I did this particular unit.

P: How did that help?

S: Helped? Er. Did help. Helped, helped me. In looking inside meself, in … the unit helped to spur me on. The realisation that education is the key to teaching every body and to stop these things[31] from happening. The unit helped to spur me on to continue my education to continue things that perhaps by learning things and by passing on my knowledge I can help to stop that cycle and that lack of education if you like and that's how it helps.

I analysed this excerpt in more detail elsewhere (Kelly, 2004).

Since interviewees "define in their own terms, their situations, gaps, how they bridged those gaps, and the ways they put new sense to use"(Dervin, 2003, p.256), this may cause the interviewer to reassess what was significant. This forced reassessment forms part of the "humbling" aspect of Sense-Making. For some interviewees in this study, this invitation opened the door to a torrent of words. With others, it was a more laborious process. With *Harry*, an international student whose spoken English was poor, it involved a learning process for both of us as I reworded questions until he understood their meaning. Words he had difficulty understanding included the key words of the Sense-Making interview process such as "bothered", "hindered" and the question, "how did that connect to your situation?" This particular question posed difficulties for other students too and I found no satisfactory answer for this. Although what

[31] By "these things" he was referring to traumatic events he had experienced in his work for the defence forces.

Harry said was constrained by his limited English, (his third language), his intent was clear and insightful.

Sense-Making was useful because students from NESB's or other minority categories are often perceived from within a deficit perspective, as problems to be "fixed", "managed" or "dealt with". Stereotyping students in terms of demographic or other categories "may be inherently anti-democratic in that they exacerbate already defined social inequities" (Dervin, et al., 2003, p.11). Sense-Making seeks to overcome or bypass deficit based approaches by, among other strategies, creating the most democratic, dialogic and nurturing situation possible between interviewer and interviewee.

In the earlier interviews, due to lack of experience with the method, I did not close off the interviews well. When I changed to asking interviewees about the interview process, this provided better closure and also offered interviewees a chance to add any further thoughts, as reported in Chapter Seven.

Applying the theory: Situation-Movement-State. The Situation-Movement-State is the term given to a "set of categories that focus on how the informant sees self as stopped or moving at a particular moment in time" (Dervin et al., 2003, p.242). "By codifying how informants described themselves as stopped, struggling, and moving, what seems chaotic across different cases becomes more orderly" (ibid). Situation-Movement-State "significantly predicted the nature of the questions asked" (ibid, p.264). Thanks to previous Sense-Making researchers, many of these have already been identified, Table 5 below. Each situation-movement-state has also been associated with some identified "Helps". So for example, individuals in a "problematic" state were more likely to evaluate the outcomes (Helps) in terms of whether or not they "got out of a bad place, got control, got connected or got support" (ibid, p.243).

Table 5: The Situation-Movement-States (Table 13.3 in Dervin, 2003, p.262)

Sense-Making movement states	Explanation
Decision	*Being at a point where you need to choose between two or more roads ahead*
Problematic	*Being dragged down a road not of your own choosing*
Spinout	*Not having a road*
Washout	*Being on a road and having it suddenly disappear*
Barrier	*Knowing where you want to go but something blocks the way*
Being led	*Following someone down the road who has travelled it before*
Waiting	*Waiting for something in particular*
Passing time	*Spending time without waiting for something in particular.*
Out-to-lunch	*Tuning out, escaping*
Observing	*Watching without being concerned with movement*
Moving	*Seeing self as proceeding unblocked in any way and without the need to observe*

Gaps. "Gaps" was the term used to describe "where the individual sees something missing in his or her sense, usually expressed in the form of a question. New sense is created when the individual sees the gap as bridged" (Dervin, 2003, p.256). In Chapter Six, I provide a detailed description of these students' "Gaps" (p.261) as a useful outcome of this study for other practitioners. Methods for classifying Gaps identified by interviewees have included:

1. *identifying who, what, when, where, why and how*
2. *a focus on the past, present or future*
3. *the determination of whether a road was (or is/will be) a good one or a bad one*
4. *a focus on self, another, an object, or a process*
5. *a focus on where one was, how one got to the present, where one is, how one can get to the future, or where one will be.*

I used the first method, identifying who, what, when, where, why and how.

Uses. This term refers to "the ways in which the individual puts the newly created sense to work in guiding his or her behavior" (Dervin et al., 2003, p.256). These can be either "helps" (got pictures) or "hurts" (didn't get pictures, etc) but Dervin uses the positive "helps". Those identified in previous Sense-Making research are summarised in Table 6 below.

Table 6: 'Uses' identified in Sense-Making research (from Dervin, 2003, p.262)

Got pictures	Without ideas, no movement can be made. [getting new or revised understandings, sense, pictures]
Able to plan	In order to move one needs direction [being able to decide, prepare, plan ahead
Got started, got motivated	Sometimes humans find it hard to get going [getting motivated to start, find ways to start
Got skills	Moving often needs skills [taps being helped by acquiring them]
Kept going	Moving may be in danger of stopping due to lack of motivation [motivated to keep going]
Got control	Help needed to gain or regain control
Things got easier/calmer	Helps make the situation easier, calmer
Got out of a bad situation	[The help obtained is getting out of it]
Reached a goal	[Helps involve getting places, achieving things]
Went on to other things	Able to leave the situation behind and go on to other things
Avoided a bad situation	[helps involve seeing a bad situation ahead and avoiding it
Took mind off things	[helps enable you to put something out of your mind temporarily
Relaxed	Helps involve some kind of rest, recuperation, relaxation
Got pleasure	Helps involve obtaining pleasure, joy, happiness, satisfaction, or other pleased emotional states.
Got support, reassurance, confirmation	The helps involve pleased emotional states
Got connected to others	Being connected with others, not feeling lonely.

The "helps" identified in my interviews illuminated students' learning, resistance, and transformation. They also added some significant new "helps" which are discussed in Chapter Six.

The next sections offer a detailed introduction to Causal Layered Analysis and Sense-Making. An earlier version of this section was published as Methods for an Age of Meaning (Kelly, 2004). I explain the methodologies, their similarities, complementarities or points of challenge; their compatibility with my stated values and their suitability for this educational context.

3.4 The methodologies: Sense-making and Causal layered analysis

CLA and Sense-Making helped to develop textured explanations of the questionnaires' quantified indicators of changes in opinion. Sense-Making moves beyond "static characteristics of human beings" such as gender or ethnicity, to consider "how people make sense" (Dervin et al., 2003, p.8). In this process, it views "humans as sometimes free and sometimes constrained" (ibid, p.9). This perspective takes into account the increasing likelihood in Higher Education that "any individual student's voice is already a 'teeth-gritting' and often contradictory intersection of voices constituted by gender, race, class, ability, ethnicity, sexual orientation, or ideology" (Ellsworth, 1989, p. 312).

Likewise, "Futures Studies attempts to acknowledge the different ways individuals construct the world" (Inayatullah, 2002, p.5). Evolving a more integrated future society, that is neither technophiliac nor a retreat to some idealised pre-modern past, means "re-admitting the interior dimensions of individual and collective life into the picture as well as re-assessing the kinds of values and deep cultural commitments we want to take on into the future" (Slaughter, 2004, p. 28). Slaughter used the work of Wilbur (1995) to explain the

kind of reintegrated thinking required in order to "re-balance a one-sided culture" (ibid, p.27) that has given rise to the crises humanity is facing today. He summarised Wilbur's complex model, which is also a methodology, and its implications for futures thinking. Its significance lies in the value it assigns to the "interior development" of both individuals and the collective social being, as well as to the "external" physical development of the individual and "external collective development" of societies. This usually involves unlearning and relearning the ways we have perceived the world. It could provide another meta-view of these students' development, but time and space limited this study to Sense-Making and CLA, which appeared complementary for the following reasons.

3.4.1 Complementarities

Sense-Making now refers to a "generalized communication-based methodology…useful for the study of human sense-making (and sense un-making) in any context" (Dervin, 1999, p.729). Dervin and her colleagues have been working on this since 1972, but the label Sense-Making has been used since 1983. There are three main aspects of Sense-Making, all of which inform this study; Sense-Making as a metatheory – framing questions; Sense-Making as a methodology – collecting data; and thirdly, data analysis.

3.4.2 Theory

Both Sense–Making (SM) and Causal Layered Analysis (CLA) are relatively new and evolving concepts as well as methodologies and they have not previously been used as complementary methodologies for designing and evaluating learning. They are complementary at the theoretical level because they (1) welcome input from other methodological frameworks; (2) have a critical meta-dimension; (3) have a complex appreciation of time; (4) have a deep concern for a more equitable, communicative future for the planet and (5) make use of

metaphors. I address each of these issues in turn. In terms of methodology, they (1) address power issues, (2) actively engage with diversity, culture and gender, (3) have a reflexive dimension, and (4) open spaces for deep understanding.

3.5 Theoretical level

3.5.1 Welcome other methods

In line with my declared values–base, Sense-Making requires a conscious awareness of its metatheoretic underpinnings. These are highly critical of any communication models that are based on "transportation/transmission…rather than communication metaphors" (Dervin, 1999, p.729). Sense–making criticises current communication, information and knowledge management systems as based on assumptions that the "system is the essential order and the person/user bends to it rather than the other way around" (Dervin, 1992, p.64). In contrast "Sense-Making admits all manner of connectivities and patterns" (Dervin, 1999, p.735). CLA is equally open, being seen as "a search for integration in methodology, seeking to combine different research traditions" (Inayatullah, 2002, p.23). "Positive engagement" is a key quality in futures thinking generally, since studying the future can help us "move away from a passive or fatalistic acceptance of what may happen to an active and confident participation in creating positively desired futures" (Slaughter, 2004, p.37).

3.5.2 A critical meta-dimension

Both CLA and Sense–Making offer a meta-dimension. Sense-Making is "a set of metatheoretic assumptions and propositions about the nature of information, the nature of human use of information and the nature of human communication" (Dervin, 1992, p.62). In identifying fifteen meta-theoretical underpinnings of Sense-Making, Dervin resisted the linearity of written text as inadequate to

explain their interconnections, instead referring to them as "themes."[32] CLA emerged from the critical/analytic tradition of Futures Studies, which was contextualised in Chapter One. Critical Futures work does not simply critique and question. Rather, it is a deeply transformative and reconstructive approach that seeks "the grounds of new, or renewed options" (Slaughter, 2004, p.130).

In Sense-Making, information seeking and use are seen as "constructing" activities — as personal creating of sense (Dervin, 1983, p.5). For CLA also, "the purpose of communication is to begin to create a shared reality" (Ihsan, Inayatullah & Objiofor, 1995, p. 898). CLA is more recent than Sense-Making, having emerged from the synergies created through the critical and epistemological futures work of Sohail Inayatullah (1995, 2002, 2004). He attributed the influences of Galtung, Foucault, Shapiro, Sarkar and Slaughter (2004, pp. 4-5) in developing this response to the inadequacy of other methods to create "transformative spaces" for alternative futures (Inayatullah, 1998, p. 815). As a method, CLA integrated poststructural concepts of "deconstruction", "genealogy", "distance", "alternative pasts and futures" and "reordering knowledge" into a "poststructural futures toolbox" (ibid, pp.818-819). These tools can help not to "forecast" any future more effectively but to question it, so CLA's interrelating and informing levels can clarify complex interconnections. By referring to an "infinite tool kit", Slaughter (2004, p.94) opened the way to endless synergies. I suggest that Sense–Making is another useful tool.

While Sense-Making is a metatheory, futures studies is seen as a "globally distributed meta-discipline" (Slaughter, 2004, p.37), whose "ultimate purpose is to open out productive 'mind spaces', precursors of in-depth social innovations that, taken together, create the foundations for more advanced stages of civilised life"

[32] Her use of 'themes' here recalls the choice of "scape" in relation to globalisation, because it includes perspectives and inflections rather than "universal objectivities" (Appadurai, 1990, p.296).

(ibid, p.41). As he unpacked this term, it is "meta" because it integrates materials, tools etc. from various sources and a "discipline" because it can support "disciplined enquiry" into creating human futures (ibid, p.36). Within this meta-discipline, critical futures methods "refer to a set of powerful tools and frameworks that allow us to look 'beneath the surface' of social life, social being and to actively deal with the hidden realities and commitments that are found there" (ibid, p.92). Dervin (1999) referred to "shallow depths" and "hidden depths". She criticised the first and called for a process "of bringing the unsaid and unarticulated into consciousness" for the second (ibid, p. 746). CLA is one way of answering this call, as depicted in Table 7, below.

Table 7: A good fit: showing how the depth dimensions of Sense-Making and CLA are compatible

Sense–Making	Causal Layered Analysis
Shallow Depths	Litany (Pop Futurism) Social Causes (Problem Oriented)
Hidden Depths	Discourse Myth/metaphor/world-view (Critical/ Epistemological)

The cost may be the loss of simplicity, but the benefit is a kind of unlearning that can open the way for new ways of doing and being. In this sense, both methodologies are useful to help the move from True Simplicity to Apparent Simplicity in Somerville's model, described in Chapter Two.

3.5.3 Appreciate time as complex

Sense–Making and CLA integrate the complexity of the concept of time. Sense–Making "mandates attention to time horizons, past, present, and future" (Dervin, 1999. p.733). It assumes that "humans and their worlds are constantly evolving

and becoming" (ibid, p.731), and that "from the actor's perspective, time can be constructed in a variety of ways, linear, cyclically and otherwise" (Dervin, 1992, p.70). Inayatullah also sees time in terms of multiple metaphors, "seasonal, rise and fall, dramatic, mythological, expansion/contraction cosmic, linear, social–cyclical" (2002, op. cit., p.73). These different views "time" our world and impact on our futures. Consider for example, the difference between short-term, political-time based decisions and their long-term social and ecological impacts, (nuclear weapons, carbon-based energy). This highlights the need to consider important differences between "science-time", (what we can do) and "ethical time", (what we should do) (Somerville, 2000, p.282).[33]

By referring to "a" future, not "the" future and "a" past not "the" past, Sense–Making makes spaces for alternative histories and futures. This is reinforced by Sense–Making's claim to exist as a methodology that refuses certainty. It prefers the gaps, the spaces in which changes are always taking place, thus making it compatible with a post-structural, critical approach to the task of questioning and challenging any assumed future (Inayatullah, 2002, 2004; Slaughter, 2004).

The concept of alternative futures opens our thinking about futures to something we are creating, not some predetermined destination. Inayatullah uses Sarkar's "spiral" metaphor, (a present informed by both past and future) as a more inclusive alternative to the linear (one past, one future) or the cyclical (return to an idealised pre-modern past) model (1995, p.118; 1999, p.19).

3.5.4 A deep concern for the future of the planet

Eckersley concluded that the 'seven deadly sins' of pride, envy, greed, wrath, gluttony, sloth, and lust have been rehabilitated and "domesticated" as the "seven

[33] A recent example is the DNA sequencing, now apparently available for copying on the WWW, of the influenza virus which caused the global pandemic early in the 20th century and led to the death of millions.

marketing imperatives" of an unquestioned consumer hyper–culture (1999, cited in Slaughter, 2004, p.11). Effective Critical Futures work supports attitudes and strategies that move us towards healthier alternatives. "Not only do we need to think differently, we need to be different" (Inayatullah, 2002, p. 93).

Sense–Maker Dervin challenged the moves to better "knowledge management" as an insufficient response, either as a manifestation of, or "a proposed solution for human confrontation with issues of chaos versus order and centrality versus diversity" (1998, p.37). Some years ago she saw the need for a radically different conception of knowledge management generally, as urgent and serious, affecting "the success of our enterprises, the harbouring of scarce resources, and perhaps even the survival of the species" (ibid, p.45). Although this was a human–centred concern, she implied a space for all other species in her call "for the human species to humble its knowledge, to respect the diversity of knowers, and to find a way to use knowledge without arrogance" (Dervin, 2003, p.135). At a metatheoretical level this is expressed as "a utopian imagination" in which a utopian focus is "not an end, but a methodological move" designed to free research from assumptions which block change in humans and their systems (Dervin, 1999, p.734).

3.5.5 Use of metaphors

Metaphor is another foundational complementarity. Sense-Making is founded on a simple, clear metaphorical framework of "human beings travelling through time–space, coming out of situations with history and partial instruction, arriving at new situations, facing gaps, building bridges across those gaps, evaluating outcomes, and moving on" (Dervin, 1983, p.5). Using this core Sense-Making metaphor helped me to find and understand critical points in students' learning, resistance, and transformation as revealed through individual interviews. Metaphors offer

alternative ways of seeing the world to the current, dominant Western rational way of thinking, in which facts and figures predominate in "'the mind of the ratio', that is, analysis" (Wildman & Inayatullah, 1996, p.729). The challenge is to remain open to different perspectives and ways of knowing the world in an active relationship that enables each method or process to enhance the other (Inayatullah, 2002, p.56). Uncovering our own paradigms and cultural backgrounds is essential groundwork for such a relationship (Wildman & Inayatullah, 1996, p.733). This work has the added dimension of acknowledging the role of the spirit. Sense–Making incorporates the spiritual dimension by mandating openness to "not only thoughts and ideas, observations and understandings, but emotions and feelings, dreams and visions, pretenses [sic] and illusions, connections and disconnections" (Dervin, 1999, p.730). This makes it appropriate for helping students feel that their lives are significant to the curriculum and not "disengaged" from it (Inayatullah, 2002, p.58). Being sensitive to metaphors as part of culture and gender–bound language opens spaces for alternatives by making us aware of how limited metaphors can limit our teaching and our personal growth (Bowers & Flinders, 1990), as I show in Chapter Seven.

3.5.6 Methods

Sense-Making's metatheory *guides* our work, but it also includes *methods* of conducting research into "human sense–making (and sense un-making) in any context" (Dervin, 1999, p.729). I needed a methodology in which interviewees felt as free as possible to say what they wanted to under the contrived circumstances of an arranged interview. Sense-Making informs the "designing of interviewing" and "mandates respectful listening to users as theorists and knowledge–makers in their own world" (Dervin, 1998, p.42). In terms of data collection, Sense–Making methodology uses four techniques (with variations), the core of which is the Micro-Moment Time–Line Interview, described above.

The next section addresses the methodological level. Both CLA and Sense-Making (1) address power issues; (2) engage with diversity, culture and gender; (3) have a reflexive dimension and (4) open spaces for deep understanding.

3.5.7 Power issues

Sense–Making and CLA explicitly address power issues and assumptions. Sense–Making clearly states the need for reflexivity in terms of research practices and the way researchers think about them (Dervin, 2003, pp.123-124). I saw two implications here. Firstly, it is refreshingly free of the certainties of the kind of USA–centric view so incisively and respectfully criticised by Slaughter as a misplaced and un-informed belief in a world "without limits" (2004, p.74). Secondly, Sense–Making methodology thus addresses the warning that "inappropriate pedagogy effectively disengages the student from the 'internal' journey of immersion in the mystery of self…" (Wildman & Inayatullah, 1995, p.736). The student's life is significant in Sense-Making. Sense-Making attends to power by continually applying "questions focusing on the user's struggles, constraints, barriers, hurts and hindrances as well as the user's assessments of the relationships between a given moment of sense–making and the power structures of an organisation or society" (Dervin, 1998, op. cit. p.41).

The three main findings of previous Sense-Making research are that people do have understandings of how power works; that the Sense-Making approach results in users who reveal more than ordinary surveys achieve; and thirdly, that for this to occur, we must create a situation in which it is safe for them to address power issues (ibid). So Sense-Making sees "every sense–making instance … as a time to potentially disagree or find hindrance or exception" (ibid). This parallels Grounded Theory's search for negative case sampling and cases that challenge the emerging theory. For CLA, critique is essential because among other roles, it

"removes the 'taken-for-grantedness' of culturally derived meanings and helps us to locate ourselves…within these very social processes" (Slaughter, 2002, p.6).

Sense–making also challenges researchers to explore their role in generating and interpreting data and makes issues of power part of the mandated interviewing technique. Whichever variant of Sense-Making interviewing you choose, the respondent is seen as a colleague and the purpose of the interview must be made clear. The participants themselves have to learn new skills to make the most of the technique, so there is a potential for reciprocity in the relationship, as Chapter Six demonstrates. For example, one interviewee, a mature-age female, "Muffin",[34] wrote in an e-mail after I sent her the interview transcript for approval or change:

> *I am a bit scared to read back over the interview actually! I had no idea how scared I was of — everything. Quite incidentally, good friends of mine recently broke up, and when 'counselling' one of them, I noticed myself using some of the techniques you used in Sense–Making! Works like a charm for uncovering deep–rooted issues!*

3.5.8 Diversity, culture, and gender

Sense-Making and CLA are committed to engaging with social and cultural diversity. There is a respectful, reflexive mutuality in this approach that is very different from the power relations inherent in compensatory approaches. As stated earlier, Sense-Making warns against stereotyping individuals on any simplistic basis such as age, gender, ethnicity etc., while not ignoring the role these variables may play in individuals' responses to issues. In Australia, students from non-English speaking backgrounds (NESB) and Indigenous students are two groups who are often perceived in this way, as 'problems' to be

[34] I have *Muffin's* permission to use this email excerpt.

'fixed' or 'managed'. For example, 'Dealing with Diversity' remains a common title for conferences and workshops. Sense–Making specifically seeks to overcome or bypass deficit approaches by creating the most democratic and dialogic situation possible between interviewer and interviewee. Interview procedures are designed to discipline the interviewer so that the interviewee can be "as unimpeded as possible" (Shields & Dervin, 1993, p. 75). Attending to areas of maximum disagreement and agreement allows a space for the "full range of diversities that pertain to a situation" (Dervin, 1998, p.42). This includes "nurturing — caring for and responding to the human being who is the focus of the change" (Dervin, Harpring & Foreman-Wernet, 1999, p.4).

These strategies all fit within the Sense–Making method of "circling reality", using many different perspectives from different points in time and space to create a better idea of that reality (Dervin, 1983, p.7). Sense-Making and CLA share a commitment to multiple perspectives, being "…sensitive to the different ways we learn from each other and know the world" (Inayatullah, 2002, p.56).

Sense–Making is anti-stereotyping and anti-essentialist, since "Communication (i.e. knowledge management) works better when speakers are mandated to anchor themselves in their histories and their frameworks" (Dervin, 1998, p. 37). Thus, Sense–Making has been used to improve services to minority and/or disadvantaged groups in the USA where other methods have failed, usually because traditional approaches are deficiency-focused. Relevant examples include helping librarians to meet Hispanic Americans' needs for library facilities and helping medical workers to ascertain and meet some significant but previously unacknowledged concerns of mothers from NESB's. These women had recently given birth in US hospitals, where they found the procedures unfamiliar and alienating (Wittet, 1983, cited in Dervin, 2003, p. 289).

Critical futurists acknowledge that the "inner" world "of identity, culture, language, value and purpose" is a neglected domain (Slaughter, 2004, p.93). Sense-Making explicitly seeks out and values the spirit and emotions for three reasons. Although often ignored, (1) "they are a major measure of outcomes for human beings"; (2) "emotions play a large role in human capacities to share and cooperate with other people"; and (3) "emotions are a site of human struggles" (1998, p.42).

It is important to engage in the difficult work of facing our respective attitudes and practice that attach to class privilege, racism, wealth, corruption, religion, gender equity, Indigenous rights, or any of their complex intersections. Since teachers are not above this process but of it, we should share our own struggles. For example, Higgins, an American teacher in Turkish Cyprus used Sense–Making methods to implement and challenge the notions of radical pedagogy discussed earlier in this paper; that is, "encouraging self-reflection, recognizing the multiplicity of ways of knowing and experiencing the world, and incorporating students' experiences as a body of legitimate knowledge" (1998, n.p.). He found the process useful but problematic in that sensitive political context. I return to this in Chapter Eight as an example of the challenges faced by "Globally Competent" teachers.

Theories (and practitioners) which take equity seriously speak in terms of humanity, not 'Man'. '*Man*kind' is not the same as 'Humankind'. This is not a trivial change, since so many other attitudes attach to such choices. It takes courage to challenge gender–based assumptions. We can collude with the *status quo* by our silence, or support struggles to change. So, Sense–Making built on research using feminist methodologies to devise female–appropriate responses to health problems, rather than accepting assumptions based on research with men (Kearney, 1998, cited in Dervin et al., 1999, p. 5). Sense–Making methodology also nurtures our self-reflexive powers. This identifies it as

part of the transdisciplinary "congruence of insight" (Slaughter, 2004, pp.11-12) needed for healthier futures. Inayatullah teaches macrohistory that includes Gaian and feminist perspectives. His examples reflect an internalised gender–sensitive practice, in which:

> the feminist perspective on the real can be brought in at the worldview level, and thus challenge the systemic level and the litany level, both of which claim gender neutrality. Gender can be used to disturb fixed futures. By allowing negotiation of the future, by ensuring multiple perspectives, CLA fits well into feminist epistemology and the methods that are derived from it (Inayatullah, 2004, pers. com).

3.5.9 Reflexive dimension

CLA and Sense–Making combine well in relation to reflexivity, a concept central to this project, the methodologies, and my role. Sense-Making embraces an approach to metatheory in which methodology and researchers should be involved in on–going "reflexive analysis and development of methods" (Dervin, 1999, p.728). Applying reflexivity, as explained previously, led to confronting questions about my use of reflective journals. Previous research had highlighted the power of this increasingly popular teaching strategy and its potential for harm, despite good intentions (Boud, 1998). It led me to use detailed metaphor analysis to test my motivation and the reflective journal process against these well–founded concerns (Deshler, 1990).

The researcher as a human sense–maker is also struggling and must be prepared to see his/her interpretations and understandings "humbled and tested in dialogue" (Dervin, 2003, p.145). Similar understandings and qualities are required of those wishing to work as futurists (Inayatullah, 2002, p.98). It is this resistance to work based on ego and the corresponding urge towards a better world that leads to uncompromising critique of hegemony at a global level. At

this level reflexivity is a broader, explicitly values–based, conscious, "reflexive capacity" (Barnett, 1997, p.6). This related directly to my work, because it addressed the role of the individual in making sense of their world, however constrained that may be. Sense–Making specifically resists any approaches that blame the victim or rely on 'expert' assumptions about any group. Part of my role, supported by Sense–Making's interviewing protocol and its theoretical underpinnings, was to create a situation in which students felt comfortable to share. "Humans can and will talk about their confusions and stumblings if the dialogic interface is conducive to trust" (Dervin, 2003, p.144). This clearly involved more than being conscious of my positioning and my potential to control any interpretation. My initial fear of what I would find from the interviews gave way to renewed respect, not just for the students I interviewed but for the many I did not, each of whom must have been equally complex. It had practical (although not entirely successful) effects in my responses to the (on–line) sexism and negativity of several 2003 students[35]. I argued strongly but respectfully for the alternative behaviours I expected from them. I was no longer hiding behind my "objective" researcher role but deep in the swamp of practice (Schon, 1997).

3.5.10 Open spaces for deep understanding

Sense–Making searches for patterns in how people construct sense, rather than for mechanistic input–output relationships, observing rather than assuming connections "between information exposed to and uses" (Dervin, 1983, p.7). So, my Sense–Making based interviews were designed to provide a richer and deeper understanding of how the Reflective Journals were used to record learning and what helped or hindered students' ability to bridge the gaps in their

[35] I made a mistake with the discussion line. In 2003, I was concerned at a slanging match that had eventuated between two students, male and female, and intervened. Although I tried not to be judgemental, as Inayatullah observed in another context, it had the effect of "silencing their voices" (2002, p.85).

knowings (at any level) between the beginning and end of the twelve-week unit of study.

The fact that CLA analyses in vertical and horizontal dimensions, both depth and layers, does not exclude other understandings, since CLA, based in nurturing metaphors, can "feed into and be fed by other methods" (Inayatullah, 2003, pers.com). So while the Sense-Making dimension reveals interconnectivities that might appear as "overlapping circles", applying CLA would reveal them as "more like overlapping water–towers" (ibid), in which each identified connectivity emerges from and is nested in multiple, layered understandings. Moreover, in futures studies, diversity is not just seen across cultures but across time. "Advanced futures work cannot be based on ego; it is an expression of shared transpersonal aspirations to help create a better world" (Slaughter, 2004, p.41).

3.5.11 Sense-Making and BNB007

Dervin identified ten assumptions flowing from the metatheory of Sense-Making. I summarise these in the first column of Table 8 below. The second column summary provides an overview of how I perceived Sense-Making informed the role of the Reflective Journals in the context of BNB007.

Table 8: Comparing Sense- Making theoretical assumptions with exemplar applications in BNB007design and process

Sense- Making assumptions	How demonstrated in BNB007
Sense-Making is gap-bridging	While the Reflective Journals created a gap for many students, they also motivated bridging that gap. In the process, many students learned new skills and experienced personal growth
There are many ways to make sense	Students were encouraged to borrow, make, reject ideas – engage in learning and unlearning. Resisting is one legitimate response.
Sense-Making is anchored in time and space It is Internal (thinking, remembering) and External (asking, objecting)	**Internal:** Reflection required students to engage with their learning, willingly or unwillingly. **External:** There were spaces to object - the journals, formative assessment, email communication, the discussion line. "Why do we have to do this"?

Table continued from previous page	
Sense-Making is the intersection of three horizons, past, present and future	We were responsive and respectful of what students brought to learning, the past. Futures thinking was embedded in the Personal Learning Agreement, the content and the encouragement to value family and cultural input as part of the learning process in the present.
Can be flexible or inflexible	Resisters are often inflexible Sense-Makers. For example, one way for them to "bridge" the gap was to try to turn back. 2001 resisters complained to the administration to try to reverse assessment back to their comfort zone (Teekman, 1991).
Involves energy – push and constraint, "within" and "without" Within is characterised by motivation/resistance Without is represented by barriers/helps.	Contrasting energies are represented by Resisters versus the (once unacknowledged) majority of motivated Accepters and Converts.
People can make sense of their worlds	Reflective Journals and interviews offered rich evidence of struggling. This gave me respect for all students and the learning process. The Reflective Journal process + content + support built students' respect for each other and supported successful team work for many. .
Focusing on verbs of experience means you can compare one Sense-Making instance with another	I saw students' deep commonalities rather than surface differences. Students "got insight" or "got courage" regardless of differences of gender or culture, age or background.
Comparisons yield centrality and dispersion – ask under what conditions each happens? What are the implications?	Sense-Making analysis offered deeper understanding of how and where points of transformation or points of resistance occur. The understandings gained led to more effective personal and pedagogical responses.
10. I am also a Sense-Maker. Any expertise I claim must be examined.	Using Sense-Making methodology in and on the Reflective Journals and the interviews made me continually re-examine my motives and process. Fits Sense-Making's mandate that communication between researcher and researched "be conceptualised, designed and practiced dialogically" (Dervin,2002, p.234) I am more confident, more understanding of the origin of and legitimacy of "resistings" - willing and able to engage respectfully and authentically.

3.6 Why are these methods potentially useful?

Critical Futures work is useful because it helps to explain what lies beneath current concerns and it can therefore support attitudes and strategies that move us towards healthier alternative futures. In terms of critical language, referring to students as participants or interviewees rather than "subjects" entailed thinking about what rights they had in relation to the study. I addressed this at a practical level through my letters to participating students, making the interview process transparent, including a web-link to my previous writing about the Reflective Journals and inviting them to comment on it (Appendix 7). Interviewees gained from the experience of the Sense-Making methodology, which addressed issues of power by being clear about what questions are asked and why. Many of the interviewees perceived it as useful in the ongoing process of self-understanding, as demonstrated in Chapter Six.

I applied Causal Layered Analysis to the collated Reflective Journals I had permission to use and could access from the 2000-2004 cohorts, in conjunction with twenty-six interviews devised according to Sense-Making methodology and analysed according to Sense-Making methodology. This produced a meta-view of the underlying metaphors and world-views of the three graduate visions and of the student learning and resistance in the unit. Sense-Making and CLA provided complementary understandings of what transformation or resistance meant for these students as analysed from the Reflective Journal data and the interviews. Finally, my reading and my on-going work with engineering students contributed to my own growth.

3.7 Conclusion

In this chapter I argued that Causal Layered Analysis and Sense-Making were complementary and useful methodologies for understanding students'

transformation or resistance to change within a Higher Education context. I identified multiple connections at a deep level to inform futurists and sense-makers as well as other student-centred teachers with an interest in transformative teaching. To my knowledge these two methods have not previously been used in tandem, so the findings created new links and suggested alternative ways of creating and analysing data. These theories and methodologies are used in Chapters Five, Six and Seven to investigate the inner worlds of these students (and myself). They helped to identify stumbling blocks, supports and transformation points in their learning through, and as demonstrated by, their Reflective Journals and subsequent interviews. The next chapter, Chapter Four, describes the data sources in detail and summarises the empirical data from the questionnaires. This gave a quantitative basis to my observations based on the initial Reflective Journals, that significant changes had taken place in students' attitudes to a number of core issues.

Chapter Four: Data Sources

> *Human beings possess significant reflexive powers; they can look afresh upon the world (inner and outer), revise assumptions, explore others and together, re-invent their worldview by consciously incorporating other elements (Slaughter, 2003, p.12).*

Introduction

This research arose out of practice. I recognise that preparing a research design in this context represents "a cyclical rather than a linear process" (Blaikie 2000, p 13) and I have imposed order on what arose out of an iterative process during the teaching period studied. From 2000-2004, I used various complementary qualitative and quantitative methods to gather, analyse, synthesise and evaluate the data. In this Chapter, I first describe three issues relevant to the data collection process, the Background, Ethical Issues and Changing Context – What is "normal?" The chapter then introduces the data sources which are:

1. The Pre and Post questionnaires from 2000, 2001 and 2002
2. The Reflective Journals of those students who gave permission for their journals to be used for research purposes, 92/301 in 2000 or 31% of the cohort, 144/317 in 2001 or 45% of the cohort, 144/358 in 2002 or 40% of the cohort and a 10% sample of the 2004 cohort or 38/380. I included six journals from 2000 and two journals from 2003, one of which is from *Fiza*, an interviewee. Not all these journals were saved in the final samples.
3. Interviews with 26 students, five female and twenty-one male, five from 2001, 20 from 2002 and one from 2003; as well as four members of the

Professional Practice teaching team and my mandated self-interview, all of which were devised and conducted using Sense-Making methodology and methods. The next section introduces the Data Collection Process.

4.1 The data collection process

I explain this process under three headings, "Background", "Ethical Issues" and "Changing Context".

4.1.1 Background

I explained previously why I documented and evaluated my early work in Engineering. The mainly positive but polarised evaluations from the original interventions with the small cohort of the 1998 precursor unit BNB005 spurred more detailed research. What is significant is that we could already discern the basic response pattern of later cohorts. For example, of the 70 "Positive" and "Negative" responses to the suggested Work Contract, 7 marked potential "resisters" in the group - 10 per cent, a similar Resister percentage to that which presented in following cohorts. These responses included instant antipathy to group activities, an unwillingness to try something new and the desire for numbers-based content. The overwhelming majority, however, as in following cohorts, were positive and welcomed the opportunity to express feelings otherwise unheard.

I used a Harvard One Minute Evaluation or the Minute Paper (Cross, 1994) to evaluate that session. This simple, anonymous strategy has variations of two open-ended statements, "Three things I have learned or am taking away from today's session are…" and "One unanswered question (or muddy area) I am leaving with today is…".

It is effective for several reasons.

- Sense-Making elements are identifiable in the way it foregrounds the positive aspects of learning and its lack of "blame" in relation to the unclear areas. It is not the student's fault if he/she did not "catch" information, nor the lecturer's for "bad aim" (Dervin, 2003, p. 35).
- It is non-threatening to the lecturer/tutor because it is anonymous, between them and the students only and can be used to alert teachers to any emerging problems with teaching or content before a formal evaluation reveals them publicly, with attendant consequences.
- It is quick and easy to administer. I prepared the sheet using a Power-Point slide and printed the required number. It can also function as a communication exercise in which students work in pairs or small groups to discuss the issues arising. Individual or group responses can be left at the front of the room or in a box as students leave.

In order to be effective, some or all of the questions raised must be addressed at later sessions in some form of reciprocal feedback. Students then know that their comments are being taken seriously. We collated their comments and posted them on the unit web-site. Collating and sharing enables students to see negative comments in context, not as the majority, dominant or *only* voice but in perspective, as one among many, usually positives (Brookfield, 1995). This challenges the power of "in" groups and gives confidence to students who benefit from such activities and who would otherwise be silenced. In innovative units, early positive feedback is very important to assure the innovator, students and the administration that strategies are effective or, if not, that the areas needing change are being identified and redressed wherever possible. The Harvard One Minute evaluation for this 1998 session revealed that the activities contributed to students' "confidence", "communication skills" and "friendship". Many similar

words emerged in the comments on the Draft Learning Agreement as well. Student comfort is important to setting the scene for change and transformation. The discomfort which also plays a key role in transformation comes later!

The final assessment in 1998 (a multiple choice exam), which was outside my control, did not support the aims or process of the unit. In 1999, in collaboration with the Coordinator of the unit, I contributed to creating more appropriate assessment items for 1999, including the Reflective Journals. I was not engaged in formal research that year and I helped to mark the almost 300 journals, which were submitted in hard copy. The process was labour intensive, but the sociological, academic and personal reasons stated in the Preface encouraged me to begin this study. The next section deals with Ethical Issues relevant to the data collection.

4.1.2 Ethical issues: The pre and post questionnaires 2000–2002

I had limited experience of questionnaires and so sought advice to develop and improve the instrument, as I have acknowledged (pp.vii-viii). Any imperfections are mine. In terms of the need for anonymity and confidentiality, the questionnaire responses were anonymous (Appendix 1). On advice, in 2001 I changed the questionnaire to ask students to code their responses with self-generated coding, based on their mother's initials and their own day and month of birth. This meant that they could be paired, but not identified. This resulted in 94 paired responses in 2001 and 72 in 2002, which added a reliable, comparative dimension to the 2000 unpaired questionnaire results. I also changed the wording slightly. "Not sure" in the 2000 questionnaire became "Neutral" in following questionnaires. The 2000 statement number 3, "*Engineering is like science, neutral and apolitical*" changed to "*Engineering is neutral and apolitical*" in later questionnaires. Statement 12 in 2000, "*Culture (how we see the world) is*

an important part of engineering decisions" became "*My cultural background is an integral part of my engineering decisions"* in the later years.

4.1.3 Ethical issues: The Reflective Journals

I applied for and gained ethical clearance for this research from the relevant Head of School in August 2000. Consequently, to avoid students being in a dependent position vis-a-vis the researcher, but I played no role in the Summative Assessment of the Reflective Journals between 2000-2002. As the designer and developer of the Reflective Journal section I have always advised and supported the other marker/s of the journals. Until 2003, I was an adviser of "last resort" if students wanted extra feedback or if they had a problem that I could solve faster than the actual marker. This feedback was informal and formative only. Each semester I have delivered two lectures, an introductory Reflective Journal lecture and a lecture on Intercultural Sensitivities and International Responsibilities. I reluctantly agreed to be on a panel of three judges for some of the group presentations as part of their assessment in 2001-2003 as a stand-in for an absentee judge or because there were not enough judges.

In 2003, I was asked to mark the Reflective Journals and to take formal responsibility for the on-line administration of this section of the unit. In this direct capacity, I wanted to create a supportive environment or "oasis" for the students. This role seemed incompatible with asking student permission to use their journals for my research. I was always open about the fact that I was researching Reflective Journals and I knew that some students were suspicious about this. I did not want them to feel that their assessment was in any way related to their participation or non-participation in my research. This was frustrating because I also had more direct input to the readings chosen in 2003

and wrote over seven thousand words in the On-Line Notices that went out to students during the semester. As a result, the online discussion forum saw a dramatic increase in contributions, from about 20 in 2002, to over 200 in 2003. This extra support may also be the reason why the non-completion rates dropped dramatically in 2003 (3%) and 2004 (7%) compared with the rates for previous years, which saw a low of 10% in 2000 and a high of 27% in 2002. This decline was despite the fact that 2003 was also the largest cohort to date, 367 students, in which under previous circumstances of less support it would be reasonable to expect a higher rate of non-completion. There were no funds available to pay for this intense moderation role in 2004 and the rate of non-completions rose slightly but still remained below pre-2003 rates. I discuss some implications of poor funding and the casualisation of labour in Chapter Eight.

Not asking for permission to use the 2003 journals was a self-imposed constraint on my access to data that year and in retrospect, unnecessary. My compromise in 2004 was to send out individual requests to use the Reflective Journals after the marks had been submitted. At this point, students would realise that whether they agreed or not would have no possible effect on their marks. This did not result in permission to use as many journals as in the cohorts where I played no part in assessment and sought permission in the lecture or at tutorials. I did however, have electronic access to most of the journals from 2003-2004 for purposes of comparison. In 2003, I had to mark the remaining 279 of some 380 Reflective Journals when, at short notice, the other marker moved interstate. In 2004, I requested more markers and shared the journals with two mature female markers, both of whom also had training in Teaching English as a Second Language, (TESOL).

Our process for achieving a degree of common understanding involved sharing the first ten journals by email and marking them. We then met to compare our marks and our reasons for giving them, according to the marking criteria. If the other tutors were concerned, they sent journals to me for comment and double-marking, as I did to them. I marked 90 of the journals in 2004 but also took responsibility for the Reflective Journal section of the web-site and for sorting out any associated problems that the other markers or students had, up to the point where marks were submitted. Due to budget restrictions, the hours available for this work were greatly reduced, and possibly as a result of this, there was little activity on the Discussion-Line, students preferring to email me directly, as I undertook to answer within 48 hours of receiving emails.

The 2004 Reflective Journal sample is representative of the large group since the 38 included 24 Accepters (63%), 10 Converts (26%) and 4 Resisters (11%). In maintaining the confidentiality of the reflective journals in reporting the research, I identified students by attributes of age-group, cohort, gender, English speaking background (ESB) or non-ESB, resident or International student, where I knew them, to indicate that effective design does impact positively, across student diversity, albeit at differing levels of development and skills.

4.1.4 Ethical issues: The Sense-Making interviews

To gain separate, written permission for interviews in 2000, I attended all but one tutorial personally on the same day[36], asking students if they were willing a) to allow me to read and use their journals for research purposes and b) to participate in an in-depth follow-up interview. There were two separate sections for these permissions (Appendix 6). As mandated by Sense-Making Methodology, interviewees are identified in this study only by their self-chosen

[36] The class I did not attend was a very small night-time tutorial of 4 students. The tutor gave out the letter to these students and returned the completed forms to me.

pseudonyms to which I have added the status I have assigned them as Accepters, Converts or Resisters, their gender, age group including Mature Age (M-A) and ESB/NESB status. I used the same form and approach to gain permission for interviews in 2001 and 2002. I asked for and received permission to interview *Fiza* in 2003, after several face to face meetings related to her concerns about the Reflective Journals. The following section of the Data Collection Process covers the impact of the dramatic political events of the new century which have been a part of this research context.

4.1.5 A changing context – What is normal?

2000 was the only uneventful or "normal" year in terms of global events in an Australian context during the study. The 2001 data may be problematic because I surveyed this cohort several weeks after the September 11 attack on the World Trade Center towers in New York. Tutors reported that some students became less interested in their studies at that time and generally "unsettled". As one student wrote *"I woke up [to] the attacks in America Wednesday morning, I felt paralyzed and stunned. I didn't get much work done today" (Male, M-A, ESB, 2001).* Similar attacks have happened in each following year, including the London bombing less than two weeks before the final semester of BNB007 began in July, 2005. There are also on-going similar horrors in Iraq and elsewhere. All such events impact disproportionately on the Muslim students in the cohort (Dodd, 2005, p.8). I concluded that the idea of a 'normal' year, meaning uneventful, if it did once exist, no longer does. Students and researchers in previously privileged and peaceful environments such as Australia may have to deal with on-going uncertainty and unforeseen unsettling events. "Terror-scapes" (real and created) may have become a new and deeply value-laden global research dimension.

4.2 The students

The diversity of the 2000 cohort was typical of all the cohorts to date. The vast majority (>80%) were male school leavers and mainly from English speaking backgrounds. About 70% identified with being from English Speaking Backgrounds in the questionnaires. Between 2000-2005, the number of female students varied between 5% and 9%, with no systematic trend evident. There is great cultural and linguistic diversity in each cohort, reflecting the Australian community in which one in three was either born overseas or has at least one overseas-born parent. The number of International students in each cohort varied between a low of 7% in 2001 and a high of 16% in 2004. In 2005 it was back to 12%, reflecting generally reduced International student numbers. In the 2000 age profile, almost 80% were 17-20, 13% 20-25, about 4% between 26 -30 and 4% over 31. The school leavers in the samples came almost evenly from private (37%) and state or public schools (42%). About 80% of the samples are first year students, the rest are students from later years who were "catching up" or repeating the subject, since it was a compulsory part of their degree. As the questionnaires showed, there was an increasing, significant group of mature age students, between 15-26% of the samples. Many of these were males, who entered from a trade, often via the Vocational Education and Training (VET) programs that link into QUT. Some of these students had not written significant amounts of text for about ten years, since leaving school. However, this group also included a handful of highly articulate graduates who were making a career change to engineering from degrees as diverse as nursing and economics. Three interviewees were in this category. Positive and negative implications of this change emerge clearly in the interviews with students from this group (*Bo, Muffin,* and *Peter Parker*), as discussed in Chapter Six.

The International students were only a tiny fraction of those who withdrew from the unit, possibly because they are high achievers, are more highly motivated to study and are under more pressure to succeed. They have also been more likely to ask for help. The number of part-time students has risen from 18 in 2001 to 31 in 2004 when 61% of these did not complete the unit. Engineering is a demanding course and many part-time students cannot meet these demands and their work obligations.

I now turn to descriptions of the data sources themselves, beginning with the Pre and Post Questionnaires.

4.3 Data sources

4.3.1 Pre and post questionnaires

These were not intended to be a main source of data for this qualitative thesis but simply an "exploratory" or inductive moment (Blaikie, 2000, p.104) enabling me to establish whether there was any factual basis to the impression I gained from the 1999 journals, that students' attitudes were changing in significant ways. I began with a Pilot questionnaire in 2000 for which I have no paired samples (301 completed) (Appendix 3). I administered this again at the beginning and end of the semester in 2001 and 2002. For 2001, I have 94 paired examples, 30% of the total cohort (Appendix 4). For 2002, I have 72 paired samples or 20% of those completing the unit (Appendix 5).

The changes in student attitudes between the start and end of the one-semester unit were measured by responses to fifteen statements, using a 5-point Likert scale (Appendix 2), except for the statement, "I intend to work overseas when I graduate", which was answered with *Yes/No* in 2000 and was changed to *Agree/Disagree* in 2001 and 2002.

The Statements. Although not grouped in the actual questionnaires, these statements fit into four groups, each of which involves different levels of understanding and poses different levels of challenge, as I explain below. I modified the questionnaire after 2000, so the numbers of the statements refer to those used in the 2001 and 2002 versions. Statements 14 and 15 were interchanged in 2001. I inadvertently omitted Statement 13, "*Engineers are responsible to future generations for what they do today",* from the first questionnaire of 2001 only.

Group 1 Statements: "We do the job".

1. Engineering is applying knowledge to improve the world

3. Engineering is neutral and apolitical

4. Engineering rarely involves ethical considerations

6. Australia has no serious environmental problems

11. Engineering practice involves dominating the natural environment

These statements were based on accepted generalisations or "truths" about engineering, taken from previous student comments or widely held assumptions about engineering and the environment. They match the unproblematic dominant views based on unquestioned "certainties" or the Globally Portable vision of the Litany level in CLA terms.

Group 2 Statements: "We do the job better"

2. Engineers need to be able to work with several fields of knowledge (disciplines)

7. Engineers should be aware of contemporary issues and their historical context

9. Simple technologies are often the most effective

15. I expect to work overseas when I graduate (2001)

These statements begin to challenge traditional roles in that they introduce awareness of the need for interdisciplinarity or multidisciplinarity, the need to have a broad general knowledge and the ability to see that the most complex solution is not necessarily the best. In Statement 15, I was interested in how many students already saw themselves as part of a globalised profession. This statement took on extra significance after September 11, 2001 introduced a new perception of risk to international work and travel. These statements loosely fit a Globally Competent vision or the problem-based level of CLA, how problems are addressed in short term historical, social and technological systemic ways.

Group 3 Statements: How and why should we do this job?"

5. New technologies create as many problems as they solve

10. Engineers working in teams must be sensitive to gender and ethnicity

12. My cultural background is an integral part of my engineering decisions

14. Respect for the past should be included in engineering decisions (15 in 2000)

This level is more challenging, suggesting that more technology is not the answer, introducing and "naming" culture and gender as visible and important issues for engineers and using the word "respect" in terms of the past. This opens up issues such as heritage and Indigenous rights and the rights of "others"

whoever they might be. These can be seen at the Discourse level of CLA, since I am introducing and foregrounding a vocabulary of care, dialogue and awareness that emerges from a partnership paradigm rather than the dominator paradigm of Statements 11, 4 and 6. It involves critical thinking. This level is reinforced at the next and most challenging statements, Group Four.

Group Four Statements: "We do better things"

8. Engineers should understand and respect the economic, social and biological interdependence of life on Earth

13. Engineers are responsible to future generations for what they do today.

These statements emerged from the areas of sustainability and Futures Thinking. "Interdependence of life on Earth" involves an awareness of humans as one among many species living in a vulnerable ecosystem with finite resources. The value-laden use of the word "responsible" in relation to future generations is the opposite of the short-term thinking on which the dominator paradigm depends. In CLA terms, the statement sought to ascertain whether the students' founding myth or metaphor was a variation of "MAN has dominion over the earth and can use it as HE pleases" or whether it was guided by a partnership paradigm represented by a "We are one significant element of a complex ecology and responsible for its health" view.

Cultural Questions. Section 2 of the questionnaire asked for information about 6 aspects of the students' backgrounds: age, gender, current year of study, education (school leaver, private or government), whether mature age student, International student (full fee paying or scholarship) cultural background (whether Anglo/Celtic/Other), Non-English speaking background/s and whether students

identified with any particular cultural or language groups. I also asked which of the three tutors' groups they were in, although I did not use this information.

I believed that students would feel more confident to identify with a cultural/language group if their learning environment overtly valued any cultural knowings they brought with them and actively encouraged them to incorporate these in their work, as BNB007 did in the written unit outline. For example, in African and South Pacific nation contexts, Baker and Taylor (1995) reported more effective science learning from a "harmonising of old way/new way" approach rather than one based on rejecting any past knowledge that did not fit a "western" model. Sense-Making's gap-bridging metaphor encompasses this harmonising approach by seeing "gap bridging" or learning not simply as a linear process but one which may entail going back into the past or forward to the future to inform the present. In CLA, time is contextual and makes spaces for the observer. Where the curriculum does not value cultural knowings, but assumes students are a *tabula rasa*, whose task is to learn and apply new, given "knowledge", this may pose a barrier to the gap-bridging process that is making meaning of one's world. So I expected that more students would identify with a cultural group at the end of the semester than at the beginning.

Section 2, Question 5 (2000) and 5.3 (2001-2) (Appendix 2) included a question relating to identifying with a cultural or language group, in order to allow students to self-identify in more meaningful ways than simply English Speaking Background or Non English Speaking background. This revealed that most cohorts included students from around thirty different ethnic groups and various cultural combinations thereof, for example, *"Finnish-Fijian-Indian", "German-New Zealand*". 13% took this opportunity in 2000, identifying with language, religious or cultural groups as diverse as *Afrikaans, Jewish, Bosnian* and *Welsh*. Similarly

13% in 2001 and 15% of the paired group in 2002 identified as Non English speaking background or with another culture. Indigenous Australian students would usually be classed as English-Speaking background[37] but this does not accommodate the cultural identity that is a powerful force for many. To date, few Indigenous students have taken up Engineering. Several have self-identified in the Reflective Journals. One Aboriginal student accepted to do an interview but withdrew from Engineering.

In the next section, I summarise only some points of interest arising from the questionnaires and include several exemplar tables or graphs, according to year, but all questionnaire results are included as Appendices 3-5.

4.3.2 Results

Group One statements (1, 3, 4, 6, 11). In 2000, the responses to one of these statements showed quite striking changes. At the beginning of the semester, 31% agreed with Statement 3, *"Engineering is, like science, neutral or apolitical",* while 32% disagreed. At the end of semester, those figures had changed to respectively, 24% and 43%. So the group was about equally divided on the question at the start of the course. By the end, many had changed their thinking, since nearly twice as many disagreed as agreed.

Less dramatic changes were evident in responses to the other statements. In relation to Statement 6, "*Australia has no serious environmental problems",* 6% agreed at the beginning of semester in 2000 and 73% disagreed. By the end of semester only 3% still supported that statement and 84% disagreed. There was a similar change apparent in relation to Statement 4, "*Engineering rarely involves*

[37] There are Indigenous students from islands in the Torres Strait, for example, for whom English is a second or a third language after mother tongue and Kriol. The term Indigenous, (capitalised) includes Aboriginal and Torres Strait Islanders. Aboriginal refers to Indigenous people from mainland Australia only.

ethical considerations". The percentage disagreeing changed from 73 at the beginning to 84 at the end. A small group, 10%, agreed at the beginning and at the end of the semester. This percentage is similar to the number of resisters in each cohort. The responses to Statements 1 and 11 did not change significantly.

Table 9: Statement 3, 2000 *"Engineering is, like science, neutral or apolitical* (unpaired data)

	Start		**End**	
	N	%	N	%
Missing	12	4.7	2	1.3
Agree strongly	10	3.9	6	3.9
Agree	68	26.6	31	20.4
Not Sure	83	32.4	48	31.6
Disagree	75	29.3	56	36.8
Disagree strongly	8	3.1	9	5.9
Total	256	100.0	152	100.0

Table 10: Statement 3, 2001, *Engineering is, like science, neutral or apolitical* (paired data)

	Questionnaire 2					
	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Missing	1	.	2	1	.	4
Agree Strongly	.	2	4	2	1	9
Agree	1	9	19	16	2	47
Neutral	2	3	7	17	3	32
Disagree	.	.	.	2	.	2
Total	4	14	32	38	6	94

In 2001, paired data (94) were available. Based on these, responses to Statement 3, "*Engineering is, like science, neutral or apolitical*" again showed large and significant changes in desired directions. Whereas 56 students agreed or agreed strongly at the beginning, only 11 of these agreed and 1 agreed strongly at the end. While 32 were neutral in relation to this statement at the

beginning, 20 of these had moved to disagreeing or disagreeing strongly at the end.

Statement 4 responses showed a similar change, with 10 of the 13 students who were neutral in the first questionnaire changing to disagreeing or disagreeing strongly at the end. In relation to Statement 11, "*Engineering practice involves dominating the natural environment"*, 30 students gave a neutral response in the first questionnaire. Only 11 remained neutral at the end while 16 disagreed. However 3 polarised in the opposite direction and agreed.

The 2002 paired data (72) again showed significant changes in response to Statement 3, which was stated as "*Engineering is neutral or apolitical*". 36% disagreed or disagreed strongly with this proposition at the start of the semester: this increased to 50% at the end. Although those agreeing and strongly agreeing remained almost the same, Neutral declined significantly, with the most noticeable change going from Neutral to Disagree.

Table 11: Statement 3, 2002, "*Engineering is neutral or apolitical*" (paired data)

	Beginning		**End**	
	N	**Percent**	***N***	**Percent**
Strongly Agree	5	6.9	4	5.6
Agree	11	15.3	10	13.9
Neutral	29	40.3	21	29.2
Disagree	22	30.6	31	43.1
Strongly Disagree	4	5.6	5	6.9
Missing	1	1.4	1	1.4
Total	**72**	**100.0**	**72**	**100.0**

There was a similar change in the responses to Statement 4, *"Engineering rarely involves ethical considerations"*. Here, the percentage selecting Disagree or Strongly Disagree increased strongly, from 67% to 88%, indicating the benefit of including Ethics as a weekly topic. Those who had agreed dropped from 8% to

3%. It is even more significant that the percentage strongly disagreeing doubled, from 22% to 44%, since values change will depend on firmly based ethical views.

The responses to Statement 11, *"Engineering practice involves dominating the natural environment"* also showed strong changes. The group who agreed or agreed strongly halved from 22% to 11%, while those disagreeing or disagreeing strongly increased from 50% to 68%. This included twice as many who strongly disagreed at the end, an anticipated outcome.

Statement 1, "Eng*ineering is applying knowledge to improve the world*" showed increases in those agreeing from 82% to 94%. This significant change suggested more positive feelings towards the Engineering profession. This conclusion was supported by the expanded understandings of a professional engineer's roles reported in the Reflective Journals and in the Interview data in Chapter Six.

In relation to Statement 6, "*Australia has no environmental problems*", while the numbers disagreeing or strongly agreeing stayed about the same, there was a move from Disagree to Strongly Disagree, which could indicate that students felt supported in and therefore more confident to hold this opinion.

Group Two statements (2, 7, 9, 15). The 2000 pilot data gave strong indications that student attitudes to the open-ended statements were changed by the experience of BNB007. Responses to Statements 2, 7 and 9 showed movement in the direction that the unit designers expected. For example, in 2000, at the beginning of the semester, 87% agreed or agreed strongly with Statement 2, "*Engineers need to be able to work with several fields of knowledge or disciplines*", while at the end of the course the figure had increased to 95%. Statement 7, *"Engineers should be aware of contemporary issues and their historical context"* saw an increase in those agreeing or agreeing strongly from

76% to 82%. What is significant here that the numbers agreeing strongly rose from 12.5% to 18.4%. For Statement 9, "*Simple technologies are often the most effective*" those agreeing or agreeing strongly increased from 67% to 76% while those disagreeing or disagreeing strongly shrank from 11% to 5%.

The 2001 paired data (94 paired samples from the beginning and end of semester) confirmed that some significant changes were occurring in students' attitudes. In response to Statement 2, "*Engineers need to be able to work with several fields of knowledge (disciplines)*" 14 students were neutral in the questionnaire but only 3 remained neutral at the end (Table 12 below). The others changed to either Agree or Agree Strongly with the statement. Of the 54 students who agreed in the first questionnaire, 21 agreed strongly and 29 agreed in the second questionnaire, while 4 of these moved to a Neutral stance.

Table 12: Statement 2, 2002, "Engineers need to be able to work with several fields of knowledge (disciplines)" (paired data).

	Beginning		**End**	
	N	**Percent**	***N***	**Percent**
Strongly Agree	28	38.9	34	47.2
Agree	37	51.4	32	44.4
Neutral	4	5.6	5	6.9
Disagree	2	2.8	1	1.4
Strongly Disagree	0	0.0	0	0.0
Missing	1	1.4	0	0.0
Total	**72**	**100.0**	**72**	**100.0**

Statement 9, "*Simple technologies are often the most effective*" showed changes in that of the 24 students who were neutral at the beginning only 10 remained neutral at the end, with 1 moving to Disagree but 12 to Agree and 1 to Agree Strongly. Similar responses emerged from the 2001 paired data in relation to Statement 7, *"Engineers should be aware of contemporary issues and their*

historical context". Of the 27 students who were neutral at the beginning, 17 agreed by the end of the semester. There were also changes in the other direction. Of the 9 students strongly agreeing in the first questionnaire, 2 had moved to Disagree in the second.

In the 2002 paired data, the response to Statement 2, "*Engineers need to be able to work with several fields of knowledge or disciplines*", showed strengthened acceptance of the need for transdisciplinarity. Those agreeing or agreeing strongly only increased from 65 to 66 (out of 72) but the number agreeing strongly increased from 28 to 34.

Responses to Statement 7, *"Engineers should be aware of contemporary issues and their historical context",* showed a decline in the numbers of students disagreeing and disagreeing strongly. There was also a decrease in the Neutral response, with the number agreeing or agreeing strongly increasing from 50 to 58.

The only significant change in relation to Statement 9, "*Simple technologies are often the most effective*" was a strengthening of the degree of agreement among those who agreed at the start of the unit: the number strongly agreeing doubled from 7 to 14, with an equal reduction in the number agreeing. There were no significant changes in the minority who disagreed or were neutral.

Table 13: Statement 15: "I expect to work overseas when I graduate"

Year	Start %	End %
2000 [non-paired]	*45*	*57*
2001 [paired]	*62*	*50*
2002 [paired]	*38*	*50*

I highlight the responses to Statement 15, Table 13 above, for the three years, because I had originally anticipated that the unit would encourage students to

consider working overseas, since cultural issues were an important aspect of the unit and we encouraged students to think of themselves as global professionals. In 2000, which was the only year without a traumatic global event, in relation to this statement, the percentage agreeing or strongly agreeing did show a marked increase, from 45% to 57%.

The 2001 data in relation to this statement is one of the more interesting results. In the overall data first questionnaire, 62% agreed that they expected to work overseas when they graduated, with 33% disagreeing and only 4% unsure. In the second questionnaire administered soon after September 11, as might be expected, there was a significant drop, with only 50% now saying they expected to work overseas. Surprisingly however, the number of students not expecting to work overseas still fell dramatically, from 33% in the first questionnaire to only 7% at the end. The biggest increase came from the Nos moving to Don't Know. A remarkable 40% were unsure at the end. So, an overwhelming majority still expected to work overseas or were considering it. This trend is clarified by the snapshot provided by the paired data, in which 37% said No at the beginning and only 17% said No at the end. I concluded that despite September 11 and the fear it engendered at the time, which discouraged overseas travel, the unit seemed to have encouraged students to accept or be more willing to consider the idea that their engineering career would involve working overseas.

The 2002 results, as might be expected given the impact of September 11, 2001, showed the smallest percentage of students agreeing that they expected to work overseas, 38%. Yet, despite the Bali bombing, which occurred well into Semester 2, on October 12, by the end of semester, the students who already thought they would work overseas strengthened their opinion. Agreeing had increased to 50%. Those disagreeing or strongly disagreeing halved.

Group Three statements (5, 10, 12, 14). In 2000 in relation to Statement 5, "*New technologies create as many problems as they solve",* the 45% who agreed or agreed strongly at the start of semester had increased to 61% at the end, while those disagreeing or disagreeing strongly declined from 31% to 22%. This indicates a significant move in desired directions. This was similar to the 2001 Paired data, in which about half of those who had originally disagreed had moved to Agree or Neutral in the second questionnaire. The 2002 paired data showed a different response. Those who were Neutral increased slightly from 36% to 43% but those disagreeing or strongly disagreeing rose from 24% to 28%. Those who strongly agreed increased slightly from 4% to 8% but in keeping with the rise in disagreement, those agreeing at the start fell from 36% to 21%. I assumed that this indicated their increased confidence in the ability of technology to solve the problems ahead.

I expected that Statement 10, "*Engineers working in teams must be sensitive to gender and ethnicity"* would alienate some students. I also expected that group work, combined with work on cultural sensitivity would lead to more acceptance. In fact, the majority already agreed. In 2000, the percentage agreeing or agreeing strongly increased from 79% to 93%. In the overall data from 2001, a smaller shift occurred from 68% Agree or Agree Strongly in the first survey to 75% in the second. The 2001 paired data also showed significant changes. Nearly two thirds of those who had been Neutral had changed to Agree while in the small group who disagreed, all had changed to Agree or Neutral. In 2002, the paired data showed that 8 disagreed or disagreed strongly at the start, with 16 Neutral. By the end of semester, this had dropped to 3 disagreeing, 0 disagreeing strongly and 9 Neutral. The numbers agreeing or agreeing strongly increased significantly from 48 (67%) to 59 (82%).

As expected, the number of students agreeing with Statement 12, "*Culture, (How we see the world) is an important part of engineering decisions*" increased. In 2000, the 71% agreeing or agreeing strongly at the start increased to 86% by the end of the semester. I reworded this statement in 2001 to the more personal, "*My cultural background is an integral part of my engineering decisions*". This obviously challenged the 2001 students because only 15% agreed at the beginning whereas 42% disagreed. However in the second questionnaire 30% agreed and 30% disagreed. In other words at the beginning of the unit, three times as many disagreed as agreed. By the end of the unit, these more dubious students were almost equally divided between Agree, Disagree and Neutral.

The 2001 paired data substantiated this overall change. 14 of the 23 who disagreed originally had moved to being Neutral (9) or Agree (5) by the end of the unit.

In 2002, this positive trend continued, with the numbers agreeing or agreeing strongly, doubling. At the start, 24 (33%) disagreed, 32 (44%) were Neutral and only 16 (22%) agreed. At the end, 32 (44%) agreed, 24 (33%) were Neutral and only 16 disagreed.

In relation to Statement 14, "*Respect for the past should be included in engineering decisions"* (Statement 15 in 2000), there was no significant change in 2000. However in 2001, the 57% who agreed or agreed strongly at the beginning had increased to 68% in the second questionnaire. There was a slight decrease in those disagreeing and neutral. There was a more interesting shift observed in the paired data from 2001 in which 30 students were Neutral at the beginning. Of these, only 9 remained neutral at the end with 1 student moving to Disagree and 20 to Agree or Agree Strongly. Of the 12 students who disagreed or disagreed strongly at the beginning, 5 still did so at the end of semester but 3 moved to

Neutral and 4 changed to Agree, showing change or willingness to change had taken place.

The paired data from 2002 in relation to Statement 14, "*Respect for the past should be included in engineering decisions"*, while not dramatic was still in the expected direction, with the number agreeing increasing from 52 (72%) to 57 (79%).

Group Four statements (8, 13). Students were clearly aware of these issues and had formed definite, mainly positive opinions in relation to both these statements. Their experience in the unit strengthened those opinions to an almost unanimous acceptance. Statement 8: "*Engineers should understand and respect the economic, social and biological interdependence of life on Earth*" was overwhelmingly endorsed by students in 2000 with nearly 90% agreeing in both questionnaires. This was similar in 2001, although with a smaller 82% agreeing in both questionnaires. Of the small number who were neutral (8) or who disagreed or disagreed strongly (4), all but one had shifted to agree or agree strongly by the end of the unit. The paired data from 2002, confirmed the popularity of this statement. The level of agreement rose from 60 (83%), similar to the 2001 figure, to 66 (92%).

In 2000, in relation to Statement 13, *"Engineers are responsible to future generations for what they do today"*, 90% agreed at the start and 95% at the end. Although this statement was inadvertently left out of the first questionnaire in 2001, the 83% agreeing or agreeing strongly in the second questionnaire is so close to the responses for Statement 8, that it seems reasonable to infer that their initial responses would also have been similar. The 2002 paired data provided another opportunity to check responses to this statement. There was a similar increase in the numbers agreeing that "Engineers are responsible to future

generations for what they do today" from an already high 67 (93%) to a remarkable 71(99%) at the end, with only one student choosing to remain neutral.

4.3.3 Questionnaires: Concluding comment

Although some of the numbers in these selected examples are small, there was enough evidence to show that students' opinions had shifted, sometimes significantly, during the semester. The questionnaires confirmed that change was occurring and in desired directions. There was enough evidence to suggest a *prima facie* case for change worth further research. I then moved my focus to the main source of data, the Reflective Journals, which indicated in more detail what kinds of change were occurring, in many cases at what points in the semester and sometimes, how. The next section explains what is meant by Reflective Journals in BNB007 as a data source for the study and some factors impacting on them.

4.3.4 The Reflective Journals

I received permission to use 92 Reflective Journals from the year 2000 cohort (301), 144 journals in electronic format from the 2001 cohort (318) and 144 from the 2002 (358) cohort. I did not seek permission in 2003 apart from two or three individual journals, including the interviewee *Fiza*. In 2004, I received permission to use 38 journals which was 10% of that cohort and includes almost equal numbers of journals from all three markers[38]. Not all of these were used as a data source for various reasons. Some were not passed on by other markers. I stored in NVivo as my Reflective Journal database 328 students' Reflective Journals. Six journals were saved from 2000, 144 from 2001, 138 from 2002, two from 2003 and 38 from 2004. Significantly, no matter how large or small the sample, the division of Accepters, Converts and Resisters remains similar, as the

[38] We divided the roll alphabetically, although in 2004 I chose to mark fewer than the other two markers, since I had other journal-related responsibilities.

following table shows across the five years of sampling. I coded the journals by first storing those for which I have permission in separate folders from those without permission. I then sorted them into Accepter, Convert and Resister subfolders on the basis of what they said in the first and last journals particularly. This is illustrated in Chapter Five and exemplar journals are included as Appendices 11, 12 and 13). This gave me a rough guide, shown in Table 14 below. I included 2005 figures, since they were available and of interest.

Although females were overrepresented in the small 2004 sample and students from Non-English speaking backgrounds were underrepresented, the numbers of Accepters (63%), Converts (26 %) and Resisters (11 %) were similar to those of the other cohorts.

Table 14: Numbers of Resisters, Accepters and Converts compared across five years

	2001 [316 total]	**2002** [344 total]	**2003** [429 total]	**2004** [369 total]	**2005** [335 total]
Accepters	93 = 66%	99= 71%	77= 56%	24 =63%	50 = 68%
Converts	35 = 26%	29 = 21%	47 = 34%	10= 26%	19 = 25%
Resisters	12 =9% n= 140 45% cohort	12 = 9% n = 140 39% cohort	13= 9% n = 137 32% cohort	4 = 11% n= 38 10% cohort	5 = 7% n =74 22% cohort

4.3.5 The Sense-Making interviews

The process. Using Sense-Making required me to look at interviewees "on their own terms" (Dervin, 2003, p.255). In accordance with the mandated Micro-Moment Time-Line core technique, I asked interviewees to describe what they recalled of a situation, step-by-step. The situation here was the students'

experience of the Reflective Journal section of BNB007 throughout the semester in which they studied.

Dervin's advice to think of it "as if it were a movie" was useful for some students. It seemed to remove the element of "getting it right," as if it was an exam. For some students the experience was still fresh, as they were interviewed at the end of the year in which they did the unit or at the beginning of the next one. For several it was a year or more after they had studied the unit. Although this was not planned, it did offer additional layers of experience to these interviews. I took notes as the students identified the events that stood out for them, the Time-Line-Steps, of which there were usually between nine and sixteen, as depicted in Figure 9 [*Andrew*] and Appendix 17 [*Bo*]. These were summarised for all interviewees. After the first two interviews and receiving advice from Professor Dervin, I improved my technique to clarify and confirm the TimeLine Steps with the interviewees.

The Sense-Making interviewing technique mandated first asking what gaps interviewees faced in relation to each step or the steps chosen. The way I phrased this came from previous Sense-Making researchers. I soon gave up trying to predict which interviews might 'flow' and which would be difficult from an interviewer's point of view. I had to learn to trust the occasional pauses, and to resist asking a question too soon. This is described in the Sense-Making interviewing method design as systematic and "disciplined listening". If done well,

> …this inviting of a deep internal dig has been shown to provide respondents with a space where they can if they choose use the interviewing session as an opportunity to bring to consciousness and articulation hunches and feelings that they

> have not confronted in the past (Dervin, B., Harpring, J. E., & Foreman-Wernet, L. 1999, n.p.).

Still, I was shocked when two male interviewees broke down. The fact that they did so suggests that they had both been under great stress with few outlets for discussing its causes. This may have been a factor in their willingness to be interviewed. This supported the statement that "every sense-making instance is seen as arising from a past in the present and moving towards a future" (Dervin, 1999, p.733). This important issue is revisited in Chapter Six.

The interviewees. Sense-Making applies to all communicating situations whether personal, cross-cultural or societal so it was useful for this study. The sample was not chosen as a strictly representative sample of the cohorts but emerged from those willing to be interviewed. As Appendix 14 shows, the interviewees include 81% males and 20% females, which over-represented the numbers of females in the cohorts. In terms of cultural background, 17 (65%) were from English speaking backgrounds and 9 (34%) from Non English Speaking Backgrounds. Of the 9, 5 were Australian-born or English-born Australian residents and 4 were born overseas including 1 International student. Their Grade Point Averages for Engineering covered the spectrum from 2.2, a low fail, to 6.3 of a maximum 7 or High Distinction. 19 had gained credits, 5, or a distinction, 6, for BNB007. *One interviewee* was granted exemption from submitting his journals, for reasons of stress that emerged in the interview. Another interviewee did not submit his journals at all, believing that he would fail anyway.

Given that there are a small but slowly increasing number of Muslim students and that world events may be impacting on them disproportionately, I welcomed the opportunity to interview *Fiza,* a Muslim-Australian. The percentage of Muslims in

the cohort, who I identified by their distinctive names, has steadily increased, from 2% in 2000 to 3% in 2004 (over 5% in 2005). This is significant because the world events discussed above have highlighted the differences between Christianity and Islam in particular and the media have conflated Islam with Terrorism. These differences are discussed as a cause of concern and group work friction by one interviewee and the issue was also reported in the Reflective Journals by Muslim and non-Muslim students.

NVivo. Because the study involved such a large textual data base, I used the software package N-Vivo (Version 2.0) to store, collate, code and help analyse the data from the journals and the Sense-Making interviews. I have only used a fraction of the capacity of this soft-ware, but it provided a fast and effective way of checking whether an issue did feature in the data and in what ways. Understanding perceived changes called for a deeper analysis of the individuals in the process of change. I chose Sense-Making methodology for the ontological and methodological reasons explored in Chapter Three.

4.4 Conclusion

This chapter introduced the data sources and discussed the unforeseen global events that occurred during the data collection process and impacted on the study. Other personal and professional issues that affected the process were explained or footnoted in the Preface. I explained the different levels of challenge posed by the questionnaires and highlighted the more interesting results. The paired data from two years were particularly useful in showing that significant changes did take place in students' attitudes to some of the issues that were the focus of BNB007. This was sufficient evidence to warrant further research into these attitude and value shifts.

The next chapter, Chapter Five, moves this exploration to a broader basis by analysing change and transformation as recorded in the Reflective Journals of the students described above. Chapter Six will use the Sense-Making Interviews to illuminate this process further. The two chapters combine to provide the complex human dimension to the statistics with which the study began.

Chapter Five: The Reflective Journals – *Opening eyes and minds*

> *Human beings possess significant reflexive powers; they can look afresh upon the world (inner and outer), revise assumptions, explore others and together, re-invent their worldview by consciously incorporating other elements (Slaughter, 2003, p.12).*
>
> *BNB007 Professional Studies has been a journey of discovery and revelation in the sense that engineering is no longer about the numbers and facts. Engineering is no longer black and white, but there are grey areas too and it is these grey areas that will show the globally responsible and professional engineers, from those who are simply engineers. (Male, NESB, 18, 2001, Convert)*

Introduction and chapter outline

Because of the large textual data base provided by the Reflective Journals and the Sense-Making interviews, this chapter uses only Reflective Journal data to engage with the first major research question: what evidence is there, from this teaching intervention in selected student cohorts, that Reflective Journals are an effective pedagogical strategy for transformative learning outcomes in a vocation-based course such as Engineering? "Reflection and self-regulated learning (together with authenticity)" are recognised key elements in enabling "successful learning to take place" (Luca & Oliver, 2003 cited in Kunz et al. 2003, p. 284). See also El-Hindi, (1997). Therefore the journals were designed as a significant and integral part of assessment. Assessment, in turn, formed an integral part of the supportive process described in Chapter Three and summarised as a

Pedagogy for Change in Chapter Eight. Mezirow recognised journals as one reliable way of accessing attitudes before and after any intervention (1991, p.221), although that was not the reason I chose this strategy.

The journals indicated that learning was occurring, defined as "our ability to adapt and change with such readiness that we are seen to change" (Revans, 1981, p.250 in Passfield, 1996, p.19). The Reflective Journal process also helped most students to integrate their learning into their lives as developing globally competent professionals, with some or all of the qualities described in Chapter One. Many journals indicated that students were capable of thinking critically and willing to assume responsibility for their impact on communities and the planet. I refer to these as developing *Globo sapiens*. Many wrote of their emotional, intellectual or actual commitment to present or future actions for change. Changes at the latter levels, in the models I have considered, are regarded as transformation (Barnett, 1997; Mezirow, 2000; Rogers, 1996).

In this chapter, I first identify three categories of responses that emerged through reading the Reflective Journals, *Accepters, Resisters* and *Converts*. I then consider the general perceived benefits of Reflective Journal writing for students in this study under two broad headings, "Increased Competencies", and "Supportive Relationships and Environment". I next address "Reframing and Transformation" by identifying specific "stepping-stones" or critical points in learning and transformation as they emerged in the journals, followed by "Indications of Change". I then offer a brief response to the work of Kember et al. (1999) before using two meta-analyses, Rogers' (1997) alternative model of levels of "global learning" and Causal Layered Analysis, to underpin my claim that changes have taken place at transformative levels. Students from Non English Speaking Background/s (NESB) may be International students, Australian-born

or Australian residents. ESB is English Speaking Background/s. I did not assume any student's background but assigned it where it was revealed in the journals. This also applies to students' ages.

5.1 Responses: "Accepters", "Resisters", "Converts"

I had no preconceived ideas of what, if anything, these students' journals might reveal in an Engineering context. The categories "Accepters", "Resisters", and "Converts" are terms I used after similar responses emerged in the 1999 and 2000 journals. This is an example of letting the data "speak", in Grounded Theory terms. Similar attitude groups have been identified in a Computer Science context, by George (2002), who knew of my work[39]. Brice's change management "Virus" model (2004), described briefly below, is also relevant.

Brice, a manager of a large Australian company, used a "Virus analogy" to compare changing organisations to a community of cells, rather than a top-down pyramid. Thirty percent of any group need to be potential "Viruses" who can bring about rapid change (2004, p.77). There are also the "Antibodies", who "not only resist the change", but attack and undermine the Viruses in overt or covert ways. She warned it only needed 10% of Antibodies to defeat the *Viruses* or render them inactive (p.78). This was certainly true of the role of Resisters in BNB007 in the early years. However, a "converted" Antibody is a powerful force for change. Her "Resisters" do not want change but do not undermine it, rather like the "Unthinking Resisters" in my typology. Her final category is "Neutrophils", who have no position but can be persuaded to become Viruses. They need to be convinced of the relevance of the change to their lives. These are similar to the Converts. Her model echoes 'diffusion of innovations' theory, used in community

[39] She identified a) those who liked the journal, and saw it as beneficial , b) those who perceived benefits but complained of drawbacks, c) those who disliked the journal and perceived it as irrelevant and detrimental to learning (2002, p.2).

education schemes relating to sustainable practices (Guerin et al. 2001, in Taylor, 2005, p.8). Such differences are part of a normal environment and people can hold more than one of these positions in relation to different issues. In a healthy environment, there is an optimal balance. The early years of BNB007 suffered from an imbalance in that the Resisters (Antibodies) assumed control. A similar group of 15% "least amenable" to change were identified in the general population and labelled "laggards" (Rogers, 1962, 1995 in Taylor, 2005, ibid).

I now describe the three categories, giving examples to illustrate their characterising attitudes and qualities, summarised in Table 15 below. The characterising words or comments for each group were taken verbatim from students' journals. As with all student examples, I have not corrected grammar, spelling or syntax. Where I have cut sections for the sake of brevity, this is indicated by three dots. Table 15 includes the average percentage of each category from 2001 – 2005 although not all years are fully represented in the journal samples, for reasons given in Chapter Four.

Table 15: Characteristics of each category, with associated average % 2001-2005 [40]

Category	Characterising comments	Average %
Accepters	"Positive" "Hope" "Try" "Benefit" "Look forward" "Willing" "Passion for" "I will aim to achieve both success and happiness" "Prepared to give it a shot" "Going to try my best"	66%
Resisters	"Waste of time" "Hypothetical garbage" "Annoying" "Pain in the neck" "A joke" "Dear 'I wish this was a multi-choice marking scheme' Marker". "BNB007 makes me feel like destroying something beautiful."[41]	9%
Converts	"My Initial thought on the reflective journals was not a joyful one … I now consider it a worthwhile exercise. " "I started… with a sense of dread and irritation this was a 'non-engineering' subject … taking up my time… As the weeks passed … I found myself actually looking forward to the readings." "I must admit that I was a sceptic at the beginning of the semester, but I have been converted. Hallelujah!" "I really must commend the organisers of this subject for converting one of the most avid sceptics of what I like to call "humanitarian" subjects."	26%

[40] The detailed figures were given in Chapter Four.
[41] I return to this comment in Chapter Six, as it was made by *Gir Bob,* a student I interviewed 18 months later.

5.1.1 Accepters

This section identifies and clarifies the qualities of Accepters. They were the majority of students, average 65%, who welcomed the content and process despite its acknowledged challenges. They were immediately identifiable through their use of words like “wish”, “hope”, “positive”, “ready” and “willing” as in Table 14 and the following example. Their language was optimistic and enthusiastic.

> *I believe that as an individual I have the potential to impact on the lives of others in a positive and constructive way. (Male, 18, ESB, 2001, Accepter)*
>
> *I believe that I will always try to learn things every day and that I will benefit significantly from this. (Male, ESB, 18, 2001)*

I have subdivided this group into “Willing Accepters” and “Grudging Accepters”. Willing Accepters expressed interest in the journals from Week One and while they often acknowledged the challenge that writing posed, were happy to embrace it. Willing Accepters had no fears about liking the journals. Some knew that they were good writers and “relished” the idea of writing and a chance to ”express innovative and creative skills”. Others enjoyed the variety of topics.

> *Having covered so many topics it was also liberating to not feel ‘boxed’ in by only having to deal with one subject for the whole semester. Being able to sit down every week and deal with a new issue really gave me time to broaden my experiences from the unit. (Male, ESB, 2004, Accepter)*

These responses occurred in both males and females. Accepters such as interviewee *Andrew* (male) revealed that they found the negativity of the Resisters off-putting and disheartening, an issue I return to in Chapter Six.

Grudging Accepters were dubious but still willing to try. This initial willingness, despite doubts, marked the difference between an accepter and a convert.

> *Generally, I think I would not enjoy writing these reflective journals but I am going to try my best to do them. (Male, NESB, 2001, Accepter)*

Accepters often enthusiastically identified the journals as helping them to do differently or better in such aspects as becoming introspective and discussing their feelings. The journals were an assessment item which enabled articulate females to shine in the engineering domain, for which many reported they felt less prepared by previous life experience than males. Students (male and female) who liked writing, used the journals to improve their skills and the process helped some students to reconsider their career choices and transfer to more appropriate courses. Accepters used the learning opportunities to move gradually or dramatically towards new ways of thinking or transformation.

> *Through this learning journey I have developed a new perspective on life. (Female, ESB, 18, 2004, Accepter)*

5.1.2 Resisters

Resisters, like the other categories, tended to say similar things in similar ways, although the intensity of their response seemed to diminish during the years of this study. Early evaluations included comments which were rude, contemptuous, sarcastic and/or sexist as in the examples below. Although Resisters were consistently the smallest group, average 9%, they confidently claimed to speak for the "overwhelming majority", who they asserted, disliked the unit, hated the journals and only wrote what they had to in order to pass. They saw no need to learn communication skills by communicating but preferred an examination in place of assessed tutorial exercises, Reflective Journals or projects.

This group assumed a disproportionate influence, particularly in the early years of BNB007. I became aware the extent of this in 2001, when several students put in

an official complaint about the unit and its approach, claiming to represent the majority of students. A written response was required from the Coordinator by the Head of School and so as my contribution, I checked every journal to which I had access. I realised that the overwhelming majority, over 90%, were positive towards the unit, consistent with the data in Table 14. The detailed staff response was accepted by the Head of School and to my knowledge there were no further official complaints.

There have only been one or two examples each semester where students crossed the line from constructive criticism to rudeness in the last three years' BNB007 cohorts. I am aware of this since I read most journals and the other markers contacted me if they were concerned about any students or journals. This group included "Angry Resisters", "Arrogant Resisters", "Threatened Resisters" and "Unthinking Resisters" separately or in combination, as I explain in the next section.

Angry Resisters

> *I come from a family of military engineers and I bet they didn't have to deal with this crap!*
>
> *Are you two lesbians? In which case there are help places for people like you.*

These examples give a "flavour" of the powerful, personal impact of the comments 1998 students made in early, anonymous evaluations. Without the perspective this research has since provided, the effect was intimidating and enervating. Negativity and verbal aggression have been documented in other recent Australian engineering research in relation to gender issues. Burrowes, for example, reported that "a minority of male students in this study attempted to 'put down' the researcher personally by indicating that she was only wasting her

time and that her feministic views were not welcomed in the environment" (2001, p.36). Challenges to the status quo whether through gender, culture, age or teaching and learning styles, are correctly perceived as threats and strongly resisted by those who, it has been argued, benefit most from its continuance. Tonso concluded that US male engineering students "recognised" women's collaboration "as an intention to reshape the campus culture" (2001, p.162) and therefore as a threat to the status quo which favoured "men over women and some forms of manhood over others" (ibid, p.156).

Here is a typical Angry Resister comment, this time from a journal:

> *I have really detested writing these Reflective Journals, personally I have found them a great waste of time. …most of the topics are hypothetical garbage. I didn't come into this degree to turn out a hippie, I thought I went into engineering to become a cold hearted bastard who got all the know how to make the world a better place but has realised that it's a waste of time and may as well be squandered. …Out of all the people I know all of us believe that this subject and the Reflective Journals in particular are a joke. (Male, ESB, 2001, Resister)*

I documented this kind of resistance to new learning activities (Messer & Kelly, 1997; Kelly & Messer, 1998). It was partly due to the lack of fit between some students' concept of Engineering and Engineering education and the personal learning approaches we used. Many had previous experiences that predisposed them towards a narrow, one-dimensional view of engineering. The assumptions and values of this "tight culture" (McIsaac & Morey, 1998) were expressed at the observable, surface or "Artefacts" level and at the Perspectives level, the norms and rules that govern behaviour (Lundberg 1985, cited in Passfield, 1996, p.18).

The journals raised the issue of power in the learning environment because of the equalising situation they created. Resisters were challenging and sometimes

disturbing, not only from a teacher's point of view but for other students, because they represented the dominant view so loudly and with such certainty that other students tended to believe it as well. They included the most vocal and articulate domestic students as well as some International students who had proved that they could succeed in the traditional system. Another sub-group expressed their resistance through arrogance.

Arrogant Resisters

> *Week two went off much like week one, with a disappointingly small amount of new things learned, and an unfortunate lack of free time. I have read the "Trouble at the Temple" article, with [which] was completely uninteresting, and personally I believe the Muslims and Jews should stop bickering and get real lives. (Male, ESB, 2004)*

Resisters exercised a powerful negative influence on others in lectures and online because in cultural terms, they saw only *their* perspectives or norms of behaviour[42]. The following comments demonstrate the (misplaced) certainty that characterised so many Arrogant Resisters.

> *One does not learn personal skills by writing a journal (of which I am still confused as to whether is personal or professional), or through working in a group of randomly assigned people. (Male, ESB, Resister, 2001)*

Threatened Resisters

The collaborative qualities I was trying to encourage were themselves threatening to some Resisters, who struggled to reconcile this ideal with their more negative perceptions of the real world, as in the next example.

[42] An interview exemplifies this in Chapter Six.

> *Firstly I think this unit the most unpleasant unit I have come across so far, it's a unit where everybody come together and try to have a "warm and fuzzy feeling (get together an be nice) or something like that. In real life not everybody is nice, so that why I find it difficult to adapt. Deep, deep down inside I sure in a way I really enjoy the company of been around nice people. (Male, ESB, 2002)*

The next student offered other insights into a Resister attitude to feelings. It appeared that feelings would impel him to take a stand on issues that for whatever reason, he was unwilling to take, perhaps because as in the following excerpt, his stand would make him a "greenie" or part of an "out" group.

> *I am still unsure on what is to be marked in these journals, whether it's my writing ability, telling things how they are or expressing my feelings. I am not very good at any of the above, especially the one about expressing my feelings. To most things I have no feeling towards, or rather have a 'couldn't be bothered' attitude. If I did then I would probably be a member of these radical student protest groups or a greenie. (Male, ESB, 18, Resister, 2001)*

Fear of expressing feelings was not peculiar to Resisters, but they were a large influence on it not being "cool" to say something positive or praise the unit. This is illustrated in the two examples below, one from an Accepter who feared that praise may look as if he was trying to gain favour with markers, and the other from a Convert, who could confess to the marker but not to his friends.

> *The project has given me more leadership experience, which I am grateful for (now that sounds like a suck-up). (Male, Bi-cultural, 2002, Accepter)*
>
> *Before I finish this journal, I'm going to reveal something about myself that I would never tell my mates. I've started to write personal journals about myself on a weekly basis. These*

> *journals are not for uni, but rather, for myself. SEE, BNB007 HAS HAD AN EFFECT ON ME and I'm positive that it is a good one. (Male, Bi-cultural, 2001, Convert*) [emphasis in original]

Unthinking Resisters

The Resisters category included an interesting group who first claimed not to have gained very much as a result of studying BNB007, but then proceeded to list the usually numerous and/or significant changes they had noticed in their understandings and approaches to various topics and issues *and* themselves. George (2002, p.5) described a similar response among her students as "an amazing discrepancy between the (mainly positive) written comments and the quantitative rating" of the journal process by her Computer Science students as "not useful." These students are really Resister/Converts.

Resister/Converts

This excerpt is from an early Angry Resister's first journal which began:

> *Oh Bloody Hell, what a lot of piffle, just what the world needs - another talk feast. Save us from the secular Liberal humanists and bleeding heart feminists…*
>
> *I don't have to think about why and what I am doing, I know!*
>
> *I am here to get my piece of paper as soon as I can. That's all, Full Stop! This is my learning agreement, "whatever it takes", I'm here for a short time, not a good time. I'm not here to learn a single thing, I'm here for a piece of paper in 3 years time so I can keep doing what I am doing and work around the world making lots more money. (Male, MA, ESB, 2001, Resister)*

The reasons for this anger emerged in his later Reflective Journals. This mature age student with a young family had taken a huge risk in going back to Higher Education. He was confused by this learning approach and this led to fear, which

he expressed as anger. This gradually changed. By week four he could focus beyond his own needs to realise that other students did benefit. By the last journal, the tension in previous journals had relaxed and he admitted

> *…"to my surprise I have got a few high quality distillations of things I've been thinking of for some time and this will prove very valuable to me. (ibid)*

Here is an example from another student's BNB007 six week review.

> *I believe that I had a very similar attitude towards these topics in the first place. Having said this, I believe that this unit has open my eyes to a few aspects of team work, thinking and professionalism that I might not have thought of otherwise. I think that this will make me a better person to have around in certain situations then I would have been before. (Male, ESB, 2001, Resister*)

By the end of the semester, however, he had developed metacognitive thinking skills and self-awareness enough to acknowledge and describe how his eyes had not only been opened to "aspects" of topics but to "the world". He had become a "Convert". It is tempting to see his mistake "defiantly" as a Freudian slip[43].

> *After reading over the last eleven journals I have come to realize that I have taken away more from this unit than I thought, and defiantly [definitely] more then I had expected. The opinions that I have formed when writing the journals over the last twelve weeks has made me think about topics I have not had much of an interest in previously and open my eyes to a different world. (ibid)*

Converts emerged from any Resister sub-category.

[43] It was quite a common student spelling mistake.

5.1.3 Converts

Converts were the significant group, average 26% of students, who realised and were able to acknowledge, that even if they didn't like Reflective Journals or the unit, they had benefited.

> *I will admit that I was one of many students that absolutely hated the idea of having to write a reflective journal week in week out about a topic that I probably hadn't thought about until it was presented in the lecture. Truthfully, I still do not like to take the time and sit done and write the reflective journals. However, I can honestly say that I have gained so much from these journals and have learnt to truly express how I feel about these particular topics week in week out. (Male, ESB, 2002, Convert)*

The sub-group "Gradual Converts" fits Mezirow's "incremental" model, "a progressive series of transformations in related points of view that culminate in a transformation in habit of mind" (2000, p.21).

Gradual Converts. These students expressed initial doubts that the Reflective Journals would do any good but eventually were willing to acknowledge the benefits they brought. The extent of their change usually became evident in the last journal, which was a self-interview on learning. Some reported a complete turnaround or transformation, manifested in self-described attitude/behaviour change, as in the second example.

> *Writing these journals has improved my way of learning, and has improved my way of thinking in a different way. I thought they were a waste of time at the beginning, but after about the sixth one it started to sink in, that these were actually worth doing. (Male, 17, ESB, 2001, Convert)*
>
> *To see the cynicism that I had for the first few weeks' change into what has been one of the most influential learning*

> *experiences I have ever undertaken. No one could have told me in the beginning that I would be learn so much about myself and my profession in just one short semester. The skills that have been brought together through the project, communications tutorials and interacting with other like-minded students and professionals have developed me into a more motivated and enthusiastic student. (Male, ESB, 2001, Convert)*

Sudden Converts. Mezirow's second or "epochal" level of transformation is "a sudden, dramatic, reorienting insight" (2000, p.21). These students also began by expressing doubts but tended to make sudden and significant changes in attitude and often expressed deep gratitude for the changes that the process brought about. Change happened as a result of reading something, seeing or hearing something and making connections.

> *You start to question your own motives. J A's [lecture] was like a light coming on, I kept thinking, "That's right", "I've done that", It was crystal clear, he reminded me why I had gotten into engineering in the first place. (Male, ESB, 2001, Resister/Convert)*

> *Before this weeks lecture I thought that this topic would be a load of rubbish. What I mean is I thought that how could any advancement in technology have an adverse [effect] on society. To my surprise there are many technologies that have already affected society in irreversible ways. Looking now at this very important topic I feel a personal dedication to think twice about the possible technology advancements that I might face. (Male, ESB, 2001, Convert)*

The following Week 2 journal is from an International student. I quote it in entirety because it shows so clearly his transformative path through the levels of thinking from angry resistance, through to metacognitive thinking about his learning, to a commitment to taking action for change. I have underlined the points of interest or change.

> *As I begin Professional Studies 1, my first impression as many others I am sure was that "This subject is a total, utter waste of time". I really began to question the integrity of the university for putting such a subject into my course. Why would someone need to be taught how to study? I really felt like I was in grade 5, having the teacher explain to us what should be done. To me it is like someone teaching you how to eat.*
>
> *Though after a while it began to become clear to me that what really was being taught was not simply how to study, but how to learn. There is a distinct difference between the two, the first being a technique the latter being the actual comprehension of the technique. For we as university students really must have a structured lifestyle to cope, or at least to achieve our goals. This was a real important point, as it was no ordinary idea, it seemed as though the lecturer had put a lot of thought and study into what many as myself thought was pointless. This idea of goals, seemed to strike me quite strongly cause it was this that opened my mind to the fact of why I was in this foreign country. I was here to learn, to be a professional in my desired field. To be a professional is not simply to do the practical, but there was a lot of business. By 'business', I mean how it is conducted, the ethics of it all and this is what I believe professional studies aims to enlighten us with. It teaches us how to think, how to act and how to be a true professional. For it is the manner of a professional, which can make or break a career, and this is critical in view of our future and goals. (Male, Int., 2001, Convert)*

The next student also demonstrated that he had met some identified criteria by which to evaluate a successful engineering education program, "learning how to learn; recognising what you need to learn; and becoming fully aware of your own limitations" (Taylor & Johnston, 2001, p.3).

> *One of the main criteria of being a professional is that you never stop learning. This is a point that was mentioned in the*

> *lecture that I took quite seriously. Especially in a field like mine where technology plays a vital role. Consequently I took the notion to join the Engineering association here in Australia. For this way I could keep my self appraised of all that is happening around me. (Male, NESB, 19, 2001, Convert)*

Having explained the broad response categories, the next section summarises the direct benefits that students identified from and through their journals. While the entire process of BNB007 contributed, the Reflective Journals provided both the focus and the main focussing strategy. They stimulated students to reflect on the set topics and their relationship to them.

5.2 The benefits

The following benefits were identified:

1. Increased competencies

a) Improving (and transferable) writing and communication skills in students with varying levels of skill and experience – both domestic and international.

b) Increasing confidence, in themselves and their communication skills, oral and written

2. More supportive relationships and environment

a) Increasing understanding and decreasing perceived barriers between domestic and international students and between genders and ages.

b) A healthier learning environment that supported transition to university

I now consider these in detail, with examples.

5.2.1 Increased competencies

Improving writing and communication skills in students with varying levels of skill and experience – domestic and international

> *My writing skills … have even improved in the first 10 weeks of this semester. My paragraph structure has improved as to has my vocabulary…This writing tasks has helped me improve a lot. (Male, ESB, 2004, Accepter)*

As detailed in Chapter Two, there was ample previous research showing that Reflective Journals helped students improve their writing skills (Beveridge, 1997; Minnis, 1999; Tuan & Chin, 1999; Palmer et al, 1999; Scoggins, 1999; Walker & Finney, 1999). The corroboration from this study is significant because it was based in large, diverse, vocational cohorts. For some, the Reflective Journals were a chance to exercise their love of writing and to write creatively within the assessment constraints. Some welcomed the opportunity to express their feelings and challenge the engineering "stereotype".

> *I believe that my social strengths lie in my ability to empathise with people's situations. In doing so I believe that I defy, to some extent the notion that engineers are socially-incompetent as per the "Liberal Arts"[44] reading. (Male, ESB, 18, 2004)*

Introspective students welcomed the opportunity to "think" as part of a course. As I formally encouraged them to do, some students used the journals as an opportunity to develop Plain English skills. Their training in "academic" writing had resulted in only one genre, that is, highly formal, written in the third person and in the Passive Voice, sometimes archaic in style and turgid in effect.

> *Now, after finishing the unit, I understand my weaknesses as a writer. I believe that my writing is good, with minimal grammatical and spelling errors. However, I fall on not using the correct genre. At first my journals were more essay like, however after realising my genre is incorrect I changed my style of writing. (Male, NESB, 18, 2002, Accepter)*

[44] Grose, 2004.

> *From the time I wrote my first journal till now, I believe that I have refined my style of writing and have set them out better. (Male, ESB, 17, 2001, Accepter)*

Resisters also acknowledged they had benefited.

> *FINALLY my last journal. I sit here thinking to myself "thank god". I must admit that when I first found out I needed to write every week I was not impressed. It has definitely helped with my writing skills. I myself can see a great improvement in my writing and the way I am able to put feelings into words. (Male, NESB, 2002, Resister)*

Many Engineering students – both ESBs and NESBs – felt very unconfident about their writing. Some students admitted they had chosen Engineering specifically *because* they thought they could avoid writing or "ever" having to express themselves in this way. For some, previous criticism had led to lack of confidence, fear, resistance and understandable unwillingness to try again. For many mature age entrants from trade backgrounds, it was a huge challenge, because they had not "written" at length since leaving school. Some were the "walking wounded" from negative experiences with school English.

> *I realised that I still dislike writing essays or anything like that because my English teachers never did give me positive feedback, it was always "no good" and never offered any assistance. (Male, ESB, 17, 2002, Accepter)*

Others *re*-gained English skills which had "gone down the drain" as a result of lack of use in their numbers-based work at university to that point. This is a concern in itself.

> *Since high school ended, I have never truly written anything except perhaps a couple of paragraphs explaining a concept for an assignment. (Male, NESB, 2002, Accepter)*

> *After leaving high school and doing just about all mathematics for the first semester of this year, all my English skills had gone down the drain. With the help of various speeches and these journals I have managed to get back up to a high standard. (Male, Bi-cultural, 18, 2001, Convert)*

In terms of regaining skills, several very able, mature age entrants had to overcome previous negative experiences of "reflection". This is a significant issue explored in detail in Chapter Six. Closely linked to these skills, is the next benefit:

Increasing confidence, in themselves and their communication skills, oral and written. Skills are the capacities to do something while confidence is the belief that one is able do something. Both affect motivation. The word "confidence" or "confident" appeared in 376 passages in 279 journals. They referred to their hopes for improving confidence and self-confidence, and to their achievements in doing so. If students feel able to take small steps and these are supported, it leads to the confidence to explore further and deeper, as the next example shows.

> *I really appreciate that having this opportunity to learn many things from reflective journal, for instance, my thought is getting more mature and I am more self-confidence also learn more about myself than before. (Male, International, 19, 2002, Accepter)*

Students commented on specific skills, as in the first example, as well as on study skills generally. The second example consists of two excerpts from the journals of a student from a non English speaking background. The first is from Week 1 - his aims and the second from Week 13 - his achievements. The third example similarly compares an English speaking background student's writing, from Week 1 to Week 11.

> *I am proud to say that many of the skills that I have been taught during the semester have indeed improved them above the ability I possessed before undertaking this course. I am now a more confident public speaker, a more involved team member and I have more confidence in both my writing and drawing skills. (Male, ESB, 2001, Accepter)*
>
> ***Week 1:*** *Speaking in front of a group was always one of the problems I have had in high school, hopefully BNB007 can help me develop my skill to be able to express what I want to say at any certain time.* ***Week 13:*** *The tutorial is when I have learnt all my speaking skills, it help me to speak comfortable with others i.e. express to other what I want to say at any certain time. (Male, NESB, 18, 2001, Accepter)*
>
> ***Week 1****: By doing the first Tutorial sheet, I have come to realise that I really don't have any confidence in my writing skills what so ever, and this is mainly because of my English marks in High School.* ***Week 11:*** *I have enjoyed writing the journals and have also enjoyed the pleasure that I received from reviewing my writing and realising that my writing skills have improved. (Male, ESB, 2002, Accepter)*

For Accepters generally, the journal process reinforced and extended already positive behaviours and attitudes. For example, one young female student reported a move to being "all around more supportive and understanding" after completing the topics on Professionalism, Teamwork and Ethics. New-found or re-found confidence was transferred to other areas of students' study and personal lives, as they acknowledged. The second example shows how the topics and the journal process work together to develop deeper, more effective learning.

> *I have also improved my interpersonal skill and writing skills through the projects over the semester… I also found myself*

> *becoming more confident in presenting my ideas and negotiate with others. (Male, International, 2001, Accepter)*
>
> *Instead of regurgitating facts, they have made me think about those facts and what they mean to me, therefore subconsciously reminding me of the facts. I have found it to be extremely effective in remembering the course content and would like to find the time to experiment modifying the concept for other subjects to help me learn the course content. (Male, ESB, 2001, Accepter)*

Learning to acknowledge and express feelings was a significant issue for many students. Many students admitted that they found it hard to express their feelings and several journals contained spelling mistakes that indicated a lack of familiarity with the written forms of an emotional vocabulary, as in the following example, underlined. This was from a final review journal.

> *Even though I did not enjoy these journals at the beginning I have found them to be rewarding to me as I can express my true feeling in a variety of areas… Personally I have seen my communication (within a group) and learning skills improve which I feel has enhanced my self-as steam[45]. (Male, ESB, 2002, Convert)*
>
> *In the beginning I found reflective writing to be a real challenge, I found it hard to express what I feel on to paper. These journals helped me a lot in my writing and I feel more confident about reflective writing now. (Male, Bi-cultural, 2002, Accepter)*

5.2.2 More supportive relationships and environment

Increases understanding and decreases perceived barriers between domestic and international students and between genders and ages. The

[45] Another variation was “selfish stream” from a student from a NESB.

support for positive behaviours indicated above may be one reason why there were signs of increasing understanding emerging in the groups, with many students commenting on the friendliness of their groups.

> *I have also improved my interpersonal skill and writing skills through the projects over the semester. This is because most of the members in my group came from different countries which gave me good opportunity to improve my communication skills like English speaking and writing. Moreover, they led me to become a team member who can have empathy for others. (Male, 2001, NESB, Accepter)*

In the early years, some students with advanced skills in any area complained about having to work with those with less skill. Experience and skills also vary enormously in any workplace. The unit encouraged a collaborative approach in which students identified and shared the varied skills of a group, rather than simply criticising and dismissing their peers. This was in line with Passfield's adaptation of Lundberg's (1985) cultural framework to an Action Learning paradigm. His "norms" for an effective Action Learning group or "set" included "treat each other as peers" and the "values" included the importance of relationships, collaboration and respect for diversity (1996, p.19).

Gender awareness was built into the unit. The assessment and tutorials promoted a communicative, cooperative model. The Coordinator of the Unit, the coordinators of the on-line site, all but one of the tutors and markers of the Reflective Journals and professional practice tutorials were female. This was not a deliberate choice. Most of the available and interested people with the requisite skills were women. The teachers of the other modules were male. We did stress that the university required students to use non-sexist language in written work and we chose readings written by women and men, engineers and non-engineers. We also encouraged a collaborative learning ethos that many

females responded to positively. For example, the first journal's requirement to read the Code of Conduct and create a Personal Learning Agreement had a clear effect on this astute, female student. Her irritation with some of the male students emerged in a clear (and very Australian) way. The more complex story behind this emerges in *Muffin's* story in Chapter Six

> *…it was great to read something as abstract and emotionally searching in an engineering subject. I was pleasantly surprised and really encouraged because I sometimes feel completely left out, or rather singled out because I am not one of the boys. I honestly didn't expect that studying in such a male dominated area would be so challenging and unwelcoming. Hopefully with concepts such as the ones raised in BNB007, some of the other male students will wise up, grow up, or piss off. (Female, ESB, Mature Age, 2002, Accepter)*

Another young woman reflected on her previous semester's experience in a previous unit and said,

> *I often felt unappreciated as my thoughts and ideas were not acknowledged until their tenth uttering. On several occasions, it was my ideas that got the problems sorted. (Female, ESB, 2001, Accepter)*

Their complaints were compatible with detailed gender research in Engineering cited in Chapter Two. However, the Peer Interview, discussed below and in Chapter Six, proved very helpful in female and male students gaining new perspectives and understandings of the opposite gender, as well as generating friendships. The small number of females in the unit severely limited these opportunities. Gender is an issue of ongoing concern in Engineering and although I have not engaged with it in any depth, this study contributes to this area of research through the observed effects of a supportive pedagogy,

particularly the Reflective Journals. A healthy learning environment is an inclusive and respectful one.

A healthier learning environment: Transition to university

- to university life

There is a large body of literature devoted to the difficulties of the transition to university. Problems BNB007 students reported included the transition to large classes, the lack of a "close lecturer/student relationship" and the need to use the Internet extensively. Many students bemoaned the fact that this unit was offered in the second semester rather than the first, a "total bombardment of theory, mainly mathematical", which they survived as best they could. For those entering in second semester, it proved an effective transition and entry to their cohort.

> *This is my first semester at uni. I found it pretty hard at first but I've made some friends within my team project and we also have a study group going. The study groups are a real good way to learn. (Male, ESB, 2002, Accepter)*

- to a new country

Any problem allied to the transition to university can be exacerbated by being an international student. BNB007's initial ice-breaking activities were a short-cut to making the connections that are so essential to personal and academic well-being.

> *(Tutorial one) … has been very good for me, I have for the first time really got the time not to just think about my learning but also been able to talk to people and lecturers. (Male, NESB, 21, 2001, Accepter)*

- to engineering

It also proved a good introduction to engineering for students who had chosen this discipline, but knew very little about what it entailed.

> *I have learnt so much interesting and vital stuff that I never even knew you needed as an engineer. (Male, ESB, 17, 2001, Accepter).*

Young female school leavers particularly, had doubts about their choice of engineering. The environment and process helped to resolve this as in the example below.

> *Looking back on my past journals, I think I have grown in confidence about what I am doing in Engineering. I was a little unsure at first, I still am, but writing these journals is helping me realise what I want. It is also helping me to see what character traits that I can utilise to be successful and happy. (Female, ESB, 17, 2001, Accepter)*

- focus on self and direction

For many first year students there had been little time to think about themselves and their skills and weaknesses in relation to tertiary study.

> *I have noticed a change already with the way I treat my fellow peers, communicate with workmates and how I deal with relationships. (Male, ESB, 2004, Accepter,)*

> *I realise the importance of such reflections and their ability to guide the writer towards self knowledge and maturity. (Male, ESB, 2004, Accepter)*

The fact that academic and personal skills developed, as in the second example above, is further evidence of a supportive environment, the *oasis,* whose qualities are analysed in Chapter Seven. Supportive relationships and a supportive environment have been increasingly acknowledged for their crucial role in transformation (Taylor, 2000, pp.307-8). Barnett (citing Sotto, 1994) cautions that

"the development of human being [sic] cannot be taught, but it can flourish amidst an appropriate set of human experiences" (1997, p.164). We first have to want to change and this "conative" or motivational aspect is influenced by our relationships with those around us at various levels and how power is exercised in those relationships. Recent community research highlighted the "peer group's supportive impact" on "individual learning and confidence-building" (Taylor, 2005, p.8). This is one compelling reason why Resisters should be made aware, in respectful ways, that their opinions are not those of the majority. A supportive environment also makes "possible a more confident, assured sense of personal efficacy, of having a self or selves - more capable of becoming critically reflective of one's habitual and sometimes cherished assumptions, and of having the self-confidence to take action on reflective insights" (Mezirow, 2000, p.25).

> *I thought this tutorial activity was extremely beneficial as it made me sit down and actually think about my traits and my strengths and weaknesses. Now that they have been brought to my attention, I can do something about them. (Male, ESB, 18, 2002, Accepter)*

The unit supported them to "feel" and the journals gave them opportunities to practise expressing those feelings.

> *I love to see improvements in everything…in particular myself. This subject helps me to feel comfortable about that. (Male, ESB, 2001, Accepter)*

The reflective journals and the unit ethos supported changes at deeper levels as described below.

5.3 Deeper levels: Reframing and transformation

5.3.1 Metacognitive thinking

Kunz, Dewstow & Moodie identified the elements of metacognitive thinking as "awareness or monitoring of thinking and learning processes" and "strategies to consciously reflect on and regulate thinking and learning processes" (2003, p.284). For El-Hindi (1997, p.11) metacognitive thinking involved "strategies that require students to think about their own thinking as they engage in academic tasks". Students showed growing "metacognitive" awareness from the first tutorial, as in the first example below.

> …having a clearly, well defined position is something entirely different. It's a whole step in front, and something which you as a person are based on I suppose, after all who am I if I don't have opinions or beliefs? (Male, ESB, 2002, Accepter)

The next examples indicate metacognition about the role of reflection and the writing process itself, from two Converts.

> Writing this Reflective piece has perhaps given me the first opportunity I've had in, quite possibly many years, to sit back and reflect upon, not what I have achieved, but how I have gone about it and how I haven't. (Male, NESB, 2001, Convert)

> …it expanded my view and opinion just in the writing process. You see, by writing down what I thought, I could see where my flaws were and correct them accordingly. (Male, NESB, 19, 2001, Convert)

At a deeper and more complex level, one aim was to help students to acquire the critical learning abilities that would support sustainability thinking and working. This intersected with the next identified benefit.

5.3.2 Awareness of national and global issues and topics that will impact on their professional and personal lives

This kind of awareness is the "substantive knowledge" required for global competence (Wilson, 1994), or "learning-what" (Ehrenfeld et al., 1999). Many students acknowledged they knew very little about the set topics before studying in BNB007. Substantive knowledge forms the foundation for creating or changing an informed opinion and the confidence with which to express it. Students reported that the topics not only widened their knowledge, but made them realise that they needed to know more than their lecture notes, in order to write with "true and thoughtful insight and perspective". This led them to questioning the effects of that knowledge.

> *…I have steadily come to realise that engineering is no longer about the mathematical sciences, but about the deeper ramifications that numbers can really have. (Male, Bi-cultural, 2001, Accepter)*
>
> *… due to the lecture, I can now understand that yes, it is important for us as engineers to know about the political and economical state of other countries. In order to help benefit society we must understand the position it is in before we can come up with ways of bettering it. (Female, Bi-cultural, 2004, Accepter)*

For the first student above and others, the process was transformative, expressed as the ability to integrate this reframing into willingness to acknowledge and evaluate their personal and professional responsibilities on a local and global scale (subjective reframing) and to engage with and act on these new understandings.

This willingness assumes that they have the courage "to be" (Lucas, 1994, cited in Taylor, 2000, p.318), that is, to be willing to discuss topical issues, read

newspapers, take an interest in current affairs and to participate in the lives of their diverse personal, social, cultural and religious communities.

> *Since writing these journals I have even been locked in heated debates with colleagues and friends about issues I wouldn't even considered debating before commencing BNB007. (Male, ESB, 2001, Convert)*
>
> *I believe that Bnb007 has got me more interested in current affairs and local issues in the community, I have got more involved in the church in which i attend and i am now a youth leader for the age group between year seven and year eight and I am loving it. (Male, ESB, 2001, Accepter)*

5.3.3 Acknowledge and evaluate their personal and professional responsibilities on a local and global scale.

Once students were aware of an issue and could formulate an opinion on it, they could begin to consider what their values were in relation to that issue. Ethics offered an essential complementary dimension to substantive knowledge. There were hundreds of references to ethics in the Reflective Journal sample. I understand ethics in Somerville's terms as "a process, not an event, and…a life-long learning experience" (2000, p.284). Students used the journal on "Ethics" to reconsider their own ethics in these terms, as in the following example.

> *This has allowed me to take a good look at my ethical values and see if they are really the ones that I want to carry with me though out my career and my life, although there are many things I have to learn, I believe I am on the right track. (Male, ESB, 2001, Accepter)*

Those with religious convictions wrote comments such as "seeing moral values being part of the work ethics really encourages me" (Male, NESB, 2001, Accepter). Some were well aware that workplaces could pose hard choices for vulnerable workers and posed questions related to conflict of interests. One

posed a hypothetical problem in which "the task requires you to perform some deed that you believe is wrong, or morally corrupt in some way. You try to object until the boss says you do this task or you find another job. "What do you do? WHAT DO YOU DO?!?" (Male, ESB, 2001, Convert) (emphasis in original). Some students had already been faced with just such choices in the work-force, usually based on a lack of safety considerations. They had made ethical decisions, as in the next example.

> *It ended up costing me that job, however I believe that I did the right thing, I don't want to cause someone to die due to the fact that someone wanted to save a few lousy bucks. (Male, ESB, Mature-Age, 2001, Accepter)*

Others thought ahead to the impact of ethics on their choice of work-place, exactly as claimed at the New Zealand conference, in Chapter Two.

> *It seems that we will have to more cautious about where companies put us and be more morally diligent. We'll have to choose a job instead of a job choosing us, be more active in the community. Professionalism isn't the "way you walk, you talk, you smile, your style." It's the way you look after the community; it's like being a good parent. Making sure that the child (city) grows up and can look after it's self (sustainability). (Male, ESB, 18, 2004, Accepter)*

Students were also concerned with the ethics of the nation, particularly in relation to global issues emerging each year, whether armed conflict, terrorism and the responses, humanitarian issues or environmental damage. One student wrote about the OK Tedi mining disaster in Papua New Guinea and the mining company's response.

> *Nor did they experience any guilt for their actions. As a fellow human being I could not bring myself to do this to anyone. As a consequence I would like to think that if I were ever faced with*

this situation I would think twice about my actions. (Male, ESB, 2001, Convert).

5.3.4 A concern for future generations

As the surveys showed, almost all students were concerned about future generations. This was borne out in the journals where there were 130 mentions of this phrase. Some extended their concern to other species.

...humans need to reassess their use of the planet and implement effective strategies to ensure the survival of future generations of not only humans but other species too. (Male, ESB, 2004, Accepter)

This same student moved from awareness of Future generations, to understanding how important his principles were to maintaining the environment for future generations, to realising the role of education in bringing about change and challenging the awareness of engineers already in the work force.

I find it encouraging that ethics and environmental responsibility are taught to all the engineers… I just wonder when was this introduced, are we the first generation to be instilled with these new skills? How many years of graduated engineers are their in the work force who did not learn these valuable skills? How long will they be employed in the work force before all the members have received the training that encourages sustainable practices? How much damage will occur, isn't it also important that current engineers be apprised of how their current work affects the environment. Shouldn't prevention be more important than finding a solution? (ibid)

5.3.5 Willingness to engage with and act on these new understandings

At high levels of perspective transformation, "life is not *seen* from a new perspective, it is *lived* from that perspective" (Novak cited in Mezirow, 2001,

p.24). Many students demonstrated this commitment. The examples below are typical.

> *Now, every time before I use a technology to help me achieve a goal both in my personal life and professional life, I will stop and think "It is an appropriate technology? What is the effect to environment or to other people if I use it? (Male, International, 19, 2001, Convert)*
>
> *I personally pledge to place the community as my highest priority in terms of their welfare, health and safety. In order for me to provide quality contributions, I will also aspire to constantly develop and acquire knowledge and expertise within my field so that I may act carefully and give honest opinions. (Male, Bi-cultural, 2001, Convert)*

There were observable stepping-stones or critical points in these changes and transformations. I outline some of these in the next section.

5.4 "Stepping Stones" – Critical points in a transformative journey

Transformations can and did occur around any topic or related issue including gender, team-work, sustainability, etc. Reading the students' journals, however, it was clear that there were critical points in the process of change and transformation. Galbraith described such points as:

> …the most significant or distressing learning experience. Learners recall exciting and rewarding incidents...behavioural characteristics that they found helpful or hindering, important insights, and the pleasurable and painful aspects of their learning (Galbraith 1992, p.42, cited in Salmon, 2002, p.384).

At this point, a preferable way of considering transformation is to move away from seeing critical points as discrete markers in a linear journey, but rather as a series of opportunities in a transformative journey that is "recursive, evolving and spiralling in nature" (Taylor, 2000, p.290). In order to reflect this different view, I

changed this heading from “mile-stones” to “stepping stones”, a phrase I learned from a student journal. Stepping stones indicate less orderly progress, which may involve an element of risk, depending on what the stepping stones traverse. They indicate a personal journey, since there is direct contact with the stones, and a flexible view of time, since one can stop and pause. One can also place one’s own stepping stones, whereas mile-stones are fixed by others. This metaphor therefore seemed more appropriate to the most recent explanation of the transformative process, cited above. Transformations, as explained previously, can still be Epochal, sudden, or Incremental, evolving over time. The evidence suggests that significant stepping stones were the challenges posed by the early activities, (a-c), the topics (d, i and ii), the feedback opportunities, (e-f) and the final reflection, self-interview on learning, (g).

a) Topic one, Tutorial One – Thinking about Learning

b) The Personal Learning Agreement

c) Selected Readings

d) Selected Topics and Lectures

(i) Cultural sensitivities and International responsibilities

(ii) Appropriate technology and awareness

e) The Peer Interview

f) Formative Feedback

g) The Final reflection/self-interview

The purposes of and processes involved in these aspects of BNB007 were described in detail in Chapter Three. This section demonstrates the outcomes as expressed through student journals.

5.4.1 a) Topic One, Tutorial and activities, "Thinking about Learning".

For most students, the tutorial activities were the first "disruption" (or integrating circumstance). "[S]omething as simple as this 'Find a person who' exercise was already a challenge for me" (Male, ESB, 18, 2002). In following example, the student's rural Australian background was the diversity aspect that affected his communication skills.

> *…my first realization came in the first 'Networking- Find a person who…' activity. I found that my biggest weakness was actually meeting and interacting with new people. The fact that I grew up on a farm …, and had a reasonably small class at school can probably be blamed for its influence on this aspect of my nature. (Male, ESB, 18, 2002, Accepter)*

The tutorial written exercise asking students to comment on how they learned best was useful follow-up.

> *The 'thinking about learning' activity helped me to analyse my own capabilities, where for the first time I actually thought about my own strengths and weaknesses in my communication skills. (Male, NESB, 18, 2002, Accepter)*

Others appreciated the opportunity to think about their strengths first, because this gave them confidence to face their weaknesses or "the right frame of mind" as in the example below.

> *Tutorial Activity 1,"Thinking about Learning" helped me to realise that there is a lot of things I don't know and aren't good at, or as good at them as someone else. It also helped me to*

> *look at exactly what my strengths and weaknesses are, and gave me the right frame of mind to try to improve my weakest areas. (Male, 2001, ESB, 17, Accepter)*

The wording of the task itself challenged some students, since they had to articulate feelings. Some admitted that they struggled with an emotional vocabulary even at the basic level required.

> *Tutorial Activity 1, "Thinking about Learning" helped me to relies my feelings on learning, writing, speaking and working with others. It is unusual for me to answer questions which contain such phrases as "my biggest problem is", "I feel", "I am most challenged by", "I am also concerned about". Being a person that keep his feelings pretty much to himself it is odd to suddenly write them down or "put them on paper". (Male, ESB, 19, 2001, Accepter)*

5.4.2 b) The Personal Learning Agreement

The Personal Learning Agreement (PLA) was one of the most successful strategies for practical and personal reasons. It helped students set their goals and clarify their expectations. Many students had never previously thought about how they learned or how their attitudes might impact on their own and others' learning. These effects provided a basis for long-term Futures Thinking, which involves a metacognitive dimension of "learning about learning, creating a process of thinking about the future" (Inayatullah, 2002, p.98).

> *Thinking about learning… has made me pause and focus on that which I'm not doing so well at. It has meant that I have actually put the time into finding out what I'm not doing well at, why, and how to fix it. The personal learning agreement, is also something I found particularly important. It has meant that semester goals are written down and written goals I'm told are more likely to eventuate than non written ones, so I hope that*

> *this helps. These goals are not only short term, but possibly life long if I can get into the groove. (Male, ESB, 2002, Accepter)*

Students realised that the PLA could help them set goals against which they could measure their progress, and that this could also motivate them by giving them a reason to try to better themselves "both as an Engineer and as a member of society". Students who thought the agreement was "unnecessary" at the beginning, said they found themselves "thinking about it" when they "lacked motivation".

The fact that the content of the agreement was "self-chosen" was important and it encouraged honesty. Many acknowledged and appreciated the opportunity to make their own learning agreement rather than having it imposed upon them. I wanted to model from the beginning as far as it was within my power, a collaborative and participative education process. Many students understood this and its ramifications for the wider environment. One clear example was the student who described the PLA as "providing a simulated environment in [for] the real world". Taking responsibility for learning was a first step on the path to becoming responsible citizens. For example, the PLA gave this student the "bigger picture" so that

> *instead of feeling like you might be a small entity who goes to uni every day you can see your place in society and with that comes responsibility for your actions as a citizen and as a professional. (Male, ESB, 24, 2001, Accepter)*

Some realised that a world based on such values "would be a better place".

5.4.3 c) Selected readings

The readings were a significant element since many students chose not to attend lectures and summaries were available on the website. The readings provided the main challenges to their thinking on the set topics. The criteria for the

readings I chose, were that they were short, represented diverse but challenging points of view and were readable, written in the kind of Plain English we were encouraging students to use. Even so, some seemed like a "thesis" to many students, "Like some of them were ten pages long! My God!" (Fiza, 2003). I used *New Internationalist* magazine as one source, because it is committed to social justice. Its articles offered challenging alternative views on issues of global importance, to those that most students accessed via the mass media. Many are written by writers from the majority (developing) world (Kuyek, 2002; Kintisch, 2003; Godrej, 2003).

Articles relating to the set topic for each year also brought about huge changes in perspective.

> *The article A Rainforest Experience…inspired me to really believe in the idea of sustainable engineering not only as an alternative but as the most desirable option. (Female, Bi-cultural, 18, 2002, Accepter)*

Some students wanted to share their new found information with family and friends.

> *The readings where very helpful in my personal development. Personally I find reading quite boring and not worth my time, but … I found the readings very interesting, I am sending the booklet to my mother as she will find the readings interesting and she may even find them helpful as well. (Male, ESB, 2004, Convert)*

Many engineering students admitted that they read very little outside the set materials, preferring to rely on television. The articles by Margot Cairnes (2001; 2003; 2003) and Slava Thaler (2002) came from engineering management magazines and are best described as personal development. These caused very different responses. Some students loathed them, which as we made clear, was

perfectly acceptable. "You do not have to praise the readings or the journals to pass. You do have to be polite" (BNB007 website). Those who challenged some of the authors' shallow arguments effectively and with the awareness of others' differing needs, as in the following thoughtful and clever example, were rewarded with positive comments and marks.

> *I think that articles like this have a fast-food approach to the soul, and show little insight. I agree with you however, some people haven't even thought of the fast food approach so it is a 'taster'. (Male, ESB, 2004, Accepter)*

For many other students, who previously had not thought about self-development, they contained relevant and timely messages for their process of trying to manage various personal changes and transitions. For a few, they were life-changing, giving them permission to identify and "unlearn" communication habits that were no longer useful to them and to identify new ways of being in the world.

> *In regards to the article on achieving success, [Thaler] I have found it to be an eye opener on the need to achieve a balance in one's life in order to attain true success. It has reinforced upon me the need to self-evaluate and progress through goal setting, and that as always treating others with respect and genuine good-will is generally a satisfying experience that will also result in tangible rewards. I intend try a few of the exercises mentioned in the article and hopefully they may result in an improvement of myself. (Male, International, 2002, Accepter)*

For one or two students each semester, they were life-*saving.* For example, for one recent student from a Non English speaking background, Thaler's article (2002) was a "revelation" in helping him to gain a bigger picture of his life, which was in severe crisis for complex and interlinked personal, cultural and academic

reasons. When students mentioned suicide in their journals, as this student did, I took immediate action[46]. In this case, I emailed him to say that I had read his journals, I was deeply concerned for his welfare and that help was available. I passed on relevant contact numbers and spoke to a university counsellor, who rang him immediately to arrange counselling. I kept in close (email) touch with this student during the next few months, until he assured me that some of the problems were being resolved and he felt more in control. The student was immensely grateful that someone had been there at what he described as his darkest hour[47]. The journals were his only outlet to express his distress. The fast and constructive responses gave him the courage to make decisions to change those aspects of his life within his control. I return to the issue of support in Chapter Six.

I deliberately did not set a reading for the topic "Cultural Sensitivities and International Responsibilities" but allowed students free choice from some suggested websites, including *New Internationalist* magazine and *Cultures on the Edge*. The most popular articles were "Capoiera: the Brazilian Fighting Dance" (Friedman, 2000) and one on efforts by the Kingdom of Bhutan to protect and maintain its traditional culture (Greaves, 2001). Cultural issues were embedded in many other readings so that students continually had to think about culture in context. Another article was "Chopstick Controversy" (Zheng, 1999). It surprised Chinese and non-Chinese students alike

> *that disposable chopsticks could cause an environmental problem. It shouldn't. Even the tiniest waste products of society*

[46] There have been two on-campus suicides that I know of in the past five years, one staff member and one student.
[47] As could be expected in such large cohorts, there were usually two or three students each semester whose journals raised concerns serious enough to take further supportive action of some kind.

> *can cause problems when they are employed on a large enough scale. (Male, ESB, 2004, Convert)*

5.4.4 d) Selected lectures

Lectures were not popular, partly because until 2005, they were a three hour "block" that began at 8.00 am and so attendance fell away towards the end of semester. The lectures were given in a 500 seat lecture theatre, where the back of the room is known as "Mt Kosciusko",[48] because of its distance from the lectern. There was usually a group of students who sat up the back and talked loudly and who had to be reminded that they were free to leave[49]. However, for many, the lectures complemented the readings and tutorials as they were intended to do. For some, as in the example below, lectures were "inspiring", "alarming", and "eye-opening" and one third of the journals in the sample used the word "enjoyed" for lectures or other aspects of the unit. Some were shocked by the new information lecturers offered.

> *The lecture on Professionalism is probably one of the most inspiring lecture that I have had in Professionalism Studies One. It was because I have learned the true meaning of Professionalism and the kind of attitude that I should have in order to become a professionalism engineer. (Male, International, 2001, Accepter)*

> *This week's lecture [Appropriate Technology] made so much sense it was alarming. The lecturer made the great point in that every advancement in technology has brought upon some social effects that were almost never beneficial. (Male, Bi-cultural, 2000, 18, Convert)*

I introduced the "Cultural Sensitivities and International Responsibilities" topic in two, hour-long lectures. This topic was moved to early in the semester to help

[48] The highest mountain in Australia, named after a Polish nobleman, by Strzlecki, a Polish-Australian explorer of the 19th century,

[49] The 2005 cohort seemed very willing to listen and also to participate in activities. I am unsure whether this was part of a sea-change or simply the difference in individual cohorts.

with group formation and to encourage understanding and respect. The combination of tutorial activities, lectures, readings and videos seemed to combine to bring about many changes in attitudes among students from all backgrounds. Most understood that knowing about diversity and respecting diversity were part of an engineer's professionalism in a globalised world. One Chinese background student used the word "mind-boggling" in reference to learning about "how to work…in unity and harmony". It seemed surprising that students from English speaking backgrounds admitted to having had little contact with people from non-English speaking backgrounds. Others wrote of the pleasure such relationships brought them on a daily basis. The lecture material also had to be "applied" in context, as groups had to include "Cultural Considerations" in their team projects and reports. One example was the group who did not use animal products in their product, a tent for refugees, since they were aware "that certain religions view certain animals as sacred".

This topic made spaces for students to reflect on cultural issues and experiences, positive and negative. The first observation below came from a student from a non-English speaking background, who was working at unlearning one cultural habit and acquiring a new one. This may be a personal issue as well as, or rather than, a cultural one, since several males of English speaking backgrounds mentioned that they were trying to change this habit as well.

> *At first, I find it extremely complicated and hard to glance someone right in the eye because that make me turn away. However, during this semester I have developed this skill and now have the ability to look at someone straight in the eye when I'm having a conversation with him\her. (Male, NESB, 2001, Accepter)*

The following example is an insight from a student from English speaking background, who, in terms of cultural awareness, made the leap from "unconscious incompetence" (not knowing what one is doing) to "conscious incompetence" (knowing something is wrong but not how to correct it), (Weiman & Giles, 1988, cited in Guirdham, 1999, p.228). This framework is explained in more detail in Chapter Six. The next step was a further shift beyond awareness to being mindful and trying to understand what might have caused his assumption.

> *This lecture made me reflect on the sense of isolation that Australians have about cultural differences. It seems that we assume that everyone acts the way we do. Because we are an island continent we have little interaction in our daily lives with people from other cultures. If we do we often expect them to conform to our cultural norms. (Male, ESB, 18, 2001, Accepter)*

The "isolated island continent" myth is an increasingly difficult one to hold on to, since Australia is one of the most diverse countries on earth, however this student had identified the presumption that others will conform to "our norms". He had not yet interrogated the concept of who is the "we" in "our".

While changes and insights are important, we need to move beyond a cultural differences level of understanding to challenge the assumptions and worldviews behind them. As indicated in Chapter Four, nothing challenged these students' cultural views like the "rip in time"[50] of September 11, 2001. The attack brought the issues of religion and difference much more to the fore. Responses included shock, fear that it might happen to them and anger, but in only two students in the sample, a desire for retaliation. Most struggled with these feelings and resisted the revenge-based, media barrage in order to arrive at their own critical and

[50] "A 'rip in time' …a cultural short circuit that revealed deep global fissures and interrupted complacent attitudes" (Raskin et al., op. cit., p.11).

compassionate responses, as the next two examples demonstrate. The first is from a mature-age, critical thinker. The second student's comments are the more interesting since he is an Indian-Australian of Hindu background.

> *The recent terrorist attacks in New York have served as a wake-up call for business and industry alike to seriously reassess everything from structural design standards to corporate expansion policies. (Male, ESB, MATURE AGE, 2001, Accepter)*
>
> *The leader of my group [Y] 51 is a Muslim and was affected greatly by the happenings overseas in America and Afghanistan. This lead to many discussions where the topic sidetracked from the assignment task at hand to the conflict arising overseas. It was during these discussions that my one-tracked mind opened up to the actual complexity of the politics that were involved as well as the ongoing religious feud. "Y" opened my way of thinking just by teaching my about the different way-of-life of Muslims and the many hardships they have had to endure. America's disturbing past was also revealed to me and, although in this situation they were stung by an act of terrorism through no apparent fault of their own, their 'bad' decisions in the past have the Afghanistan people asking Americans to define 'terrorism'. This is only a small example showing the 'small mindedness' that can occur without knowing all the facts about the culture and the people in question. (Male, Bi-cultural, 18, 2001, Convert)*

Racism is the extreme negative in working with cultural issues. Students from Asian backgrounds had clearly suffered from it, particularly in high school when, they reported, students grouped by ethnicity. Students reported that in group work some students made clear by "responses to questions or body language" that they did not like other members of the team. There were 41 instances of

[51] I have replaced the name of the student with an alphabetical substitute.

"Islam" or "Muslim" in the journals, mostly by students trying to understand September 11 and the retaliation by the USA, which many condemned. Other mentioned various customs that might impact on Engineers working overseas, disapproval of the attack on a Brisbane Mosque that followed September 11 and several highly publicised and distressing cases of "gang rape" committed in Sydney, by young Muslim men, mainly from Lebanese backgrounds against Anglo-Australian girls and women. The impact of anti-Muslim publicity on Muslim students and the Muslim communities generally deserves further research. Most students saw the human dimension, as in the example below.

> *The large majority of Muslims do not worry about how they can destroy the Great Satan (the USA), most of them are worried about will our kids have a future, what are we going to eat, will I be able to support my family or will my village be bombed today. (Male, ESB, 28, 2004, Resister)*

5.4.5 e) The peer interview

I explained earlier why I introduced this strategy into the Reflective Journal process in 2002. Responses have been overwhelmingly positive in each cohort. The main problems students reported were finding an interviewee, including plucking up the courage to ask someone, finding a time and place to do the interview in person and interviewing someone they didn't know. The Discussion Line proved a useful site for the few students without partners to find an interviewee at the last minute. Some of these problems are elucidated by the interview data in Chapter Six.

Outcomes reported in the journals include that the Peer Interview reduced alienation and encouraged sharing. It did this by allaying students' fears that they were the "only ones" worried about the Reflective Journals or not coping in some way; that their standards were not "up to scratch"; or that they were alone in *liking*

the Reflective Journal process. For some students, their peers' constructive criticism was the first time their writing had been affirmed. One very articulate Convert, quoted again below, expressed the effect this had on him.

> *It was very refreshing for me as I am usually heavily scrutinised for my writing and I become frustrated and eventually give in. (Male, ESB, 2004, Convert)*

I provided scaffolding in the form of suggested questions to ask, which shy students said were helpful. Other positive outcomes included challenges to the Peer Interviewers' own learning approaches and students learning from their peers' learning processes, as the next examples show.

> *One thing that surprised me about "K" is how enthusiastic he has been about the preparation and presentation for his reflective journal. (Male, ESB, 19, 2004, Convert)*
>
> *"G" had found the honesty with which he was expressing himself with the journals refreshing. It seem that he is not accustomed to doing this, and it allowed him to find out a lot about himself, his career and his attitudes. "G's" journals were very personal and expressive, and told me more about him than I had previously known. (Male, ESB, 28, 2002, Accepter)*

The next example is a mixed gender interview, from a young male student who was coming to terms, albeit in an unconsciously patronising way, with realising how well the young woman he interviewed was coping with a life more difficult than his own.

> *She is currently juggling heavy out-of-hours occupational commitments for which I am honestly proud. Despite having very little spare time, "A" has not let her academics slip, nor has she worked herself into a nervous wreck. I would even say that I admire her for her efforts in striving for her broader goal of being financially stable. (Male, ESB, 18, 2004, Accepter)*

I continually encouraged students to interview someone as different from their own experiences and background as possible. The most rewarding interviews to read were from those who took the greatest risks in moving outside their 'comfort zones'. The greatest lesson for many students was becoming aware of stereotypes and how misleading they can be. The next example is from an Australian from an English Speaking Background who interviewed an Australian from an Asian background.

> *What was most surprising about interviewing "F" was how wrong my first perception was of him. It was also inspiring to see someone who has different priorities to me can think so similar in the respect that he would like to see everyone in the world showing respect to each other. (Male, ESB, 2004, Accepter)*

Students from NESBs received similar surprises, as is evident from the use of the qualifying word "however" in the next example.

> *He is a born and bred Australian, however he still enjoys the interesting aspects of other cultures. (Male, NESB, 18, 2002, Accepter)*

Students reported that the interviews were the beginning of many friendships.

> *I quite enjoyed talking to someone of a different background that I spend little time with normally, but now I believe that I have gained an interesting friend, something I find important for a full and happy life. (Female, ESB, 18, 2004, Resister).*

5.4.6 f) Formative feedback

Following a week after the Peer Interview, Formative Feedback also answered the question, "How do others see me?", but from an academic perspective. Students submitted six (later five) journals electronically to the marker/s, who used the same criteria as for the Summative Assessment but gave only

comments, not marks. This had several effects, as intended. It assured students that the Reflective Journal strategy was not a joke, that they were being taken seriously and what they wrote was important, at least to the reader/marker.

> *As a reflection on my reflections, I have learned from this exercise that I need to put a little more time into preparing my Journals, and think about them more then I have been. I am more confident about it now that I have had feedback, and will endeavor to perfect my writing skills. (Male, ESB, 17, 2004, Resister)*

This realisation shocked some students who had been coasting, or thinking that they did not need to put in any effort. *Geoffrey* explained this effect in his interview, as reported in Chapter Six. It built trust in the process, in that markers only gave constructive feedback, avoiding the negative comments students feared from previous experience.

Table 15: Example of Formative Feedback

Assessment Criteria	**My Comments**
Shows **evidence** of having engaged with the topic for each week, **including** at least one of the set readings	*Yes you do this well, "X". Perhaps you might think a bit more of how it might influence you as an engineer.*
Shows **evidence** of your own values and attitudes as part of reflective writing	*You do this very well. You are thoughtful and insightful and show that you are willing to challenge your own previous thinking. I am enjoying sharing your journey.*
Shows **attention** to presentation Shows **attention** to spelling and grammar Shows **evidence** of consistent entries each week	*Clear neat, but presentation can be better. Keep fonts consistent. Read website re headings for each journal and the way to submit. Do read the notices I send out.* *Despite your initial fears you have a clear personal voice. What I can suggest is that you become a better editor. Some of your sentences don't hang together. For a while try writing shorter sentences but make sure they are clear. Read them aloud if you aren't sure. This done, you are on track for very good journals.* *I hope this helps*.* *[*There were also detailed suggestions within the text, using the Track Changes facility in Word].]*

It gave them guidance as the kind of language we expected in this genre and offered suggestions for improvement, with the main aim of finding their "own voice" in an informal, professional style. Table 15 above is an example from my Formative Feedback on a journal from 2004.

5.4.7 g) Self-reflection and journal review

The final reflection was designed as a reflexive activity, in which students considered their learning across the semester, with time being seen as a "spiral" rather than linear (Sarkar cited in Inayatullah, 1999, p.19). That is, it presented an opportunity for students to learn from the past in order to inform their futures. These journals were rewarding to read and rewarding for most students to write, as they made discoveries about themselves in the process.

> *These journals have inspired me to express myself freely without any fear of criticism because it makes me a less judgemental person. These journals are like stepping stones, slowly developing my professionalism in every task or assignment. It's not about writing blindly but really sitting down and analyse how to approach obstacles and what other alternatives are there left unexplored. (Male, NESB, 2002, Convert)*

This section used examples from students' journals to illustrate the changes that took place and how students perceived these at various points in the process.

Indications of change or transformation can be assessed using various models. Table 16 below summarises Rogers' and Mezirow's approaches. These are juxtaposed with related aspects of BNB007 process. However, before using the preferred models of Rogers and Inayatullah, I briefly revisit Kember et al.'s model. I wrote in Chapter Two that I was puzzled by their conclusion that "premise reflection was unlikely to be observed frequently within student journals"

(1999, p.24) and was even more unlikely to be observed in topics close to students' interests. Nothing is closer to engineering students than their concept of their profession, yet so many of these young people seemed prepared to change this significantly and dramatically.

> *Engineers have been traditionally viewed as semi-literate, inarticulate, poor communicators. The reflective journals will help produce a new breed of engineers with enhanced skills and a new image. (Male, 18, 2001, Accepter)*

The next excerpt illustrates a student taking Boyd's two steps toward a personal transformation (1991, p.198, cited in Mezirow, 2001, p. 22), that is, "making public, primarily for ourselves, the historical dimensions of our dilemma" and "confronting it as a difficulty to be worked through".

> *Before undertaking BNB007, I wanted to become a professional, namely an engineer so I could have the status and the money that comes with being so. However, I have learnt that these are nothing. The personal gain of money and status mean nothing, and the real personal gain comes from the satisfaction that you have given your best in order to help the client, which would in some way, indirectly affect the world. Knowing that you have identified and explained all the possible options, helped the client to understand the risks and costs involved and made the professional recommendation is all the personal gain you need. Knowing you have done your job to your utmost, as a professional is what I aspire to. (Male, ESB, 18, 2001, Convert)*

This example was one of many which met stated criteria for personal transformation through a "subjective reframing" which involves "an intensive and difficult emotional struggle as old perspectives become challenged and transformed" (Mezirow, 2001, p.23). Moreover it is "mindful" in the sense that the learner has made "an informed and reflective decision" to act on this "reflective

insight" immediately or as a delayed action, here expressed as a future aspiration (ibid, p.24). I decided that Kember et al.'s test of transformation may be useful for the teacher and for research purposes, but I had concerns about using any such scheme as a formal way of "assessing" reflective work.

The issue of "assessing" reflection is extremely complex and needs further research. Reflection at any level makes students vulnerable and these students' journals revealed some of the reasons behind unwillingness to take risks in writing or thinking, many of which were based on previous criticism. There is a danger that "failing" because one did not "reflect" at a "required" level would be another experience of failure for the student and possibly the teacher. This would tend to discourage rather than encourage any further attempts at "communicative learning", defined as

> …understanding what someone means when they communicate with you and involves intentions, purposes, feelings, values and moral decisions that are not easily amenable to empirical measurement (Mezirow, 1996, p.121).

Mezirow distinguished this from "instrumental learning" ("task oriented problem-solving with the objective of increasing proficiency in performance" (ibid). Without this work being "assessed" most students would not have attempted it but any assessment of Reflective Journals should be part of a supportive framework. The Formative Assessment was one of several in-built strategies designed to encourage, give much needed reassurance, encouragement and guidance, so that any transformative process was not undermined but reinforced. The next section considers indications of transformation using Martha Rogers' Global Model (1996) and then Causal Layered Analysis. Table 16 compares the elements of Rogers' model with Mezirow's levels and how BNB007's process supported transformative learning.

5.5 Meta-analyses of change and transformation

I introduced both these methods in earlier chapters. Here I apply them.

1. Rogers' global model of change (1996)

2. Causal Layered Analysis

Table 16: Rogers' Model compared with Mezirow's levels and the BNB007 process

Rogers' Dimensions and qualities of learning	**Cognitive processing and Transformation (Mezirow)**	**BNB007 process**
Cognitive Stage One. Learning new facts, ideas and concepts about global situation. Learning Pattern of the mind	1. Cognitive processing: "compute, memorise, read and comprehend" (Kitchener, 1983, p.230, in Mezirow, 2000, p.4) 2. Metacognitive: monitor their own progress and products" as they do these tasks.	Students engaged with globally relevant topics. Many had not thought about these, or their relevance to self or engineering Metacognition – Learning about learning
Affective The emotional response – when knowing shifts from intellectual and detached to a personal and connected knowing. Range of conflicting emotions possible. Student responses must be accepted and seen as part of shared experience. Learning pattern of the heart. (Rogers, 1996, p.764)	3. Epistemic cognition: reflecting " on the limits of knowledge, the certainty of knowledge and the criteria for knowing" (Ibid) : the site of transformative learning "Mindful learning" (Langer, 1997 p.4)	The Personal Learning Agreement and tutorial activities begin this process in week one. Peer Interview supports/ reinforces/ inspires Formative Feedback and on-line support [on-going]
Existential Deep soul-searching, possibly questioning values, life purposes, faith and ways of living. Questions – not necessarily answers. Students face reconstruction of self at this level.	"learning through the soul" (Dirkx, 1997, p.85 in Mezirow, 2000, p.7).	Individual topics/ lectures, readings challenge at deeper levels.

Table continued from previous page		
Empowerment If this is resolved, begin to feel sense of personal empowerment, clearer sense of responsibility and commitment to do something. -cautious optimism Learning pattern of the soul (Rogers, 1996, p.764).	Objective and subjective reframing (Mezirow, 2000 p.23).	Week 5 Formative Feedback gives confidence/ shocks. Most journals indicate increased confidence at this point.
Action If first four dimensions of learning questions have been met, students can make personal, social, political choices and action. Some students report significant reorientation of personal/professional lives.	Can be "epochal" (sudden) or "incremental" (progressive changes over time). Perspective transformation: not only a total change in life perspective… life is not seen from a new perspective, it is lived from a new perspective (Novak cited in Mezirow, 2000, p.24)	Self-interview Personal change evident. Choices being made. Action is being considered and/or taken.

5.5.1 Model One: Rogers' Dimensions of Global Learning

Martha Rogers' adult interviewees were students who had chosen to do a course with Futurist Allen Tough, "Crucial Questions about the Future" and so it is reasonable to assume that they were interested in global issues. BNB007 Engineering students had no choice in studying this unit. Many stated that they had no idea that global topics were of any relevance to them or their profession and some resented having to learn about them at all.

Rogers (1996, p.492) identified "five stages or dimensions of learning" in futures based learning. They are also the foundation for the "compassion" that educators supporting this learning need (ibid). Hicks used Roger's model to show that developing "a grounded personal path of action" similar to Barnett's "critical being" and Mezirow's transformed perspective, depends on "'three awakenings', of the mind, the heart and the soul" (Hicks, 2002b, p.102). These were evident in the next BNB007 student examples.

> *My views and beliefs have changed considerably, as compared to those that I had at the beginning of the semester. This is thanks to the journals. For I have been able to open my mind to the possibilities of various opinions… that I may come across in my professional life. (Male, NESB, 19, 2001, Convert)*
>
> *"Being a quiet person by nature, I tend to keep most of my thoughts and feelings to myself, and I have learnt by experience that this can often be the cause of many problems and can also make certain things more difficult than they need to be. Earlier this week I found myself in a situation whereby I was having a conversation with a friend, and I was somewhat surprised to realise that I was telling him things that I don't think I have ever talked to anyone about before. Although this may seem somewhat trivial to most people, to me it signified that perhaps I was beginning to change, and that maybe I was becoming more like myself and starting to move away from the quiet and withdrawn person that I once was. I also realise that this is just the first step in many to being able to communicate effectively with people and being able to express myself in a way that I have only been able to achieve through writing before now. (Male, ESB, 19, 2000, Accepter)*

The key metaphor for Rogers' interviewees was "waking up". The most significant metaphor of transformation used by BNB007's students was "opening eyes and minds". This has a futures dimension since it suggests that the BNB007 process is meeting the Action Learning vision of "an enlightening agenda". The two most common statements (in 60 journals) were that it opened their eyes and opened their minds. Linked metaphors included "insight" and "revelation" and their opposites, "blinkered" and "blind". Examples include the following, which I have summarised and further divided into the appropriate levels of Rogers' model of thinking about futures.

The Cognitive stage. The Cognitive level is stage one in Rogers' model, at which students are learning new facts, ideas and concepts about the global situation. BNB007 were not studying Futures Studies as such but "learning about the future means learning about global issues" (Rogers, 1996, p.764). This study showed that the converse is true. That is, when futures thinking has informed aspects of course design, then learning about global issues means learning about the future. At this level, BNB007 students' eyes or minds were "opened" not simply to the given topics, but to new aspects of their profession, the need for engineers to know more than just facts, and to new and different opinions on topics.

Summarising BNB007 students' comments and using the same metaphor, at this level their eyes and minds were opened to themselves and the "outside world", to "a different world" and to explorations of their thinking that led to increased confidence to express opinions "in other facets" of their lives. Even working with interested students, Rogers reported that there was an understandable "resistance", confusion and feelings of being overwhelmed, as well as opposing emotions (Rogers &Tough, 1996, p.492). This is not "simple cognitive learning" (ibid, p.495). Feelings are critical to transformative education, as discussed previously.

The Affective level. "Learning about global issues can never be a solely cognitive matter, although many educators would like it to be" (Macy & Brown, 1998, p.59, cited in Hicks, 2002, p.99). The Affective level encompasses the "emotional response…when there is a shift from intellectual, detached knowing to a personal, emotional and connected knowing" (Rogers, 1996, p.493). A range of conflicting emotions is possible at this level and student responses must be accepted and seen as part of shared experience. BNB007 students, like those in

Rogers' study, had both positive and negative feelings. Their positive feelings included "love, confidence, relief, respect, passion, inspired, humble, security, pleasure, motivation, encouraged, touched and fascinating". The negative included, "fear, lost, confused, overwhelmed, shock, nervousness, hate, disturbing, embarrassed and upset". These are amplified in the interviews. Students' fears were global, including "globalisation" itself and "fear of terrorism", but linked to the ethics of how to prevent terrorism without harming "innocents". They also had personal fears, including fear of "rejection" by others, the fear of saying "no" in groups and fear of "failure". Students were upset at themselves and at others, but rarely despairing. Most were like this young woman, who expressed the strongest emotion at environmental damage and wanted to be part of changes for the better.

> *I feel nauseous witnessing the damage we all inflict. It is obvious that any advancements I want to see will not only be socially, but environmentally responsible. (Female, ESB, 18, 2001, Accepter)*

The fact that BNB007 led to these deeper dimensions in student learning indicated that the unit effectively supported their feelings. The on-going nature of the Reflective Journals and inbuilt feedback opportunities reassured students that their personal responses were valued and valuable. Lectures supported this, as this example relating to a lecture on Professionalism shows.

> *Again described in the lecture, "you're allowed to fail, you're not allowed to not try." If this is the slogan that professionals live by, then I am eager to become one. For there is no fear in it at all, you can fail and still succeed. What more could one ask for? (Male, International, 19, 2001, Convert)*

The Existential level. At this existential level or "stage of the soul", Rogers found evidence that it "caused people to question their values, sense of meaning and

purpose in life, faith, spirituality, life goals, or ways of living" (1996, p.493). This may be a time of questions – not necessarily answers. At this level, students are in the process of Transformation since they are facing reconstruction of self. Beveridge (1997, p. 37) noted a potential problem when ideas are fundamentally challenged in this way.

> The updating of old ideas, when it goes beyond assimilating new knowledge to old schemas and requires a total reorganisation of previously learned concepts, makes students feel they know less after a seminar than before it.

This response is similar to Somerville's second or "Chaos" level of thinking introduced in Chapter Two, where we know enough to be "confused" but have not yet formulated a clear ethical position based on a deep and reasoned position (2000, p.289). Many students remarked that writing the journals enabled them to form their own opinion on large and complex issues. This gave them confidence and the courage to develop further.

> *Should we as engineers destroy cultures just because the wealthy businesses want something silly? I think I just hit the topic. Are there such people like 'evil' engineers, who don't actually care for cultures, who don't have international responsibilities? I would say there would be, not so much 'evil', only cheap and quick. (Male, ESB, 2001, Accepter)*

Their resolution of this "disturbed" state may depend partly on the way a teacher approaches the issue. Rogers stressed that support at this level is critical since the "soul level" struggle "is the precursor to caring and committed action" (1996, p.494). Making clear, for example, that cultural issues are a valid and valued aspect of learning, may have reduced some of the pressure of changing perspectives where cross-cultural knowings were concerned. The next examples are two of many in which students demonstrated their confidence to share and

process the "harmonising" of their cultural knowings and experiences, whatever their backgrounds (Baker & Taylor, 1995). In the first, a student from the former Yugoslavia a) shared his life experience and b) critiqued and rethought his casual dismissal of his father's village life, to embrace the positive aspects it offered and that have been lost to modernity.

> *Today I realized just how much I take technology for granted. When I got home I talked to my dad. He is 53 years old and when he was born most of these things weren't even invented. He gets offended when I laugh at the games they used to play and how he had to tend to the animals. It was so different then. But is our world any better then my dad's childhood. For the right price we claim to have anything anyone could ask for: television, food cooked in only a few minutes, and you could keep on going and going describing the different things that you could HAVE. But we never mention what we can't have. My dad ate all natural food from the family garden, milk from the family cows… while today we do not have any food that hasn't been processed in some way or changed in another. (Male, NESB, 2001, Accepter)*

The second example is from a young Muslim-Australian male, who felt free to say what mattered to him.

> *My strengths academically are mathematics and engineering but my real strengths are my family, friends and my faith; they're the things that hold me together and bind me to become who I am. I hope this semester will [be] a productive one in the sense that I learn more about not only my field of study but also about myself. (Male, NESB, 18, 2001, Accepter)*

The Empowerment level. If the questioning stage is resolved, students begin to feel a sense of personal empowerment, a clearer sense of responsibility and "commitment to do something" - cautious optimism (Rogers, 1996, p.494). There are indications that BNB007 encouraged and supported students' growth, since

they felt "hope and energy towards the future" (ibid) expressed in their desire to have a positive role working for "both human life and the environment we live in", as one male Accepter (2002) put it. This was clear in the healthy, renewal metaphor, "seeds for growth", used by this Resister/Convert to describe the changes in his world view.

> *I have been challenged and changed by this unit in real and positive ways. I have the seeds for growth as a professional engineer supported by an honest, accepting and sincere attitude to the people I come in contact with, now and into the future. (Male, ESB, 2001, Accepter)*

The Action level. Engaging with the first four dimensions can lead to "searching for and finding personal paths of action" (1996, p.767) which may involve significant life changes. This study also included students who realised that they needed to change courses, relationships and above all attitudes to their chosen profession.

> *For myself I will no longer find myself as an engineering student, due to a descion [decision] to change my course. No matter the outcome of my final career, I will always hold many of the fundamentals from this course in high regards. Even though this course has been on a minor part of my entire academic career it may prove to be one of the more important, pronounced aspects. (Male, ESB, 18, 2001 Convert)*
>
> *The learning agreement from journal #1 has altered my course slightly. As a direct result of the ideas put across by K (tutor) regarding what employers are looking for in graduates, I have made a conscious decision to shift my focus slightly from purely academic. I have begun my own course of professional studies. Since the beginning of the unit I have:*
>
> · *Become a student representative*
>
> · *Begun reading widely*

- *Become involved in Volunteer Engineering with [deleted]*
- *Taken every opportunity to talk with professional engineers about their careers.*

Downloaded a typing tutor to improve my typing efficiency since I expect to be doing a lot of writing in the future. (Male, ESB, Mature Age, 2001, Accepter)

The "opening" metaphor implied a question. If the journals opened eyes and minds, what had kept these students' eyes and minds shut or unseeing? Students may not have been challenged or perhaps were not ready to move outside their comfort zones in their previous education. This raises a further concern that while BNB007 has helped students to lay solid foundations, future plans are missing. One student expressed this criticism clearly

The true evaluation of this subject lies in what we maintain with us as we move along our careers. For many I believe this won't be much as our training as professionals was only fleeting. In my opinion this subject should be extended to pass through several more semesters. (Male, NESB, 20, 2001, Resister)

5.5.2 Meta-analysis two: Causal Layered Analysis

I introduced CLA in Chapter One and described it in detail in Chapter Three. While I originally intended to apply CLA to the journals as texts only, the Sense-Making generated information was so comprehensive it took greater prominence. CLA gradually became more informative of the layers beneath differing versions of engineering; which vision of higher education was being served by these visions; and which vision this study's teaching approach was serving, as it emerged from the students' journals. This is how I present it in the following chapters.

The litany or pop futures level. From the time of the precursor units to BNB007, in 1997-98, the BNB007 content and process challenged the accepted stereotype

or Litany of "engineers". This was described by the first cohort as "big tough men who build stuff and drink a lot". We described this in detail in papers written at the time (Kelly & Messer, 1998a, 1998b). These papers in turn, when seen in perspective, represented my own Litany level of thinking. I was overwhelmed and intimidated by what seemed like generally negative responses and responded by trying rather defensively to "deal" with the behaviours, rather than understanding what the behaviours represented at that time. Initially my pedagogy aimed to meet short-term obvious needs such as improving communication skills. In terms of the student visions I worked through, Global portability represented the short-term Litany level, Global competence represented the social problems and discourse levels, while *Globo sapiens* became the guiding metaphor for my preferred vision. Students themselves responded at these various levels of understanding. The evolution from Global Portability began with accepting words and phrases such as "team work", "partnership", "collaboration", and so on.

> *Engineers have been traditionally viewed as semi-literate, inarticulate, poor communicators. The reflective journals will help produce a new breed of engineers with enhanced skills and a new image. (Male, ESB, 19, 2004, Convert)*
>
> *I now understand that engineering is not only an individual job, but it is about team work and partnership. Instead of always being competitive with others and being contemptuous on those who I am better of, I now know I should collaborate with others and help those who simply doesn't have that much advantage as me. (Male, Int. 2001, Accepter)*
>
> *Gone are the days when as long as it does the job it'll be right. I have learned that there are so many more factors to take in to consideration than that. Ethics, sustainability, cultural considerations, environment and appropriate technology to*

> *name a few. I can understand how each one of these factors is very important. (Male, ESB, 2001, Convert)*

Social Problems level. At the social causes or systemic level, the Reflective Journals were one successful strategy for addressing identified "problems" in communication, learning skills and cross-cultural skills. This is a significant expectation and outcome as well as a primary teaching responsibility, since all students and International students in particular, pay large amounts of money for their degrees. In terms of Internationalisation of the curriculum, then, an effective Reflective Journal process was a supportive and useful strategy for NESB students who believed, correctly or incorrectly, that their language skills were poor. The picture was complicated by the fact that the Engineering cohorts included international students for whom English was a second or other language, foreign-born students who were Australian residents and had received some but not all of their education in Australia, and Australian–born students for whom English was a second or other language. In this unit, these groups included the best and the poorest writers. As the journals and interviews showed, there were good reasons why so many students lacked confidence in their writing. At the problem-based level, the papers I wrote focussed on the strategies I used to make the Reflective Journal process a more effective one in meeting these needs. The whole process did improve many students' competencies in these areas, in preparation for the interconnected and multicultural world in which they had to work locally, nationally or globally. This was reflected in changed behaviour.

> *Before this semester I rarely kept up with daily news and events. Now I watch the news once a night and read the newspaper at least once a week from start to finish and I*

> *actually enjoy it. I know that this is a direct result of doing these reflections. (Male, Bi-cultural, 2001, Convert)*

Cross–cultural awareness developed in positive ways, that is, it was not simply a one–way accommodation to the dominant view, but showed that many students were engaging with the "other" in themselves.

> *When I first joined the course I honestly thought this was just a bunch of 'touchy feely rubbish', I seriously thought 'who needs to be a good team member, who needs to worry about professionalism, and why bother with cultural considerations?, As long as I can do the math and pass my subjects I'll just pick up all that other stuff when I get out.' Twelve weeks later I realize how ridiculous that was, because an engineer isn't a person who sits behind a desk crunching number and using formulas, they need to have very good interpersonal skills, the ability to lead, to have empathy and in general and in general be a 'Professional'. (Male, ESB, 18, 2001, Convert)*

Discourse/worldview. At a personal level, some students, mainly males from English speaking backgrounds, subscribed to, benefited from, and tried to perpetuate, knowingly or unknowingly, the discourse of engineering described above as sexist and discriminatory in effect. As described earlier, they used vocabulary that Burrowes, citing work by Wittgenstein (1961) and Wilson (1992), described as "hostile" and based in military and religious metaphors that "reinforce patterns of male dominance and power" (2001, p.56). This helped to explain why engineers have been so susceptible to the powerful, official and entrenched discourse of 'progress' which makes a virtue of the kind of 'development' that involves (among other things) the destruction of habitat and cultures in Australia and elsewhere. The pictures below are current examples in which the "engineer" is still depicted as young, white and male and is positioned by the picture and the accompanying narrative as part of the "man over nature"

discourse although with differing emphases, as I explain in the brief analyses below.

Litany: Globally portable. The front and back covers of the AECS' review (2003), Figure 10 below, feature two young males, one clearly European, the other's features are not distinguishable. It may be a child. There is no communication between the engineer and the viewer, since one has his back to the camera and the other is looking skyward, about to launch a paper plane. This male/child is photographed so that the arm and the paper plane extend the body into a skyscraper effect, enabling the image to dominate the shadowy trees in the background. If this figure is a child, there are added elements. The child is smaller than the trees and aims the paper plane beyond them. The opposing cover then shows the adult having reached his goal. This shows a "Colossus" effect, with the young male positioned on a high balcony, overlooking and dominating a tall building city-scape, with no remaining natural elements visible apart from a grey sky. His outstretched arms rest confidently on the balcony as he surveys his kingdom, alone and unopposed. The "tight" culture faces no challenge from this image.

Figure 10: Cover of the *Engineering Review*[52]

[52] Reproduced with the kind permission of The Institute of Engineers Australia (IEAust).

"*Well, Jason Langer has been obsessed with tall buildings since he was a kid. Soon after graduating in **Engineering from QUT** he began to alter the skyline of cities around Australia and the world. Now Jason has designed skyscrapers and buildings in London, Dubai, Sydney and Melbourne. Any engineer who tells you they don't get a huge kick out of that is a liar."*

Figure 11: Engineering graduate Jason Langer (QUT home page)[53]

Litany: Globally Competent. I considered graduate Langer's image, Figure 11 above, to represent a globally competent Litany for the following reasons. While he is photographed from below, so he is superior to the viewer, it is clear that he is a "good communicator". He is dressed casually and is smiling directly into the camera, with open body language. His arms are outstretched, confidently controlling the space but also making a personal space for others. The picture of Big Ben functions as an engineering icon (symbol of power, phallic symbol) but also a metonym for London and thus the glamour of an international, engineering career. However, Langer's position between a tree and the building and against a clear sky poses Langer as a positive intermediary between the natural and the built world, giving a sustainable gloss to the engineering image. The accompanying text is Globally Portable thinking and thus in tension with the picture.

[53] Reproduced with the kind permission of the Queensland University of Technology.

Informed by critical futures studies and Inayatullah's post-structural toolbox in particular, I used examples from various cultures to "distance" students from the present in order to help them question what is "normal". Distancing challenges "how truth functions in particular policy settings, how truth is evoked, who evokes it, how it circulates, and who gains and loses by particular nominations of what is true, real and significant" (Inayatullah, 1998, p.817). For example, I juxtaposed official views of 'development' with the views of the indigenous people whose lives have been devastated by it. I asked students to compare the development discourse from a 1925 documentary film; "the earth yields to the dominion of man", with a narration by an Indigenous Gagaju Elder, the late Bill Neidje. "This earth like brother and mother, they tearing our mother from us" [54] (*Rewind,* 1998). I also contrasted the Malaysian government's view of the Bakun dam, "huge energy potential of Sarawak if 'fully developed'", taken from local newspapers in both English and *Bahasa Malaysia*, with that of the Penan, the indigenous people whose land was taken for the dam: "What do they mean by progress? For us life means living with our community. What they call progress is really murder - killing of the community" (*Foreign Correspondent*, 1996). Journal responses from both international and local students indicated that such juxtapositions stimulated not only an awareness of alternatives, but a reflective and critical vocabulary with which to express them. Once students realised the limitations of their understanding they were open to develop expanded, more empathetic and collaborative understandings at a Global Competence level. This included the understanding that engineers need "more than just equations, formulas and a piece of paper to stick on the wall".

[54] Contrary to his cultural custom, this Elder and educator graciously gave permission for his image and voice to be used after his death, in order to help educate the Australian people. I made this clear in introducing the video.

> *… finally I am beginning to understand that I was looking at the profession of engineering as merely a pay packet instead of a way to further the community and myself as a person. Also the qualities that are needed to become an engineer involve more than just the equations, formulas and in the end a piece of paper to stick on the wall. (Male, ESB, 18, 2001, Accepter)*
>
> *Professional Studies has shifted my focus from just being able perform calculations, to knowing why the calculations are needed, assessing their global effect and ensuring that that effect is acceptable to society. (Male, ESB, Mature Age, 2001, Accepter)*

Unlearning led to understanding that individuals can make a difference. Eventually these responses encompassed not only their understanding of engineers, but their impact on others through ethics, technology and society and globalisation.

> *Now, I have understood that as a modern engineer we must understand we are not working for one government or company, the international society and human is what we are responsible for. (Male, International, 19, 2003, Convert)*
>
> *Journal 5 opened my mind; I had thought sustainability was just to stop logging and to use wind and solar energy. I now know that we need to consider culture and money. I think I still will think more of the environment then money. That's the way most people think of it, and if we are trying to change the view engineers are receiving we need to change the way we show ourselves. Not as capitalist, but as environmentalist and engineers. (Male, 18, ESB, 2004, Accepter)*

Myth/ metaphor. The last examples demonstrated changes at a deep level. The myth/metaphor level describes the deep stories, the collective archetypes, and the unconscious dimensions of what we think and do. Great knowledge, skill and

sensitivity are required to juggle the need to provide the moments of discomfort necessary to jolt perspective change, but with an underlying respect. CLA can also be used as a meta-reflection, reminding us that reflection can be a profoundly unsettling process (Rogers & Tough, 1996, p.491) for those we teach and for ourselves.

> Helping students understand how the dominant culture developed along the pathway of basing progress on the degradation of natural systems is only half of the teachers' curricular responsibility. The other half confronts teachers with even greater challenges because it involves the identification of practices and patterns both in the dominant and marginalised groups that are ecologically unsustainable (Bowers, 1995).

For example, the demand for some traditional medicines, in combination with global markets, threatens extinction for creatures on land and in the sea (Parry-Jones, 1998). This is a significant intersection with internationalisation of the curriculum. The clash between any cultural practice and ecological sustainability is not just a legitimate topic for university courses, as I first thought, but an essential one requiring fundamental changes in how we teach.

Dirkx (1997, p.85), like Rogers, used the concept of "learning through soul" that is, focussing on "the interface where the socio-emotional and the intellectual world meet…" (in Mezirow, 2000, p.6). In the next comment, the student was using humour to help him accept this aspect of personal change.

> *I must admit that I was a sceptic at the beginning of the semester, but I have been converted. Hallelujah! I now aim to be one of those "mythical" engineers which were talked about in virtually every article. (Male, ESB, 2004, Accepter)*

He was not the only student to use religious metaphors, such as conversion, revelation etc. Although he masked his discomfort with humour, I suspect that religious metaphors provided the only language he had access to, that linked to the kind of "learning through soul" or spiritual change he experienced.

Students moved beyond believing they could and should make a difference to identifying how they could act to achieve this. The following excerpt marked just such a transformative process. This student acquired personal awareness of his responsibilities which he expanded to global concern and a commitment to implement that in his actions. This led to trans-generational concern. All of these awarenesses mark various qualities of *Globo sapiens*. I have inserted the numbers of the relevant qualities in bold within square brackets in the text below.

> *Since I began studying Mechanical Engineering I have become aware of my responsibility to society for the way in which I conduct myself professionally.**[Q1,3]** The largest of those responsibilities is how well I look after the planet.**[Q2]** Throughout my career I must consider fully what impacts my designs and proposals will have on the environment both in the short and long term **[Q5,6]**. I am not sure of the author, but the saying "We are only borrowing the planet from our children" doesn't appear backward any longer **[Q4].** (Male, ESB, 2001, Accepter)*

Finally, I closely examined a sub-sample of 50 final journals for metaphors, which I grouped into four categories, "Journey" metaphors, "Inspiring" metaphors, "Nature" metaphors and "Opening" or "Liberating" metaphors. Some examples are given in Table 16, below.

What was significant was that these metaphors indicated life-long learners, conscious of their journey and the challenges it posed. Students saw this journey as positive and wanted their path to be the right one. The process enabled them

to look at themselves and the issues in a new light. Their world view is expressed in the language of inspiration and enlightenment.

Table 16: Student metaphors from final journals

Themes	Metaphors
Journey	Learning journey Fallen behind Steep learning curve The direction we're headed The right path Wild ride
Opening or liberating	Opened my mind Rising to the challenge Clarify In a different light Well rounded Insight A hard look at myself Out of the box Freedom to express your thoughts.
Inspiring	Search for knowledge Enlightenment Inspirational Inspiring A challenge An adventure and a positive experience Not be corrupted
Nature	The fruits of our work Earth is the giver of life Help my Earth Mother nature A new breed of engineers I have grown Shape, aid, preserve Shaping of the planet and her communities.

The “not be corrupted” comment was part of a journal in which the student hoped that he would never lose his principled approach to life and engineering. At the deepest level their Nature-based metaphors expressed interconnectedness and reverence for the world that mark partnership paradigm thinking.

> *People need to realise money doesn’t equal happiness but helping others will, and these problems that are usually linked*

> *to greed will diminish. I am glad that I have been made aware of these issues and that I have had the opportunity to reflect on them. A great focus of mine now is whether what I am doing is for the greater good or not. (Male, 19, Bi-cultural, 2001, Accepter)*

Synthesising the CLA, it emerges that at the Litany level the main issue was the skills engineers need to do a competent job in any part of the world. The systemic level relates to what it costs to do a course and what students expect in return. It also relates to the "how" engineering is perceived in a global world and "who" controls this perception. At the worldview level, two competing discourses emerged, "progress" signified by "growth" and, inseparable from this, contests over the meaning of "sustainability". Finally, at the myth/metaphor level, there were four main areas of metaphors, journey, opening and liberating, inspiration and Nature/Gaia, the latter three of which belonged to a "healthy" even "healing" vision of engineering and students' roles in that.

5.6 Conclusion

The Reflective Journals indicated that the process was effective at several important levels. Firstly, it helped to improve the often-criticised, poor communication skills of many domestic and international students in a vocational field (Bolton, 1999). The first level of competencies addressed the most common and obvious identified areas of need for first year engineering students, including those for whom English was a second or other language. If this is the "problem", then a well-designed and supported Reflective Journal process is one effective response. This satisfies the "Vocational function" of education, to supply "skills for the information economy" which Sterling identified as a First Order change in educational systems or adjusting the system to do "more of the same" but "do it better" or more effectively (2001, p.28). There are two concerns here. Firstly, I

agree with Mezirow that it is not helpful to define literacy through "a list of prescribed competencies or tasks divorced from the way one learns" (1996, p.2/8). Secondly, this unit was one small fraction of their degree. "Sustainable education is different and depends on second and, where possible third order systemic change" (Sterling, 2001, p.28). This involves "changing the educational paradigm" or "re-thinking whole systems on a participative basis" (ibid). This is not just doing better but "doing better things" and "seeing things differently" (ibid).

Since the students' writing often revealed the thought process behind them, the journals also showed clear moves to metacognition in which the process of reflection also became a means for students to learn about their learning. The journals indicated that 'meta-reflection' and transformative learning did take place. Students not only questioned themselves and issues but were making decisions about what they personally would do in response, either immediately or in the future. How did this happen? What did this process look like? The more fine-grained Sense-Making analysis of the detailed interviews in Chapter Six provides some answerings by highlighting and analysing the struggles behind the transformation and resistance evident in the Reflective Journals.

Chapter Six: The Interviews

Making and Unmaking Worlds

> *[H]umans can and will talk about their confusions and stumblings if the dialogic interface is conducive to trust (Dervin, 2003, p.144).*

Introduction and chapter outline

Chapter Six builds on and extends the Reflective Journal analysis. The specific purpose of the student interviews was to explore perceived changes resulting from the use of Reflective Journals as a teaching and learning strategy. I was looking for indications of transformative learning, in any of its many forms. The most significant aspect of Sense-Making analysis was identifying the uses to which interviewees put any new sense they had created, including how it led them to behave. This was directly relevant to a gap identified in transformative learning research, "what does a perspective transformation look like behaviourally?" (Taylor, 2000, p.298).

The interviews were conducted and analysed using methods underpinned and guided by the philosophical assumptions of Sense-Making. A list of interviewees is in Appendix 14. The theory and methodology behind the interview process was described in detail in Chapter Three. The interviews were based on the Sense-Making Triangle - "how the respondent sees the situation, what gaps the respondent sees self as facing and/or bridging, and what ways the respondent saw self as helped by the bridge he or she built" (Dervin, 2003, p.224). The Micro Moment Time Line interviewing technique made the interviewees' world the focus of a dialogue "about how they make and unmake their worlds" (Dervin,

2003, p.143). My input as interviewer was minimal and the mandated approach felt more "natural" in the later interviews, by which time I "trusted" the method and my ability to apply it. I did need to remind interviewees to represent *their* thinking and when a few students did ask whether I was getting what "I" [PK] wanted, I was not drawn but replied that I was looking for whatever they found.

Previous Sense-Making studies had already developed a content analysis scheme with various categories based on "theoretic assumptions about what the human needs to move through time-space (Dervin, 2003, p.261). I focussed only on those most significant to this study. The evidence I found of the category "got connected" was fundamental, since connection, "support, trust and friendship with others" is now regarded as a crucial part of a transformative learning process (Taylor, 2000, 308). The 'connectings' recorded here are those related to the questions students asked, as revealed in the interviews. They reflect the way they found answers to these questions, made new meaning and moved on. It does not preclude other connectings.

The interviews indicated most of the other significant categories from Dervin's list, 2003, p.262). I discuss these and their significance for this study in the section below on Uses. As Dervin claimed, Sense-Making interviews produced rich data and I have only scratched the surface of the issues that emerged. In structuring this analysis my aims were:

1) to identify how these students saw their situation - their emotions and feelings

2) to describe the gaps they identified and had to bridge as part of their learning through the Reflective Journal process.

3) to describe the helps and hindrances in this process and in this way, to document the outcomes

4) and through these, to establish the significance of this information in relation to this study.

Here, I concentrated mainly on the identified Gaps and Uses, since I felt these would be the most useful for educators. Feelings are also important and I return to their significance as part of the transformative process in later sections.

6.1 Feelings

This section establishes that, (like the journals) and contrary to the stereotype of engineers concerned with facts rather than feelings and the students' often-stated difficulty with expressing emotions, the interviews showed strong emotional responses. The 26 interviewees clearly referred to 104 separate emotions, 37 of which were positive, 60 of which were negative and 7 which could be regarded as neutral, such as "surprised". The main positive emotions were "relief" (13) and "happy" (9). Superlatives such as "amazed", "excited", "awesome" and "inspired" accounted for (15), with "confidence" (5) and "interested" (6). The main negative emotions, which occurred at the beginning of the journal process, were "frustrated" (17), "annoyed" and "angry" (14), "scared" (7) and "confused" (7). The high numbers of negative emotions related to the interview focus on the "gaps" they faced. "Resisters", despite saying they didn't acknowledge or find it easy to discuss feelings, accounted for 15% of all emotions expressed and, as might be expected, 18% of the negative emotions, although they were 11% of the sample. Later sections put these responses into perspective, since acknowledging negative emotions is an important, if not essential part of the critical reflection that marks a transformative journey (Morgan, 1987, in Taylor, 2000, p. 291). See also Bolton, 1999). This is equally true of group work, in which it is important to "embrace" rather than avoid conflict (Saavedra, 1995, in Taylor, 2000, p.314).

6.1.1 What "gaps" did these interviewees identify?

"Gaps" are represented by the questions interviewees asked as they moved through time and space. Establishing the "gaps" is useful for teachers because it helps to identify what questions these students had, and where in the learning process they were most likely to occur. Most other applied studies have done something similar, as noted in Chapter Three.

I identified a total of 208 questions from the 26 student interviews. This is an average of 7 per interview, although 5 students asked almost half of the questions. There are a number of possible Sense-Making content analysis templates to assess the nature of the gaps that students saw and bridged (Dervin, 2003, p.261). I used the "5W" approach, which codes questions by Who, What, When, Where, Why or How (Table 17).

Table 17: The kinds of questions asked by interviewees.

5W focus	Questions asked.	%age of questions
HOW	76	37%
WHAT	70	34%
WHY	37	18%
WHO	17	8%
WHEN	3	1%
WHERE	5	2% n = 208

The main topics of these questions are presented in Table form in Table 18 below.

Table 18: Main topics of questions as a percentage of questions asked

Topics of Questions	n=208	% of questions asked
Relevance of Reflective Journals	**41**	**20**
Writing (process 29 +content 7)	**36**	**17**
Peer Interview	**22**	**11**
Getting Started	**18**	**9**
Assessment	**14**	**7**
The Future	**13**	**6**
Technology	9	**4**
Culture	7	4
Creativity	7	
Group Work	6	
Expectations	6	
Metacognitive thinking	3	
Ethics	5	
Readings	5	
Personal direction	5	
Time	3	
Environment	3	
Sustainability	2	
Professionalism	2	
Lecturers	1	

"Relevance", "Writing", "Getting Started", Peer Interview, "Assessment" and "the Future" were two thirds of the 208 questions asked. These reflected the concerns of these self-selected interviewees and secondly, reflected the questions that they chose to explore in depth in their interviews. However as a group they were quite representative of the diversity of BNB007 students as described in Chapter Four, so there is no reason to believe that their questions are not representative of the cohorts. Many of the same concerns were also reported in the Peer Interview Journals. "Expectations", referred to their

expectations of the unit, the journals and the level of the work we expected. All the questions are listed under the "5W" (plus How) headings in Appendix 15.

6.1.2 How?

"How" questions accounted for more than one third of the questions asked (37%). The main How issues, almost half, were to do with writing, including the writing process, getting started, writing style and genre. These questions related to process, especially the writer's block involved with writing the first journal, and the issue of getting and giving feedback. Creme (1999) reported similar concerns in her journal research. Writing style was a concern, as a process and in terms of personal ability to write. Practical issues such as word limit, related to fears about writing too much or too little. In terms of content, they were concerned about their ignorance of the set topics, their lack of an opinion at all and how to write at length on the topics.

In terms of relevance, again the main issues were self and process related. Relevance related to self, "how will it help me?", and the relevance of the unit's theme each year to their engineering area.

6.1.2 What?

"What" questions were 34% of all questions. As with "How" questions, the main "What" questions related to writing, but only to the writing process and getting started. These are addressed in detail in the section on writing below. Again they were challenged by having to have an opinion," What do I think about this?" and what the terms (culture, sustainability, globalisation, ethics etc) meant in an engineering context. Future-related "What" questions all had a self-focus and related to their life and work after graduation. Their concerns about ethics were clear, what did ethics mean, what did ethics mean for their behaviour and what were their personal ethics?

6.1.3 Why?

Well over half of the "Why" questions related to Relevance of the Reflective Journals. These related to the process, Why "these topics?", Why should they write about things they "don't know anything about?" and their purpose in an engineering context.

6.1.4 Who?

Who questions were only 8% of the sample and, as could be expected, related to group work and the Peer Interview. One student expressed empathy with the lecturers facing poor behaviour and posed on their behalf the question that some lecturers did ask, "Am I wasting my time here or not?" The group questions focussed on themselves, how they worked in a group and concern over the size of their teams (8-10). Managing large groups is a well known problem at all levels, from group work to tutorials to lectures. The Peer Interview questions are discussed in detail under that heading below but they related to the process of the interview and acceptance by peers, including cultural concerns.

6.1.5 When and Where

I address these under the same heading since they were only 3% of the questions that emerged. Half were practical unit-related issues. Several had a short-term future focus, related to confusion over the purpose of the unit, "where are they going with this?" and one was a long-term future and critically focussed question related to whether the more sustainable technologies would solve the "big picture" environment problem.

6.2 Significant issues arising

The six major topics together accounted for nearly two thirds of all the questions, as shown. It is worth repeating that these questions represent the "gaps" for these students, in relation to the interview focus, which was what stood out for *them* about their whole experience of the Reflective Journals. Issues identified in the Reflective Journals, such as Getting Started and the Peer Interview, reappeared and were illuminated by the interviews. As becomes evident in the following sections, their questions embodied the challenges they faced and the interviews uncovered the complex and often transformative processes involved in finding "answerings" and thus making new meanings from their experiences.

I explore these topics below in order of importance as identified by the number of questions raised. I have combined several topics that were closely related, such as Relevance and Usefulness. It was not possible to go into the same detail for each topic, so I have limited detailed analysis to the main issues. These included culture, as it was so significant for many of the interviewees and intersected with group work issues. Together these accounted for 13% of the questions.

6.2.1 Relevance/usefulness

Relevance was the focus of "How", "What" and "Why" questions. These related to the process of the journals, what benefits journals offered generally and to them specifically, how and why it was relevant to engineers to be able to reflect and write, why they had to write about things they didn't know about and how it fitted the big picture of engineering. It highlights the pressing need for much more detailed and intensive support at the beginning of any Reflective Journal process, directed at the fears and concerns identified here. Perhaps Formative feedback should be moved to the second journal. This might help students to

overcome the psychological barriers to accessing practical information about how to do the journals.

The questions also demonstrate the clear need for high profile engineering role models to assure students that engineers in the modern world *do* need to communicate and to reflect. This would address the important "conative" dimension of motivation and willingness to learn (Mezirow, 2000, p. 25). Their concerns also indicated that these students began engineering with the "tight culture" view of engineering. They do not seem to have accessed information about modern engineering or what is now expected of engineers. It indicates a need for closer links and outreach between progressive members of the profession and students at this level and at the pre-university level when students are deciding their courses.

It is understandable that writing about things they didn't know about worried them, but it is a concern that they felt ignorant about topics such as ethics, culture, sustainability etc or could not see why they were relevant. One of the benefits of the unit was that it did give many students the "big picture" of engineering they sought. As *Muffin* said, "Engineering is not just useful. It can stop the world from dying". *Clarke* said, "to be a sustainable engineer is the only way you can be".

6.2.2 Writing – Getting started

This was the largest barrier for many students, which became clear when I collated the issues involved. "Getting Started" involved fear of the task itself and associated writer's block, uncertainty about the style of writing required, self-doubt, doubt over the meanings of words in general and their specific meanings in engineering contexts, writing about the particular topics and practical issues such as the word limit. Students were apprehensive about being at a poorer

stage of writing than others, hence one mature-age student's query about whether school leavers would find it any easier than he did. The other issue that arose here was feedback. They were concerned about getting and giving constructive criticism, both of which are essential personal and professional communication skills. *Geoffrey* queried how to criticise the journals to the marker without using "cursive language" (sic).

6.2.3 Writing: the process

Writing questions were mainly related to "what" questions related to the process and to self. The process questions related to actually beginning the process, confusion over the details of the task itself, the style of writing required, key terms and their meanings and practical issues. The self-focus questions reflected their doubts and uncertainty about their capacity to do the task, the writing, and their current state of awareness. As the journals also indicated, it was a challenge for some to have an opinion at all.

Despite the fears, the interviews confirmed that the journal process had positive effects on most interviewees' writing, whether they liked writing or disliked/feared it. This emerges in the next section which looks at the impacts of the journals on skilful writers and reluctant writers. The latter group includes the special category of tradesmen returning to study after some years in the workforce. I begin with the skilful writers.

Skilful writers: *Andrew, Peter Parker, Bo, Muffin, Spontaneous Combustion, T.* For *Andrew,* a school leaver, it was a chance to pursue the creative side of writing he had always enjoyed. The 300 word limit that terrified others, restricted him. Writing journals led to his greater enjoyment of the unit but more importantly, he detailed his improved "metacognitive thinking". "*It took my understanding to a new level of what they were talking about with my own slant*

as well". For *Bo* and *Peter Parker*, the word "reflection" brought back "bad experiences" (Bo). Their previous experience made the actual writing easier, but created a psychological barrier they had to cross. In each case, their previous reflection process seemed to lack the most important aspect, support. I return to this in a later section, "the impact of past experiences".

Spontaneous Combustion's previous experiences in trying to leave the Defence Forces had meant he had "been through a lot of inward reflection" and "it was easier to write the reflections because [he] had formed opinions previously". *T* had written reflective journals as part of his training as a church youth leader.

> *learning a skill in one place in Reflective Journals or thinking is always going to help in another place whenever you do anything reflective.*

The focussing questions I offered to help students get started, proved restricting for *T*, who felt he should follow the suggested guide, although it clearly stated the questions were only a guide to help students begin. My teaching aims, not to be prescriptive or provide "recipes" and yet to provide "scaffolding" for those who needed it, were hard to reconcile. Designing a website on a Sense-Making basis could make this easier by providing clear, optional entry points for those who need support and those who do not, using students' questions as the entry markers (How do I start writing?).

Reluctant writers. The interviews confirmed other research showing that at the most practical level, the flexibility of word processing and the ease of correcting have positive effects on students' academic abilities and self-esteem (Palmer et al., 1999). *Jack Africa* described what this felt like for him.

> *Although I was a lot slower on the keyboard, if something came into my head I could just enter real quickly, or a sentence or a*

> *phrase enter it in, and it would be there and then I'd go back and go okay where do I put it and if I want to put something else before it I'd just add it on and I found just in doing that my ideas started flowing a little bit more and my sentences just started to flow.*

The Word Processing section of BNB007 was particularly useful to students like *T*, whose self-esteem and educational opportunities had suffered at school and elsewhere as a result of "messy" writing. This was a painful experience he had to overcome. He realised "I've really got to write everything on computer if I want it to be taken seriously".

Tradesmen[55] - Upgrading skills and attitudes. Judging from the Reflective Journals, most of the mature-age students in these cohorts entered engineering from a trade background of some kind, including the Defence Forces. *Dave,* like many other mature-age students in this category, struggled to make the move to being a "professional" at the level of writing and in relation to the issue of ethics, as I detail below. This became clear in the following excerpts where the "circling" technique enabled him to go deeper. The dots in the text indicate the pauses in his speech as he searched for the most appropriate adverb to describe his increased skills. "*If you want to get your point of view across…you can do it… articulately".* This occurred again in relation to the Peer Interview, where he believed that his work experience was an advantage that Year 12 school leavers would not have. *"It helped that I, cause you'd, …sort …what's the word? It's like interacted with other people*" (*Dave,* p.25). *Bruce* experienced similar problems. His question was: "How do I make this sound professional?" His answer is interesting since I interviewed him one year after he completed BNB007. He had

[55] In this sample these were all men.

clearly maintained the skills he learned and moved to a metacognitive understanding of his learning.

> *"going from diesel fitting and using certain words and going to tertiary education where you know it's not appropriate to use those words, it's more say refined words that are used at university so gettin' used to that lingo or language was probably the hardest bit … sentence structure and words, like vocab's sort of a bit bigger now..*
>
> *This time last year I wouldn't have even thought about it… I'm writing a report for work experience using the same style…without the journals I would struggle and not realise I'm struggling [Bruce] (my emphasis).*

With the hindsight provided by the year, he showed metacognition of his progress as a writer and with it the confidence to trust ongoing change and development. The informal professional style we encouraged proved transferable to his work environment. He referred to the report above as his "13th journal". Without the journal experience, he would have faced the same struggle to write, but in a critical and pressured work environment which could have judged his efforts harshly and possibly without support to help him improve.

6.2.4 The impact of past experiences

Educators planning to use Reflective Journals might not realise that student concerns related to past experiences can impact so negatively on the ability of students at tertiary level to do the task. As indicated earlier, as well as not enjoying writing itself, student experiences included previous poor experiences with Reflective Journals.

> *"…the barriers were probably previous experience. Rather than having an open mind and saying, well this might be different, I*

> *just looked back and thought it wasn't any help then, so I'll just throw it out the window straight away". [Peter Parker]*

In relation to this point, 39% of students in one Australian study reported previous experience with Reflective Journals (Palmer, 2000, p.184), so they could comprise a significant fraction of any group[56]. Previous negative experiences adversely affected particular students in this study, but as *Peter Parker* regretfully admitted, not only did it "stop" his learning but, as he did, they may then act as a powerful negative influence on other students, with the consequences discussed in Chapter Five.

> *I probably led some other people down the wrong path in telling them they were going to be a total waste of time. "Oh, I've done these before. They're useless and I guess probably it was no good. [Peter Parker]*

He realised that his "negativity" was "dragging others down" as well as being against his own strong Christian-based morality. It changed his behaviour. "In future, I won't dismiss things I've had previous bad experience with" but "will try to learn from it". *Peter Parker* had not enjoyed writing journals as part of a previous distance university preparation course through another university, "*It just seemed totally irrelevant at the time*". That had been his first experience of tertiary education and had the "why" of Reflective Journals then been explained to him, he may have overcome this barrier and found them useful.

Bo's negative experience came from her nursing training, when she "*had to sit in a room and reflect*" on the day's nursing. Once she realised that "no-one's assessing *me*" she relaxed. "It took the hoodoo on the word Reflection away". Moreover, the journals proved a much needed bridge between Nursing and her new chosen profession. She suffered initial shock at being a student again and

[56] This was the lowest percentage of "prior experience" for the seven assessment activities in his study but still considerable.

wondered “What am I doing here”? The journals formed a bridge, assuring her that there were similarities between the professions and that she had “a lot of the thought processes already”. This not only enabled her to connect with what was no longer “such a foreign environment” but gave her the confidence to deal with the criticism she had received for taking the risk to change professions. “I’m not as silly as people think”. Once over this barrier, in Sense-Making terms, she “found a way to move”. This could be described as the courage to “be” and to “do”. In relation to one of the readings, she “got insight” or in her words, it “opened your mind”.

In Semester 2, 2005, I partially addressed fears based on past experiences, by using a light hearted approach to begin the first lecture. There was laughter of recognition, particularly at the ”Oh no! Year 12 English again!” The other quotes were directed, without identifying either group as such, to the fears of students from NESB’s and of those returning to study after years in the workforce. I should have included a comment directed at previous poor experiences with reflection. Naming such fears does not solve the problem, but it defuses the intensity of the fear if students realise that it is common and not just an individual problem, which they must hide. Bringing fears into the open also enables students to discuss them, which encourages a collaborative and supportive atmosphere.

Figure 12: Slide from Introductory lecture, BNB007, 2005

6.3 The Peer Interview

Peer Interview related questions were all "How" and "Why" questions concerning a) the practical aspects of the process and b) cultural issues.

6.3.1 a) Process aspects

Students were concerned about the practical skills of interviewing a peer, such as how to devise effective questions, how to actually "conduct" the interview itself and how to report on it. Despite written advice on this, some weren't sure whether to summarise the interview or reproduce it verbatim. This task occurred early in the semester and the problem may have been related to the students' tendency to leave the task to the last moment and not read the advice available. Web-based information still does not seem to be as accessible as a hard-copy guide. The ideal is to have both forms available. I discouraged students from doing the interview by email or phone, because those interviews avoided the challenges and rewards of face-to-face communication and proved the least effective.

This suggests that students need more intensive practice in oral communication tasks and earlier advice on interviewing skills as part of tutorial work. Tutorials did include interview skills, but in large tutorials (30+) it is difficult for everyone to get the detailed feedback that would most help them. This is a systemic problem which impacts on tutors, students and learning outcomes. Despite the problems, most students reported (in journals and interviews) that they learned a lot from the experience about what to improve the next time they had to interview someone, so it is a strategy worth developing systematically throughout any (engineering) course.

6.3.2 b) Cultural aspects

Cultural questions were What, How and Why questions. They expressed students' uncertainty about "other" cultures, whoever those others were. The students from ESBs were concerned about how to "approach" other cultures and how they could adjust to a "different accent version of English". The students from NESB were thus correctly concerned about "how" they would be received, reflecting the power difference between them and the "norm" or dominant culture. This is exemplified in the ESB question "is she different", and the NESB and female question, "will they look at me differently?" The question, "Will they accept me?" indicated students' concern that they would be rejected because their English was poor. Marker *Paris* reported this as a serious issue in group work, in relation to ESB Australian students complaining about Chinese (International) students. Effective groups found supportive ways to work with this but it is a strong argument for more support for students with poor oral skills, regardless of background. "Is she different" was a gender-related question. *Fiza* did not have a language problem because she was Australian by birth. Feeling different in her

case was complicated by the extra challenges of leaving her cultural comfort zone to interview a boy, and wearing traditional Pakistani dress.

> *I knew I'd have to interview a guy and the way I was raised and stuff, you know, don't speak to guys unless you have to get homework and stuff, not dating, not wearing western clothes and wearing Pakistani clothes reinforced my Pakistani culture and so , I wasn't sure how people would react to me wearing a Shalwar Chemise[57] (Fiza),*

She wondered why she had to leave her comfort zone to do this activity and what benefit it would be. The issue wasn't simply interviewing a "boy", which was difficult enough, but how to manage any friendship that might develop. These were the reasons behind not wanting to arrange a peer interview.

> *Why do I have go out and make a friend and then you have to maintain it? It gets awkward if it doesn't work out and all those feelings came together so that's why I procrastinated. (Fiza)*

This was part of a wider issue of reconciling her Muslim values and the expectations on her as a female, with her daily reality as a university student. As a female, a practising Muslim and an engineer, this would also be her professional reality. She reported a complete resolution to her interview qualms, having made a friend with the young ESB male she interviewed. She gained only a partial resolution to the professional issue, but she was better prepared for the future.

> *It's sort of started but I don't think it's finished as there are a lot more people I will have to meet and I will have to step out of my comfort zone to meet those people… I don't think it will matter as much because I've done it before, it should be easier, I'll have more in common now, like being an engineer… now I've learnt something in engineering I know that, hey, I am their*

[57] This is the combination of long trousers with a tunic top and a flowing scarf or *dupatta.*

> *equal. You know I have the same intelligence you know, so I don't think it will be as hard.*

The pedagogical lesson here is the need for tutors and lecturers to be aware that procrastination is not always laziness and that cultural issues can have profound effects on students' motivation and progress. Making "spaces" for students to express these concerns, listening and supporting them are critical aspects of a supportive environment. Based on my experience with overseas post-graduates, this is true at any level, but first years are particularly vulnerable. Tutorial groups of 30+ make this kind of response difficult. The relative "safety" of email contact made it easier for *Fiza* to tentatively ask for help, but my regular emails encouraged her to take the first step.

> *"Oh my God, you know, am I the only person in this whole unit that's coming forward… but meeting you and you explaining put my mind at ease so there was a sense of relief."*

Cultural questions related to uncertainty about what to expect from other cultures and therefore how to work with them. Students were also concerned about how to write or report on cultural issues. This reflected their lack of previous experience in reading about global issues generally. Reading about the problems caused by a bulge in the wall of the Temple on the Mount in Jerusalem, a site sacred to Muslims, Jews and Christians caused them to question and try to understand major political issues and their impact on what seemed to be an engineering problem. This was a "Why" question.

Racism/anti-racism. At a personal level, some struggled to understand why people "couldn't be friendly to each other." Some interviewees had already struggled with racism. One student wrote elsewhere that he knew about racism, as he faced it every day in the mirror. *Harry's* interview revealed one source of friction in some groups. He analysed his problems clearly despite having very

poor spoken English. In relation to his English, he acknowledged that he was "*very weak", "not confident enough to challenge myself in order to write something", "nervous and I speak fast, people don't understand".* His main sources of support were the tutor, who "gave him roughly the idea" and his best friend who helped him to improve his grammar and corrected him "*so I know where the mistake is*". What made him *"sad"* and "*concerned*" about group work was the fact that some group members "*Ockers,*[58]" were "*bad-tempered and don't listen".* This took the form of dismissing his and others' ideas without having the "*patience*" to listen.

He was even more concerned about the culture conflict that occurred when the group argued over Islam and Christianity. He was neither Muslim nor Christian, but as a Chinese Indonesian, had friends from both religions. His concern was that local students were not "*respectful"* when they spoke about Islam and because the leader was a "local" the other students couldn't do anything "*for fear of harming the project*" *Harry*'s approach was to "*change the topic …to make them more comfortable*" but he "*felt angry with the irresponsible ones"* and this was not resolved.

While there were unresolved issues as described by *Harry* above, there was also evidence that in relation to cultural sensitivity, the unit content and approach was effective in changing attitudes. Its intended anti-racist stance was clear and this had positive effects on domestic and international students from NESBs and ESBs, although for different reasons. *Gir Bob,* for example, was an 18 year old bi-cultural Australian who "didn't care about BNB007" but who became connected and gained personal understandings as a result of the lecture on Cultural Sensitivities and International Responsibilities. He related to the topic because it

[58] "Ocker" is a pejorative term for the worst Australian male stereotype, loud, rough and overbearing.

connected to painful memories of "being picked on" at high school, where he didn't understand why "we were thrown in and left to fend for ourselves" and why students had segregated along ethnic lines. The lecture helped him understand "not just my culture but other people's cultures". This got him "thinking about what I said and how" and whether *he* offended others. This is transformative learning through "subjective reframing" since he applied a reflective insight from my "narrative" to critically reflect on his own experience (Mezirow, 2000, p.23).

One example I used in the lecture involved the habit some students had of putting their feet up on the seat in front of them, near the other person's head. I pointed out that in Thailand, for example, this is completely unacceptable, since the head is the most sacred part of the body. *Gir Bob* said that his feet were up on a chair at the time and that this had "helped him to understand". This lecture apparently had the effect of getting "everybody thinking". In his group, unlike *Harry's, "*everyone knew to be mindful of other people's feelings" which he concluded, "is the natural way, the way it should be". In the following excerpt, his description of his team's growth fitted a "facework approach to intercultural communication competence" (Weiman & Giles, 1988, cited in Guirdham, 1999, p.228) as mentioned earlier. As this developmental model suggested, *Gir Bob's* group seemed to have passed through four stages, from 1."unconscious incompetence", where they had no idea what they were doing, through 2."conscious incompetence," where they were aware something was wrong but not why or how to correct it , to 3. "conscious competence," where they were "mindful" of differences, the patterns and variables of different cultures and working on their competence, to 4. "unconscious competence," where, like "swimming", their changed and more sensitive behaviour had become "spontaneous and natural" (ibid). This is evident in the excerpt below.

> *It helped our group come together and um like helped us work better in a group knowing we weren't going to offend other people as such. It just helped us build a relationship between our group members where, where by the end of it we didn't have to be careful of what we were saying. They became [tolerant] of our ways and we became tolerant of their ways and so we could just go back to how we were and just say what we thought and things like that, but er, they'd understand*. [Gir Bob]

For his group this had the effect of

> *helping us understand our cultural differences… helped us understand each other on a personal level which I thought was really good because, like in our group at the end of it, when we came out we were all friends, all buddies [Gir Bob]*

Taylor noted that the role of relationships in transformative learning has been neglected in research and that the gap was most noticeable in "the ideal conditions for fostering transformative learning". This data reinforced his conclusion that transformative learning is not "autonomous and formal" but "more dependent on the creation of support, trust, and friendship with others" (2000, p.30).

Gir Bob made other significant comments about the lecture in relation to racism and the dominant group. He understood that "there would have been a racist in the lectures" and that the lecture was

> *getting it to one person and letting them know that their way isn't the only way and that the world is becoming more multicultural, just letting all those people know that there are other groups, that they see as minority groups, that they are in fact quite large and … they think that they're only offending a small bunch of people but in fact they're, they're offending a mass, so just letting them know that this is out there. [Gir Bob]*

This gave him support and confidence and the courage "to be", while his comments reinforced for me as an educator, the power of formal statements about respect and diversity and the importance of being a diversity role model. His comment below indicates another instance of subjective reframing, in this case, in relation to the community. In Sense-Making terms, it was a complete answer to my own self-interview question, "Why do I bother?"

> *"It helps you cope with this situation. Like now if anyone is racist towards me I really pay no attention … solely for the fact that I see them as a minority group now" [Gir Bob].*

It also encouraged students who wanted to change their racist attitudes. *Clarke*, a local English speaking background interviewee, had been sympathetic towards people suffering from racism but became more mindful in realising his dominant group privilege, "other people suffer, not me". His sympathy became empathy after his opinions were "reinforced" by the lecture on culture which, he said, "makes you want to make it better". Empathy nurtured and was, in turn nurtured *by,* successful team work.

6.3.3 Group work/team work

The team project offered a natural basis for connection, if students embraced it. *Hamish* commented, *"I don't know what I would have done without my group".* He was another ESB student whose successful group experience helped him to develop respect and empathy for the feelings of the International students, who, he realised, were feeling "scared and timid". He related these feelings to some of his own experiences "but on a larger scale". His unthinking "reasonably tolerant" approach made a transformative shift to mindful, positive action. *"I go out of my way to help them now, cause I realise just how frightened a lot of them are".* Also realising this, the domestic students in his group encouraged the international students and they became an integral part of the group. *Hamish* described how

they did this by actively leaving their comfort zone to ask the International students if a) "if there was a reason they were having problems?" b) "what sort of problems?" and c) "if we could help". *Hamish* used the word "amazing" to describe what he recognised as "the transformation you can see in people if you just encourage them to come out a bit more".

This remark applies equally well to the effects of a healthy group on *Hamish* himself. His feelings about writing changed from "frustrated" and "stupid" to "empowered" as the group helped by reading each other's journals and giving feedback. Realising that "people who seemed successful were having the same problem" gave him "confidence" to stop "being so self-critical". Creating a healthy group led to being able to heal himself. This led to "behaviour change," which took several forms. He said he became "more open" and "less stubborn". This opened up "new ways of thinking and attacking problems".

Hamish also provided one answer to a question I posed in Chapter Five. If BNB007 had "opened eyes", then what had prevented students from seeing? His trade background had favoured "*creatures of habit*", with the result, he said, (continuing his "horse and cart" metaphor), that "you become blinkered and it is hard to see". Because he "felt better" he was "more able to help others". Finally, it enabled him to contemplate becoming an International student himself. This is transformation.

6.3.4 Assessment

Assessment is problematic in relation to Reflective Journals, as indicated earlier. Teachers have to tread the line between valuing such work by giving it a mark and not turning the task into a formulaic "tick the box" response. Students' concerns related to how we could assess their thinking at all, "how deep" their answers had to be, how to manage this genre of writing, and a self-focus on the

"level" of their thinking. For reluctant students from NESBs, having to write was either an opportunity or a threat, to find out what level they were really at. If this level was inadequate, they then needed the assurance that they would receive support to improve. *Harry* for example, was worried that his writing was irrelevant and that he would not get enough feedback. For him, one Formative Feedback was not enough. He wanted feedback after each journal.

> *H: Ya, irrelevant point that I have already write and nobody will try to correct me.*
>
> *P: So were you worried about not being corrected, keeping on making the same mistakes*
>
> *H Ya. So every time like we have to submit five journals in one time, then the second ten altogether and we are not submitting them one at a time. (Harry, p.5)*

The Formative Feedback was effective for most students in answering the general question about whether their work was adequate to pass. Student concern about the level of their writing led to curiosity about other students' journals, which I resolved with the Peer Interview. Student interest in other journals overcame my original concerns about confidentiality. Given adequate warnings about the "semi-public" nature of the document and advice to share only what they were "comfortable to share in this context", sharing with a peer seemed to bring only benefits, for the journal process and for personal growth.

6.3.5 Futures Focus

The futures questions with a short term and long term personal focus related to what they would do when they graduated and where this would lead in the longer term. The majority of futures focus questions concerned the future of technology and its effects on them and the environment. One queried how we can continue

sustainably and if not, two wanted to know what we could do to survive and whether "adopting better ways" would solve the big problems.

6.3.6 Expectations

In relation to our expectations, they wanted to know what we expected of them, the journal content, their level of work and personally. For Resister *Geoffrey,* this included whether or not he could "tell the truth" in his journals.

6.3.7 Ethics

The ethics topic created interest and posed challenges for many students, as reported in both the journals and the interviews, although only three questions related directly to this topic. As indicated above, the role of ethics in professional life challenged tradesmen to reconsider their responsibilities in particular. *Dave,* for example, made a significant shift during the interview itself. He began by citing his low status and low power as a worker to assume ethics weren't his problem. He gave two reasons for this. Firstly, "*if you don't do the job someone else is going to so you're sort of only hurting yourself by saying it's unethical and not doing it"*, and secondly because he made the assumption that "*If they [employers] ask you to do it, it must be ethical*."

The "circling" technique led to him to reconsider this approach. He realised that his initial approach was a "Help" in that "*you could pretend that you're not responsible but the ones above you*" so "*you could sleep at night"*, but that it could "Hurt" in the sense that "*you are not an individual …just following the collective".* Trying to express these ideas, got him "moving" in Sense-Making terms towards an outcome in which he "got ideas" that this realisation would be worthwhile in a real future situation, if not the present. A similar process is evident in *Andrew's* questions and the responses he came to, Table 19 below.

Table 19: Ethical questions and answers reached [Andrew]

Question: Is it right and responsible to do all these things? [Andrew]	**Answer:** Just because we can do it doesn't make it better for the world. We will be making our own discoveries and we don't know what impact it will have." [Andrew]
Question: How is it going to help other people? [Andrew]	**Answer:** The [lecture] "made me think what I can do that other people will come to appreciate and help in their lives…If we are always very respectful and courteous, and have integrity and we are honest with people, eventually that sort of behaviour will reciprocate… have that kind of domino effect throughout their own lives and social circles. [Andrew]

6.3.8 Uses: "helps" and "hurts"

The uses to which individuals put their newly created sense are referred to in most Sense-Making studies as information "helps" and "hurts" that is, how does it help (facilitate) and how does it hurt (block)? Both hurts and helps are defined by Sense-Making as the uses made of information. Previous Sense-Making research has identified at least 15 "Uses", which when viewed positively as Helps are:

got pictures, ideas

found direction

able to plan

got skills

got started, motivated

kept going

got out of a bad place

got control

got connected

got support

got pleasure

took mind off things

got rest

reached goal

went on to other things (Dervin, 2003, p.262).

I begin this section with "Got Connected", because connection is regarded as an essential prerequisite for transformation and its common presence in the interviews is a strong indication that that we had created a healthy environment or "oasis" that did support transformation.

Got connected. All but one interviewee (25/26) reported "uses" which I classed as "Got Connected," to something or someone. I included only those "connectings" mentioned directly or by implication in relation to the identified "questions" or gaps.

Table 20: "Interviewees' connectings"

Got Connected	**%**
14 To self, and feelings	15%
34 To others	37%
15 To issues	16%
12 To engineering	13%
13 To environment/world/life	14%
4 To past and future	4% n=92

As indicated in Table 20 above, over half of these were connecting to self, to others or to feelings, whether self-related or other-related. Other "connectings" were to engineering, to the issues, to the environment or the world and to the past and future. These indicated that students felt confident enough or motivated enough to keep expanding their comfort zones at various levels. The detailed examples below explore these connectings. Others are listed in Table 27 at the end of this chapter, which offers a sample of my "big picture" overview of the interviews.

Alex connected "my life experience, my imagination and my work". *Yamaha* said "You are touching people through who you are". Once "connected" or more correctly, along with their connectings, students were able to gain additional "helps". I explore these below under the heading "Other significant uses".

Other significant uses. I identified six significant, additional "uses" from these interviews, which I list below and then describe with examples from the interviews:

1. *Got respect*
2. *Got insight*
3. *Got inspired*
4. *Got courage*
5. *Got healing*
6. *Got transformation.*

Got respect. 75% of the interviewees (20) reported getting respect as part of the healthy language that emerged from the first journal. There were 7 reported instances concerning its opposite, disrespect. This helps to explain how the first

exercises established a healthy environment through the code of conduct and the learning agreement, supported by the tutorial exercises. *Alexander* not only articulated something we had automatically built in to the PLA and Code of Conduct, he encoded it in a human systems metaphor which he followed to its healthy conclusion.

> *The most powerful undertone of both documents is respect. If we look at each of the 9 items in the Code of Conduct, essentially they are referring to either self respect or respect for others. All of these items in the Code of Conduct are components of the anatomy of professionalism. It is clear then that respect is the life giving system, the "blood" if you like, which enables these virtues to exist. Therefore it can be seen that instilled respect for others and yourself will always be manifested as professionalism. This is very healthy for our careers and our lives.[Alexander]*

The main instances were getting respect "for others" (14) including from the Code of Conduct. Almost as many reported getting respect for others in the form of diversity/Aboriginal culture (13). 6 got respect for engineering as a profession, 4 for the environment and 1 for the power of technologies for good and ill. This respect came from readings, lectures, the peer interviews and group and project work. 5 reported getting self-respect and 6 wanted to be respected by others as ethical professionals. For *Andrew*, self- respect, led to the courage to be.

> *…team members have respect for each other and their ideas. I am a fairly quiet person and I always felt that people who dominate the conversation knew what to do and I would say nothing. Now I know that if I have an opinion I should voice it. It may be the best solution to the problem we are facing [Andrew].*

Its opposite, disrespect was an issue for both students and staff. One student felt that one lecturer's casual attitude in a specific lecture was "disrespectful" and "off-putting". Another felt similarly about an article which "inappropriately" praised George Bush, the US president. Several students empathised with lecturers and tutors in the face of rude behaviour. Tutor *Kym* "wanted to create a good learning environment but was dismayed by the initial "swearing and disrespect". *Fluffy* felt the challenge of gender as well as the task.

> *I wish I'd had a way to tell them that it was not a soft option. In fact reflecting is one of the hardest things you can do but I didn't know how to articulate that in a way that would articulate as much respect as telling them they had a cement test or something… I think if I was a tall man, (laugh) that would have helped.*

Georgia highlighted the lack of respect from the institution and the lack of mentors outside the university who would command respect on our behalf. She tied this back to the political change to neo-conservatism in Australian politics.

> *…no longer a respect for diversity, difference, no longer women on the agenda. … It's very difficult to design for difference and respect for diversity when you've got so much reinforcement for existing culture being okay. The existing culture is not okay.*

Respect featured strongly in the interviews, indicating that it contributed to the early establishment of a learning environment in which trust could develop and other qualities flourish.

Got insight. The significant examples of "got insight" supported the strong "opening eyes and minds" metaphors that emerged in the Reflective Journals. Almost three quarters of the instances of "Got insight" were into themselves and to a lesser degree, into others. Some also gained insight *from* others, whether via the readings, the lectures, or as a result of the Peer Interviews or the Team

Work as in the four examples. There were 35 instances of got insight", where students actually mentioned the word "insight" or expressed it in other words. These examples had to indicate deeper awareness than just "got ideas", which was one of the categories already identified. There are some examples in Table 21 below. These indicate that the journals were the impetus or "push" as one interviewee phrased it, to acquire mutually strengthening insights, into self and issues. The insight comments expanded the "opening eyes and minds" metaphors of the journals.

Table 21: Examples of Got Insight

Got Insight [35]	**Examples**
Into self 18 (51%)	"[The journals] have given me … greater insight into who you are and greater insight into a topic too." [Alex]. Journals – without them I would struggle … I'm more aware of what I'm saying. [Bruce] "helped me identify behaviour …I realised I did this a lot [Zaeris]. " It pushed me ..I had to do it…it opened my eyes"… [Bruce]
Into others 7 (20%)	I got insight into …the way they do things…the different cultures in class". [Yamaha] "Not everyone thinks the way I do or does as I do." [Jimmy]
into Issues 3 (9%)	The (Qualities article) "opened your mind". [Bo] Made me feel lucky – all my family deal with water shortages. [Fiza]
Profession 2 (6%)	It is important as an engineer to reflect and express feelings. [Lady Arwen]
Sustainability 1 3%	The (Qualities article) "opened your mind." [Bo]
From others 4 11%	(Team work): "Someone sees what I didn't see…opened my mind a bit more.". [Ignatias]

Got inspired: "Wow, this is really cool". To classify helps as "inspiration", I looked for comments at a stronger level than motivation. There were numerous instances of motivation. "Got motivated" was one of the previously identified Sense-Making "helps".

Table 22: Examples of "got inspired": by something/someone or to do something.

Interviewee	Inspired by…	Inspired to…
Alex	The topics "… imagination gives me inspiration. Thinking about these wonderful things …being professional is a noble trait".	"make own opinion do a journal think about social issues."
Lady Arwen	Innovation & creativity lecture - "Wow, this is really cool". PI interviewee - "His feelings were inspiring".	"It started to make a difference. It opened my eyes. I wrote journals to try to get in touch with what I was feeling."
Ignatias	Lecture on creativity	"We [Australians] don't know how good we are."
Clarke	Ethics lecture	" Brings out the best in you so you give the best to a project so the community gets the best".
Muffin	Theme: environment and ecotourism	"To see engineering as progressive" to think of ourselves as engineers in the future looking after tomorrow's people and tomorrow's environment. To find solutions that won't cause further problems".
Andrew	All these excellent and wonderful things I'm doing as an engineer.	"Improve yourself Help planet survive Make it sustainable To think what I can do that other people will come to appreciate and help in their lives."

There were 17 instances of "got inspired". 9 students were inspired by something or someone and 8 were inspired to do something. Six of the interviewees or almost one quarter, were inspired by the topics, the "professional studies" theme of the unit, individual lectures and the Peer Interview. They were also inspired to do their journals and to think about what their opinion was on any topic. Table 22 below offers some examples.

What is noteworthy about these examples is the way students were inspired to think about the impact of their personal and professional behaviour on others and on the planet, that is, qualities of *Globo sapiens*. Students like *Andrew, Clarke, and Muffin,* have already foreseen how they can integrate this responsibility into their professional lives. *Alex* also realised that "engineers are powerful people" and that he "could have an effect on the earth". He also saw that the future would not be easy since "other forces will operate which will oppose each other, my professional ambitions as opposed to my beliefs and my morals". This leads to the next new Uses category, "Got Courage".

Got Courage. Courage is a "little-discussed phenomenon" that is essential to transformative learning (Taylor, 2000, p.318). This study confirmed research (Lucas, 1994, cited in Taylor, 2000, p.318) identifying "four types of courage: to be, to believe, to feel and to do" as essential to transformative learning. Courage can mean different things at various levels of understanding and personal development. Associated aspects of courage are "encourage" and "discourage". Many more interviewees were encouraged (17) than discouraged (3). The journals "encouraged" students "to have opinions" and to extend themselves.

> *"…the articles that involved self-examination…encouraged my thinking to turn inwards, and self analyze a bit" (Bo).*

> *"The agreement also encourages those reluctant to seek help on certain unit content to seek help and pass successfully in this unit. (Fiza)*

They were discouraged by practical issues such as the early time of the lectures and the fact they found some of them "boring". A progressive student was discouraged by reading that she felt "was working against what seemed to me to be the ethos of the subject". Another student was discouraged by reading about "the way the companies which employed engineers seemed to over-rule the individual engineers (sic) right to make ethical decisions". Table 23 below shows examples of getting courage from something/someone and getting courage to do something.

Table 23: Examples of Got Courage

Interviewee	Courage from	Courage to
Bruce		"Put strong argument, stood up for my opinion."
Alex		"Find out for yourself..ask questions Form opinions about something we haven't thought about before."
Andrew		"To move out of comfort zone – get to know everybody".
FIza	Family Tradition "Some of my Pakistani friends feel embarrassed wearing *shalwar chemise* in front of their Australian friends, but because I was raised to wear traditional clothes, I feel embarrassed wearing western clothes".	"One of my strongest cultural strengths is having the courage to wear traditional Pakistani clothes in public."
Spontaneous combustion	Self questioning	"Less of doing something because I feel like it and more I can't do that because of the consequences. Affirm your convictions".
Harry	I am not like when I face a problem I will keep it in my heart… once I open my mouth I can learn a lot	"To take first step to setting my goal"

Got Healing. Inayatullah posited "health and healing" as the defining dimension of the "next five hundred years" (replacing "strategy") (2002, p.142). Healing ourselves is an essential corollary of a healthy planet. This section identifies some of the ways healing was part of students' experience in BNB007, linked to

the journals. 12 of the interviewees or almost half (46%) reported experiences I identified as healing some past hurt, changing qualities they identified as not healthy for them, or a clearly expressed moving towards an integrated, holistic view of themselves. As Alexander expressed it, "I am a more complete human being".

In Table 24, below, Column 2 contains examples from interviews and in Column 3, I have identified what I consider was being healed.

Table 24: Examples of Got Healing

Interviewee	Example	What was healed
Clarke	"Resolved conflicts in self and learning… moved barriers you put in front of yourself.. be more open with yourself.. don't have to hide things".	**Self –** accepted responsibility able to acknowledge feelings
Geoffrey	"I can now try in writing or in person to consider other people's feelings…. I CAN do it… it will make people like me as a person not just my work. Help me as a person and an engineer."	**Self** – able to acknowledge feelings, his own and those of others
Gir Bob	"I was picked on at school…[the lecture] got it through…that their way isn't the only way…helps me cope, I see them as a minority group now…helps you move on…"	**Pain from the past -** racism
Hamish	"I was my biggest critic…stop being so self critical.. gave me confidence…became more open.. less stubborn, more tolerant"	**Self -** of self criticism
Lady Arwen	"I can't express my feelings…I can't find the words…I gained so much [from the PI]. Mine were low, his were heart level…I wrote journals to try to get in touch with what I was feeling… I learnt about myself".	**Self** – able to get in touch with feelings
Muffin	"I was feeling self important. .I should be exempted. I was scared they would reject me so I rejected them…I was wrong… I should have been more open from the beginning. The problems were mine."	**Self** – fear of rejection

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Odysseus	"Peer Interview …gave me another perspective on my views .. my home life is better now… I'm more able to ask for help and less likely to need it."	**Self -** able to ask for help Relationships with others
Sirocco	"I hadn't dealt with my past… keep it under wraps.. out of mind. I've never talked about feelings… anger and fear..fear of being the downtrodden, fear of failure, fear of being bullied…I get upset over things I can't control… takes away the feeling of futility…if I can educate others I can stop that cycle...it's not a lost cause…learnt a lot about myself.. Reflective Journals helped a lot, as has this interview".	**Pain from the past** – fear and trauma Journals plus interview
Spontaneous Combustion	"No anchor point, many schools, no family, friends, ..haven't got the inner demons…the more you learn the closer you become to being that high level of inner, of self worth."	**Self** – on way to restoring self worth
T	"I'm not good at describing feelings, emotions…I came from a trade, my English was poor, writing messy, at school I wasn't allowed into the A stream...people wouldn't bother reading it… Every week I've got better, developed skills to deal with life pressures."	**Pain from the past** - criticism. Better able to deal with life pressures
Yamaha	"I wouldn't speak up, limited my comments. I was racist, that leads to conflict...I didn't realise I was.. I got stuff off my chest.. made me think about the way I am and how others perceive me... I became a better person… I'm not so frightened to learn to know someone else.. they become a support for you."	**Self -** of racist thinking. More open to others, more open to being vulnerable. Relationships with others
Zaeris	"Helped me identify my behaviour and look for other ways...I did this in another group. It can be done differently".	**Self** – relieved stress "Makes me wiser".

This section explores one example. *Muffin,* a clever, mature-age, female graduate, was highly perceptive and critical of the "resistings" of those around her. However, she found that she had to go on a journey of discovery concerning

her own. As one of only 16 females in her cohort, she felt constrained by being older than most of the male students. She didn't want them to feel she was trying "to crack on to them". Coming from a feminist background, it also "hindered" her to hear males talking about "femi-nazis" in class, but "helped" her by leading her to question male-female relationships. She felt "scared" and "intimidated" and approached her oral presentation to the group thinking "they will hate not just what I said, but the person saying it". This fear of being "judged" was also reported by other students. This included fear of peers' opinions or fear that the markers would be judging them as a person, rather than their journals.

The reality was that *Muffin* was humbled by the success of her oral presentation and realised that she had appeared "standoffish…I was looking down on others and they hated it". The real issue was "I was scared they would reject me so I didn't give them the opportunity". Instead of complaining, she realised that she needed "to find something to put energy into positively". Once she realised that she should have been "more open", she got connected to others and acquired the confidence to be "more open generally". This is the courage "to be" (Lucas in Taylor, 2000, p. 318). This deep understanding emerged as one result of the interview process. Interviewee Clarke also reported this as a benefit of the journals.

> *They helped in resolving problems, probably conflicts within yourself. Helped in moving barriers that were in front of you that you'd virtually put in front of yourself. Like helped move them so that you could realise what you could do and move on from there [Clarke].*

Other indications of healing were described in relation to the Culture and Team-work headings above.

Got Transformation. At this point, it is useful to revisit Taylor's summary of the latest research on how transformative learning can be fostered in an educational setting (2000, p.285). The most significant indicator of a change of meaning perspective indicating transformation is "not only developing a revised frame of reference but a willingness to act on the new perspective" (Taylor, 2000, p.297). "Action, acting upon redefinition's (sic) of our perspectives, is the clearest indication of a transformation" (Saavedra, 1995, p.373, cited in Taylor, ibid).

Transformations do not only follow a "disorienting dilemma" (Clark 1991, 1993, cited in Taylor, 2000, p. 299). This is the best known of ten phases of meaning identified by Mezirow as possible "triggers" for transformation. More interestingly for this study, transformation can occur from "integrating circumstances" (Clark, cited in Taylor (ibid). Taylor also warned against seeing perspective transformation as only related to the "logico-rational" side, noting that Clark's three dimensions to a perspective transformation included "Psychological, (changes to the self), convictional (revision of belief systems) and behavioural, (changes in lifestyle) (1991, cited in Taylor, ibid). Other characteristics of perspective transformation he summarised from various cited studies included:

- a "revelation" including "new concepts of knowledge, mystical experience, personal power, and a redefined perspective followed by a sustained change" (Van Norstrand, 1992).
- "increase in personal power "
- "spirituality "
- "compassion for others"
- "creativity"
- "a shift in discourse"

- "courage"
- "a sense of liberation"
- and "a new connectedness with others" (cited in Taylor, 2000, p.297).

Table 25 below lists examples of epochal transformation from the interviews, together with the characterising behaviour changes interviewees reported. I indicated in brackets which of the above transformative categories each seemed to fit.

Table 25: Examples of transformation

Interviewees	**Changes in "being" and "doing"**
Changed my life. [Alex]	I read more – gives me something to do – gives me a chance to have input – makes me more a participant than a watcher – I participate rather than watch.[Alex] *(Increased personal power/ new connections)*
I felt a shift in my thinking/ a change of thought processes[Bo]	(Shift in discourse)
It opened my eyes, I could see both sides of the story. I had to restructure my.. thinking. [Bruce]	*(*Revelation)
	"Changed the way I address people and speak to people" [Clarke] *(Sustained change)*
Reading: "Just like reading those sorts of amazing facts, it hit me as a person, it hit me as a Pakistani, it hit me as an engineer, as a student , you know like, hey I might be able to make a difference to the world" (Fiza).	…as an engineer I have a responsibility to conserve water, to respect the resources…to have a lot more respect for the world… I have a responsibility to the environment to the world…I can't have a long shower [Fiza] (*Revelation / increased personal power)*
"that wasn't my responsibility"… I hadn't thought then just all of a sudden saw, Oh wow, I do have to worry about the environment. It is my responsibility." [Peter Parker]	Made me a better engineer, a better person, more aware… who can better things for the long run [Peter Parker] *(Revelation / increased personal power)*
"I reflected…I hadn't done that for a long time…it helped me to grow personally…Wow, this is really helping me!" [Lady Arwen]	(*Revelation / sense of liberation)*

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"I like rules and regulations. … [Bruce]	"It opened my eyes... you have to move forward…you can't continue your life around one set of rules and lifestyle…I had to restructure my thinking and accept things I didn't understand until I could understand them. [Bruce] *(Redefined perspective / epoche) [explained below]*
"Suddenly, there was this presence in my mind of what a professional is .. , in my opinion of what a professional is and something I have never had an opinion on that before". [Alex]	*(Revelation / new concept of knowledge)*

Bruce's comment is also an example of "*epoche,"* a Greek term meaning "a provisional suspension of judgement about the truth and falsity of, or the belief or disbelief in, ideas until a better determination can be made" (Mezirow, 2000, p.13).

Do students continue to act differently in response to a transformative experience? The concept of "regression" is another under-researched area of interest to transformative educators. I raised the concern earlier about the lack of formal continuation of this approach in the engineering course. Through force of circumstance rather than planning, I interviewed four students one year (or more) after they completed BNB007, *Ignatias* and *Peter Parker,* Mature Age students, and *Clarke* and *Gir Bob,* who were 18 when they did BNB007. Their experiences added windows of insight indicating that the process had supported continued change over time.

Gir Bob's final journal was the source of the Resister quote, "BNB007 makes me want to destroy something beautiful". He was the bright, articulate bi-cultural "Resister" who changed courses as a result of BNB007. In the same journal he wrote, "If we didn't have to do this subject the world would be a better place".

However, he still agreed to the interview one year later. By this time, he was able to acknowledge that he had entered university wanting to "have fun". He didn't care about BNB007, it was too simple. His question at that point was, "Why are we learning this stuff?" In relation to the cultural sensitivities lecture he wrote, "I didn't pay much attention after the first 15 minutes". However, he wrote one line in his journals which proved to be the core of the interview. "Being born from ethnic parents, I know what it is like being picked on as a child just because you look different and act differently to everyone else". I explored this issue above. Gir Bob had clearly continued the transformative journey catalysed through the Reflective Journals. In retrospect, he concluded,

> *It helped me. ..In the beginning I didn't really like it at all but by the end of it, although I said I didn't, didn't like it (laughs) I looking back I quite enjoyed it. I mean comparing it to all the other engineering subjects, it probably would have been the best one because of the fact that it actually meant something, it wasn't just learn and recite, it was grow and adapt.*
>
> ***P How did that help?***
>
> *G I guess it just helps you with life in general. It helps you grow and understand that you need to grow…It just, yeah, helps you evolve.*

Many of these transformations are also indicators of the desirable qualities of a *Globo sapiens*, as listed below. As I identified the "uses" to which students put new meaning, particularly the new ones discussed above, I could see the qualities of *Globo sapiens* they represented. Table 28 at the end of this chapter offers a sample from a complete table of all interviewees showing how I summarised interviewees' outcomes and then used these to determine what qualities of Globo sapiens these indicated that they had developed or were developing.

Globo sapiens is one evolving, guiding vision, not an end in itself. The qualities build on and offer a more global form of Bellah's "democratic habits of the heart", "respect for others, self-respect, willingness to accept responsibility for the common good, willingness to welcome diversity and to approach others with openness" (1985, in Mezirow, 2000, p.14).

6.4 Developing *Globo sapiens*

At the least, *Globo sapiens* will be reflective, reflexive citizens/professionals connected by a common sense of global responsibility and a willingness to act accordingly in their integrated personal and professional lives. The qualities emerged during the study, from the literature, but the students' journals and interviews, across cultural, gender and age groups, brought them to life, as the examples show.

6.4.1 Quality 1: S/he will be "sensitive to the different ways we learn from each other and know the world" (Inayatullah, 2002) and "able to exercise imagination in order to "feel for and with the other" (Brady, 2004, p.55).

I borrowed the first aspect from a longer quote, "engaging in futures–oriented pedagogy requires sensitivity to the different ways women and men, civilisations, classes, people with disabilities and those without…know the world" (Inayatullah in Dator, 2002, p.121). "Transformative learning…relies on the affective dimension of knowing: such as developing an empathic viewing of other perspectives and trusting intuition" (Taylor, 2000, p.303). One study found "feelings to be the trigger for reflection" (Ibid). *Geoffrey* demonstrated this in action. First he had to acknowledge that he "had feelings". He was then able to relate to other people in a first tentative step. This may lead to an expanded relationship to the environment. "Empathy…attentive caring is important in understanding not only people but also the written word, ideas, even impersonal

objects" (Belenky et al, 1986, cited in Mezirow, 2000, p. 14). This has significance for the neo-humanist ideal of re-sacralisation of the Earth and reducing violence against other species.

> *reflecting…gives you so much insight.. and the ability to understand what other people are saying (Alexander).*
>
> *Actually I think that I was probably a bit racial, I think. So I'm sort of not like that any more. I didn't realise that I was [laugh] but I sort of was. (Yamaha).*
>
> *A guy's point of view is usually different to a female's point of view and it was just good to hear what she [Peer Interviewee] had to say and how she thought through stuff or processed through stuff. (Bruce)*

This quality was also clear in the 2001 students' responses to the 11th September, 2001 attack on New York's Twin Towers, as reported in previous chapters. Their words not only demonstrated their "democratic habits of the heart" but corroborated Brady's assertion that "feeling for and with the other…also spurs a demand for change since it enables us to choose against the grain of habit and power" (2004, p.55). Quality 1 is thus directly connected to Quality 5, Courage.

6.4.2 Quality 2: S/he will show evidence of global consciousness

Many students demonstrated that they are on the way to showing a degree of "global consciousness", for which Markly identified two elements, "expansion of consciousness beyond the confines of an egocentric sense of self…and a functionally adequate awareness of ecology as a whole system of physical and non-physical interactions across time" (2002, p.340). These are illustrated below.

> *if I was to, I don't know, invent something that before I give to anyone else I'd sort a think about the bad ways as well, how*

this could be used against, against people, how it could be used against our ways of living, how it could alter the world for good or bad. Yeah, it just helps you be mindful of life. (Gir Bob)

It drives you to find out how you yourself can improve, do your little bit to help the planet survive, to make it sustainable for many generations. (Clarke)

6.4.3 Quality 3: S/he will be able to contemplate changes to their current way of life, rather than taking its continuation for granted.

Changing our thought processes and values to develop an ecologically sustainable culture, means abandoning "the middle-class vision of unlimited economic prosperity and technological progress" (Bowers & Flinders, 1995 p.230). See also Raskin et al., (2002). This may be the most difficult change for any privileged young people to contemplate, since they are surrounded by images and messages telling them that escalating consumption and a universal "no-limits", business-as-usual future is the rightful reward for a university degree. Yet some Engineering organisations have already acknowledged that this change of culture is exactly what is necessary or overdue in response to the "scary" reports mentioned in Chapter One, Climate Change and the Millennium Assessment. [59] Many BNB007 students reached the same conclusion. The examples below show three levels of awareness of this issue.

Awareness

It will affect my opinions and what I'm prepared to work on in the future (Jimmy)

Expanded awareness

[59] Even the US College of Engineering has stated that "We need to move from seeing the Earth as an "endless, limitless frontier" to seeing it as a spaceship, with limited resources that have to be closely monitored and managed to preserve the health and welfare of the crew".

> *It made me aware of my responsibility as an engineer…the environment has been overlooked…we have to allow for it and make sure it's there tomorrow (Lady Arwen)*

Globo sapiens level – integrated into personal action-oriented thinking

> *It may not help me or my career prospects, but it will make the world a better place… if someone wants me to do something that I think's environmentally unsound 30 or 40 years down the track I don't want my children or their children having to suffer for something that I made or I signed off on. [Peter Parker]*

6.4.4 Quality 4: S/he will be capable of trans-generational thinking.

As well as engaging and *re*-engaging with their own and others' cultural background/s, many students now recognise and understand the concept of Future Generations. Integrating the past, present and future depends on understanding that we can learn from both the past and the future to inform a better present (Inayatullah, 1995). Concern for all other species featured less often and this is a gap that needs to be addressed, since violence against Nature is one of the eight violences identified by Galtung as indicative of social disorganisation (2004, p.103).

Awareness

> *I guess it kind of challenges you to um you know because you've got this responsibility to future generations to make sure that ah the world is protected. (Lady Arwen)*

Expanded awareness

> *However, the concepts of sustainability will influence in my profession practices due to the results from activities that I involve. Thus,, they enhance the planet's ability to maintain*

> *and renew the viability of the biosphere and protect all living species. It also maintains a decent level of welfare for all present and future generations of humanity. (Harry)*

***Globo sapiens* level, asking critical questions**

> *To me, environmental principles represent the ethics that engineers have regarding the environment: being aware of the impact that we have on the environment, its sustainable development and so on. Sustainable engineering means looking after the earth for future generations: making sure that we don't waste the world's resources, looking after the flora and fauna for generations to come, and investing in the future. (Fiza)*

6.4.5 Quality 5: S/he will be a person of courage

Courage is emerging strongly as a core and possibly the most demanding quality for Globo sapiens – and their teachers, in the 21st century. The following quote encompasses the differing levels of awareness, understanding and action needed, as well as the responsibility this places on education.

> *"Engineering graduates will need to come to terms with the causes of environmental degradation as well as the social and political factors which shape and direct technological change. They will need an education that gives them this understanding as well as the courage and professional integrity to independently pursue sustainability" (Beder, 1996, p. 8/9).*

Barnett acknowledged that to find one's own voice and express it "in thought and in action — requires the moral virtues of courage, independence and persistence" (1997, p.173). Sidhu (2003, 2006) took up Foucault's notion of *parrhesia* or "fearless speech" as a mark of university education. This term has moral and critical qualities and also implies a person with less power having the courage to

challenge someone with greater power. The collective noun for those with such qualities is *Parrhestiastes.* An extreme example was Barnett's 'critical being', the lone student photographed facing the tanks in Tiananmen Square in 1989.

At the basic level, these students showed courage in questioning their choice of engineering and the role of engineering.

> *Before this subject I was really questioning the role of engineers in the global community and their relevance to society in general. I wondered whether this was the course I should be taking as all first semester subjects were maths and science subjects. The subjects weren't difficult, only a little uninspiring and theoretical. This subject has helped me to further understand what an engineer is and who an engineer is. (Female, NESB, 18, 2002, Accepter)*

Students will feel more confident to develop such qualities if we model them through the environments we create and through our own behaviours. This supposes that we ourselves are globally competent practitioners prepared to engage with difficult democratic and ethical issues. But "it needs courage to take risks in modern society" (Kenny, 2004, p.83). By risks she meant speaking up for policies based on long-term thinking that may jeopardise promotion in a society based on short-term gains. Meadows *et al* agreed it is difficult to put forth new information in a system that is structured to hear only old information (2005, p.270).

Professionalism… "not just a sometimes thing". At the next level students are aware of the "courage" that they will need to live an ethical life.

> *It has now become clear to me that to be a professional is not just a sometimes thing. It requires you to dedicate your life to excel in your chosen field, in my case electrical engineering.*

> *You have to have the courage to stand up for what you believe in while at the same time not disrespecting people of your same culture or different cultures (Male, ESB, 2004, Accepter).*

At the highest level, there is both a critical and an empathetic dimension.

> *Engineers hold great responsibility in the development and implementation of new products and technologies thus the need to put the livelihood of people and the environment first is important. We need not only to ask, as an anonymous person said, "Can we do it" but also, "Should we do it?" (Male, NESB, 34, 2002)*

6.4.6 Quality 6: He/she will <u>work towards</u> healthier futures, at various levels, from the personal to the spiritual (Inayatullah*).*

This quality has two aspects, awareness and action. It assumes firstly that s/he has substantive "knowings" and the emotional vocabulary needed to understand questions such as, "do you feel connected to yourself, to others, to the organisation, to the planet and to the cosmos?" (Inayatullah, 2002, p.139). Secondly, it assumes that s/he has the confidence to apply it. As detailed above, one of the main positive outcomes was that interviewees became "connected" to themselves, their feelings and needs, to others, including their peers, families and cultures, to the Engineering profession, to the world and the planet itself. They saw responsibility in terms of 'us' - our responsibility, not 'them', or someone else's job (Eckersley, 2004, p. 254; Beder, 1998, p.309). "Without the medium of healthy relationships, critical reflection would seem impotent and hollow, lacking the genuine discourse necessary for thoughtful and in-depth reflection" (Taylor, 2000, p.308). For some students, connecting was the first step to "healing" of self and others since we have to be able to imagine "a healthy self" in order to bring it about in our local and global environments (Inayatullah, 2002, p.139).

> *You haven't got the inner demons… Reflective journal stuff brings it down to a more inward, inner kind of level …it affirms your convictions, you're more at ease with how you feel… gives you a sense of inner worth. [Spontaneous Combustion]*
>
> *It was … so different to what I had written and to what I thought Reflective Journals meant … here were his feelings, and here was what went on outside and mine were about here [indicated a low level with hand] and his was about here [indicated heart level]. It was really close to what he was feeling and I found that very profound cause it was, yeah it was inspiring… it encouraged me…to try to get in touch with what I was really feeling about the issue. [Lady Arwen]*
>
> *The unit helped to spur me on to continue my education … perhaps by learning things and by passing on my knowledge I can help to stop that cycle and that lack of education if you like and that's how it helps. [Sirocco].*

Their comments supported Eckersley's assertion that people "are looking for a different paradigm, a new vision of where we want to go" (2004, p.242). For these students the Reflective Journal process played a part in their search.

6.5 Significance of the results

The most widely stated and "understood" student and staff criticisms of BNB007 and similar "soft skills" units (Pulko & Parikh, 2003) were that it was "airy-fairy", a "waste of time", and "irrelevant" to engineers/engineering. This study helps to explain why such comments are not only an inaccurate but unhealthy aspect of engineering discourse. The Reflective Journals and the interviews clearly showed that, on the contrary, this teaching environment and these strategies provided *precisely* the personal, academic and professional benefits about which students and staff were most dubious.

I demonstrate this below by comparing “Expressed Doubts” or criticisms that interviewees or staff expressed verbally or in writing about BNB007 and the journals, with their reports of the experienced or “Reported Reality”. Many of the Expressed Doubts summarised in Table 26 below underpin the myths of engineering’s “tight” culture (McIsaac & Morey, 1998, p.114). In the second column, I sorted the reported realities into the relevant benefits. These are summarised as Transferability, Approach to Learning, More connected to Engineering, Skills, Ways of thinking and approaching problems, Improved Confidence, Enjoyment, the Journals, the Topics, Engineering, Feelings, Ethics and Environment. This is a long and detailed table but given the entrenched and damaging nature of these criticisms, it seemed important to offer a detailed rebuttal.

Table 26: Expressed Doubts about Reflective Journals, BNB007 and Engineering compared with the Reported Reality

Expressed Doubts / Myths	***Reported Reality***
1. Waste of time, Crap, Touchy feely "Waste of time" [Lady- Arwen, Bo] "Useless, irrelevant" "Airy-fairy *Fluffy* subject" [Bo] "A bit of a sort of touchy feely sort of stuff that's not going to be any use". [Peter Parker] "Oh this will be a pain". [Yamaha]	**Transferability** "Took the 'hoodoo' [from my bad experiences in Nursing] on the word Reflection away"[Bo] "I should be doing this for all my other subjects…to make sure I do revision. I thought, I can do this in other subjects as well" [Lady Arwen] "Helped me to change over from Engineering to Business" [Gir Bob] "It helped me with my other subjects" (Yamaha) **Approach to learning** "They took up time but freed up space. Frees your mind up...uncluttered my mind". [Yamaha] "I am more disciplined, more serious about my studies…helped me network – know more in the profession" [Jimmy] More connected to Engineering [females] "It changed my idea of what Engineering was. I was really excited about becoming an engineer" [Lady Arwen]. "Spurred me on…I cannot be put off" [Muffin] "Got connected to IEAust…Joined, see it as source of support." [Peter Parker] Skills "When you dealt with people you were working with or consulting with, that you really needed to have your interpersonal skills working and you need to speak to them politely, using manners and listening to everything they had to say". [Clarke] Ways of thinking and approaching problems *"Helps students look at things from a more engineering point of view…Helps transition to engineering for students with no experience…I can think better now." [Bruce]*

	Improved Confidence
"BNB doesn't inspire a lot of confidence in a lot of people" [Peter Parker]	"Got confidence to put my ideas forward…Got confidence in my ideas." [Hamish]
"Touchy-feely". Everyone hates it ".[Peter Parker]	"The exploration in my mind that I did to write the journals. It was eye opening and gave me more confidence in myself to express my opinions in other facets of my life. This is true, no garbage there." (Alexander). "Got more assertive –stood up for my opinions". [Bruce]
	Enjoyment "As much as I am loath to admit it, I did quite enjoy BNB007". [Peter Parker]
"Good luck getting engineers to think in shades of grey" (Student in tutorial to Kym]	"Secretly, I looked forward to doing them." [Muffin] "...it added more breadth, it wasn't just black and white, I probably included a shade of grey in my arguments as well so it's probably a more rounded argument." [Jimmy]
2.The Journals …easy..simple rubbishy task…rattle off some stuff and be done with it [Hamish]	**The Journals** "not like that at all.. it's very personal and quite difficult at times" …"you have to be honest with yourself and do it properly. You can't be impartial" [Hamish]
[RJ's] didn't make me smile [Jimmy]	"I could just put down what I thought…like they said there was no right or wrong answer…I'll just write what I think"… helped create a more personal journal. It was 100% me". [Jimmy]
This is crap. What do we need this for? [other students, to Andrew]	"…took my understanding to a new level of what they were talking about with my own slant as well". [Andrew]
3."They only write what they think you want to hear" [Engineering academic to Paris]	"They're not ideas that other people regurgitate because you're reflecting and you come up with your personal taste on it too. And it's just , I think it it's powerful". [Alex] "They gave us an idea of our own possibilities and futures". [Muffin} "There was no doubt. Either they were perfect liars, which I don't think they were or

	they had extreme literary skills. In the end I just discarded it because I'd read such powerful things from some of them". [Paris] "Every time I read the journals, I feel inspired. It's true. If they're lying, God, they're good liars. I believe that is a struggle they go through at the beginning but I don't believe they only write what we want to hear at the end". [Self-Interview]
4. Why these topics? "I didn't care about the topics, not the slightest interest [Bruce]. "What difference is this going to make to what I think? [Clarke]	**The topics** "Maybe I should worry about what's going on in the world. [Bruce] " the fact that you had to… write something every week improved your written skills and verbally in the way that you don't hold back any more, and you say things that are appropriate at the time". [Clarke]
5. Engineering "the image of big machines…hadn't though much about sustainable engineering" [Jimmy] "Maths and Physics" [Peter Parker] "Maths and science and sitting in an office and not really dealing with people or having a direct impact of people [Lady -Arwen] Engineering is a tough course…great responsibility…I always think Engineer is	**Engineering** "It's not just whether the gears turn at the right ratios or the electronics are right, it's also the by-products it creates…sustainable engineering is going to be big so letting us know now and how they're working towards it …helps with the overall big picture." [Jimmy] "…be open with your thoughts, innovative, creative…engineering has matured. It's not just machine work, it's how it affects the environment…this adds another dimension. [Hamish] It has all that and more…culture, political context, …dealing with people and having an impact on other people's lives but in a positive way…that's amazing." *[Lady Arwen]* "Engineer is always working with other people…people is very important to Engineer." [Harry]

working alone" [Harry] How am I going to graduate? [Harry] I thought a professional engineer was an ideas man, b. a number cruncher and then c. the overseer, the guy who makes sure his idea actually comes into implementation and what he saw when had the vision is actually being built out there [Clarke]. **6. BNB007** In the beginning I didn't really like it at all [Gir Bob]	"How do I contribute to people as an engineer?" [Harry] "…in this day and age to be a sustainable engineer is the only way you can be… those ideas you come up with will have to be sustainable ideas and then when you crunch those numbers you'll get an answer that will have to be sustainable and when it's being built you'll have to make sure that the way you construct it doesn't harm your own….people that surround where you're building in any way". [Clarke] "It provoked me to think about Engineering in a wider context… a global community with cultural issues and sustainability issues and stuff about the environment." [Lady Arwen] **BNB007** "… but by the end of it, although I said I didn't, didn't like it I looking back I quite enjoyed it, ...because of the fact that it actually meant something, it wasn't just learn and recite, it was grow and adapt. It helps you grow and understand you need to grow, it helps you evolve". [Gir Bob]
7. Feelings I find it difficult to express feelings…I don't even think about how I'm feeling" [Lady Arwen] "I've never enjoyed writing things especially writing things about my feelings, because I've never really had to acknowledge that they exist until now" [*Geoffrey*]. Deep and different…I was confused [Kelly]	**Feelings** "Helped me speak about my feelings…be aware of what they were. It is important as a person and an engineer to express your feelings and explore them creatively".. "It was a very different way of thinking…It helped with everything…Made me able to stand back and have pride in it." [Lady Arwen] "It's a lot more shaded so I had to actually consider someone's feelings and actually try to make it better…I CAN actually do it and I can now try when I'm writing other things up or when I'm having an interview with different people I can now actually consider their feelings and work out what they think of it." [Geoffrey] "…reminded me that there is a creative side you can use to make things exciting…helps with the whole positive attitude thing". [Kelly]
8. Environment I felt strongly. I always liked plants and animals [Lenny]	**Environment** "I'm not doing enough…You have to think globally - not just "us". It helps

	by……you……want to encourage yourself and people to do more to think about it, cause you see other people not doing much". (Lenny)
9. Ethics What would I do in that situation? [Peter Parker]	**Ethics** "It stopped some people from thinking they know it all.. opened some people's eye's up" [Kelly] "Make it my problem. Our responsibility to be part of the world - do something good about it". [Peter Parker]

6.5.1 Lessons from Sense-Making: From Resisters to "resistings"

"Sense-Making conceptualises every verb of collective and individual and human sense-making as useful under some conditions and methodologically mandates research to unearth those conditions" (Dervin, 2003, p.142). So although the concept of Resisters can be useful, I no longer think of Resisters, with the capital letter creating an inescapable and undesirable "label", but of "resistings", which result from individual responses to a variety of situations. "[A]s individuals in specific situations they are themselves sites of power, to resist, reinvent, challenge, deny, and ignore" (Ibid). Resistings were *one* important set of responses, and I now understand better what drove them. It seems that most innovative units will face opposition from a small group who think, correctly or not, that such units do not serve their perceived interests at that time and who will resist in overt or covert ways. What *is* crucial to paradigm change in Engineering and any other discipline, is that teachers need to know this is usually a small group. These individuals also need to become aware and to understand that they are not THE voice of any [engineering] cohort, as they claim, and as the litany reveals they assume they have the power to claim.

Knowing more about the nature of such resistance in vocational (and other) cohorts may help to reduce the stress of teachers setting out to bring about similar changes. This should not only reduce the personal anxiety of working with "resistings," but knowing some common causes of anger and frustration should lead to choosing alternative strategies to avert the most negative responses and their equally negative consequences.

Clear, overt support from senior management is essential in order to work effectively with students who are convinced of the rightness of their own opinions

and very conscious of power structures, the discourse of power and their place in it. I expand on this in Chapter Eight.

6.5.2 Did this study support Sense-Making claims?

In Chapter Three I summarised how the Reflective Journals and BNB007 embodied some of the theoretical assumptions of Sense-Making. In this section, I take a broader look at Sense-Making's potential benefits for practitioners, which Dervin (2003, p. 265) expressed as five statements. I engage with each of the five in turn to indicate how each claim was confirmed or negated by the BNB007 interview data.

1. Sense-Making reveals a great deal of information seeking, use and impacts from messages and contacts compared with previous research.
2. Sense-Making shows an increased ability to predict specific information needs and specific kinds of ideas they create.
3. Increased ability to detail questions at different points - enabling better support at the most appropriate times.
4. Usefulness of data collection methods in assessing what happens when people intersect with a given system
5. The approach can provide theoretical guidance for inventing communications procedures that can improve practice.

Reveals a great deal of information seeking, use and impacts. Sense-Making reveals "a great deal of information seeking and use and impacts from messages and contacts" compared with previous research, because it addresses what respondents call information and effects, "rather than…what the researchers or the institution call information or effects" (Dervin, 2003, p.265).

The interviews showed an enormous amount of "information seeking and use" among these students. The sense-making was rich across the diversities of the group. The resistings of *Geoffrey* and *Zaeris* revealed the source of some of their struggles and their successful, or as in *Zaeris'* case, temporarily abandoned attempt to bridge the gaps in their learning through the Reflective Journal process. While *Zaeris* did not hand in his journals, he was willing to attend the interview, which was an alternative way of making meaning. He also sent me the journals he had done, which were extremely good. His fears were real, but groundless and could have led to him failing, unnecessarily.

Understanding the causes and extent of students' fears led me to using more humour in the presentation about the Reflective Journals and to name the main fears identified, for reasons given previously. I also included a "How to fail reflective journals" as part of my introductory lecture before I moved on to the most common questions and "myths". I did this as part of a "negative brainstorm" to highlight the behaviours and actions which students used, consciously and unconsciously to sabotage their own and others' learning.[60]

Reading detailed student experiences of reflective journals would be a helpful preparation for any intending marker. It was more labour intensive to mark the journals of students whose English was poor. *Paris*, the new marker, said that "sometimes it set up a kind of a filter and I wasn't able to really see them individually, I was saying, 'oh, here comes another Chinese'". Not having

[60] Decide from the beginning that you hate them, Be negative, Don't read the study guide. Never read the notices. Don't bother with the readings. Choose someone exactly like you to interview – that way you won't have to learn anything new. Don't ask for help or advice. Don't help anyone else. It only encourages them. Leave your interview to the last minute. Don't listen in lectures - what can you learn from an expert? Procrastinate - Leave writing journals to the last week. Don't check your work – near enough is good enough. Talk loudly in lectures, other students are paying to listen to you.

experienced this, I puzzled over why this conscientious and caring person had such a negative response. I offer one explanation late in this chapter.

Sense-Making interviews provided an answering to my misgivings in relation to Kember *et al*'s (1999) research on coding students' work for evidence of Transformation, which they believed did not occur. While it may be unfair to judge from the small interview excerpt they offered, a Sense-Making interviewing approach may have enabled their students to "dig deeper" into their experiences.

Increases ability to predict specific information needs. Knowing that students identify "gaps" such as getting started, writing, starting writing, and relevance every semester, meant that I was better prepared both to raise those questions and to provide more appropriate guidance and support in order to avoid the anger, frustration and fear that fuel many resistings. This information should be transferable to others planning to use reflective journals. Using Sense-Making interviews or Sense-Making focus groups, which are also possible, would also provide an effective early aspect of curriculum evaluation for any strategy in any innovative subject. Previous research in the USA has resulted in more appropriately designed information access programs or services, either print-based or electronic. For example, librarians and medical staff found that Sense-Making strategies aided their personal growth because they understood their clients' behaviour and "read" it through the clients' eyes, not their own. This led to clients or patients obtaining the answers they wanted, rather than the answers the systems assumed they needed (Wittet, 1983; Dervin et al, 1981, 1982). This reduced stress for all concerned.

Students' responses demonstrated another aspect of the efficacy of the Sense-Making interviewing process in a higher education setting. In later interviews, guided by previous Sense-Making research, I asked respondents what they

learned from the interview and eventually asked directly "Was the interviewing technique interesting or useful to you?" For some interviewees, the questions brought unarticulated issues to the surface.

> *… [It] brought up a lot of issues, like how did it help, how was your culture involved and you really made me look back on the experience rather than just go through the motions. …They were all there and I sort of knew … but talking about it, putting it down on paper, it made me realise how big an impact it had and I reckon that this far this is one of the most helpful units that I've done and I think that, cause I remember quoting that in a lecture and I'm beginning to think I might feel the same at the end of my course, like looking back seeing how much of an impact it's had….. this interview has helped close off the journals properly. (Fiza)*

Some students were more able to articulate than others.

> *O: Possibly… it's made me think about things more again…*
>
> *P: Any new ideas?*
>
> *O: Discussing the various problems I had I guess, so that gives you a few new perspectives on it [Odysseus]*

T, a "Resister", did not want to respond to this question. He may not have wanted to be rude in person. This response could itself have become the basis for an interesting deeper dig, but I was constrained by time.

> *All the repetitive, does it help, does it hinder and the magic wand. ..No, no comment. (T)*

Clarke's answer emerged from "Chaining" questions.

> *It just helps you, brings out the bigger answer, doesn't just pull up the yes or no, the really shallow answer. You can give a deeper answer.*

Staff had similarly interesting responses. For *Fluffy*, it was a focussed opportunity to pause and think about the positive aspects of her tutoring and what she had learnt from the experience.

> *I've probably never voiced any of this stuff in the context of the work itself. I used go home … and bitch about it or say to Kym, "oh these f'….'n' students" or I'd say to you, "oh, those journals", but that's only one side of the picture. What this has done has actually shown me how much I've achieved and I can now see it at that end of the tunnel finally … I've added a whole new string to my bow in a way, this teaching communication. It's great, it's very, very nice actually……It's given a lot of clarity. (Fluffy)*

For *Georgia* the interview helped by confirming that the experience wasn't "a dream". This referred to the fact that the unit and her work became invisible once her administrative mentors moved on. This disinterest was illustrated by the university newspaper, from which we never managed to gain any publicity for our students' achievements despite attempts over the years. This formed part of a reinforcing cycle of invisibility and lack of value evident to staff and students.

Increases ability to detail questions at different points- enabling better support at the most appropriate times. The detailed description of the gaps should be useful to practitioners. "Getting Started" and "Writing" the biggest hurdles, involved overcoming variously caused writing "blocks", the personal misgivings students had about BNB007 and the role of Reflective Journals in particular and above all, the relevance of the task to them as engineers. Educators wishing to use Reflective Journals could use this information to help them avoid the pitfalls that have been reported in using Reflective Journals without having planned how best to support them in particular cohorts.

Usefulness of data collection methods in assessing what happens when people intersect with a given system. In terms of benefits for the researcher, findings can guide "developing communications procedures directed at improving practice" (Dervin, 2003, p.265). After the Sense-Making interviews, I became more confident to write warmly and personally on line. It helped my change from seeing "Resisters" as aggressive "blockers," to considering what might be blocking *them.* I moved my focus to "resistings", rather than trying to identify what traits "Resisters" had and blaming them, or myself, for not liking what I designed. Their journals began my transformation as their teacher, but the interviews opened my heart. This same transformation was evident after *Fluffy* had] read the journals and students ceased being the "sea" and became individuals. As she elaborated through the Sense-Making "Circling" technique.

> *I would see them all as human beings who are struggling for something rather than this mass of masculine energy that's just waiting to pounce on the first victim or whatever that comes along… and I'm gonna keep that thought for next time so that when I'm faced with this sea of faces, you just remember that every single one of them is struggling and desires something.*

Paris, marking for the first time, had just begun this journey. Although she worked with and liked International students, she struggled with her negative responses to Chinese students, as noted earlier. Co-marking helped her see differently.

> *I think we talked about it. We co-marked one of the International Students and that was very helpful because I was able to see it in a new way cause I think I got…a bit frustrated with some of them. I felt that what they were saying wasn't very sincere and there wasn't much to reflect on really and it helped to double mark it because you helped me see that this one had more than we initially thought*.

The approach can provide theoretical guidance for inventing communications procedures that can improve practice. In relation to change, Dervin raised the useful concept of Flexibility/Rigidity. Since we need to flexible in order to respond to a new moment, Dervin highlighted the need for procedures to undo "rigidities" (2003, p.190). Changing behavioural practices requires both awareness and access to the same opportunities for "repetitive practice" that created the behaviour in the first place. This is more complicated where rigidities indicate the site of damage from "oppressive and hurtful learning conditions" as for *Geoffrey, Sirocco, Gir Bob* and *T*. Change for them entailed not simply awareness and practice, but "a self-controlled consciousness raising process" (Dervin, 2003, p.191) that is, "an act of individual emergence from past circumstances" (ibid). This was made clear the way *Geoffrey* described the gendered process by which he had become alienated from his feelings to the point where he said "I've never really had to acknowledge that they exist until now".

> *When you're a male, you grow up, you've always got to be macho, you can't really cry in front of people or really express your feelings, which means that writing a reflective journal about your feelings is extremely difficult, because you haven't actually decided whether they exist or not.*

Globally competent practitioners, guided by a democratic approach, would support this growth by "incorporating conscientising tactical procedures" (Dervin, 2003, p.191). The journal process, however difficult *Geoffrey* found it, seemed to have provided such procedures or aspects which helped his growth. The first was the formative feedback he received. He was warned that his journals were not yet at an acceptable standard and knew he had to improve them. He considered himself a "bad writer" and yet he had been told that one journal was

excellent which "surprised" him. He also wanted to pass and didn't want to risk being rude in his comments for fear of alienating the marker. Although his motivation was instrumental, it meant he "had to actually consider someone's feelings and actually try to make it better" something he had not previously had to do. "I don't think about others' feelings. I assume they are like me". This was an insight into one Resister's certainty. Using the "Help" chaining method to follow this thought through, indicated that he had added "an alternative communicating behaviour" to his previous rigid repertoire and in doing so had become a more "flexible" communicator (Dervin, 2003, p.191).

> *It means I CAN actually do it and I can now try when I'm writing other things up or when I'm having an interview with different people I can now actually consider their feelings and work out what they think of it.*

He envisaged this helping him in future work situations by "making them like me as a person and not just with the work I can do". The interview ended with him agreeing that being able to "consider other people's feelings will help me in the long run," as a person and as an engineer.

Lady Arwen also 18, was similar to *Geoffrey* in recovering feelings.

> *I find it difficult to express feelings… I don't even think about how I'm feeling… I can't find the words.*

The "conscientising tactical procedure" for her was the Peer Interview, in which her male interviewee inspired and "provoked" her to use the journals "to get in touch with" what she "was feeling".

As stated earlier, students decide what they put into journals. If they trust the situation and a reading or lecture "triggers" reflection on some related aspect of their lives, this needs to be respected and responded to appropriately. Accepting

this returns the "affective" and "subjective" from the margin and removes the implied stigma from the "confessional" aspect of journals, *where* students find this a helpful aspect of their "emergence". The fact that students did this, even under such constrained conditions, suggested that many students' emotional needs were not being acknowledged or met elsewhere. This disturbing conclusion is supported by Australian research in which almost a quarter of high school students (13-15) "said they had no one to talk to if they were upset, no one they could trust and no one to depend on" and that "those aged 18-24 had the highest prevalence of mental disorders" in the preceding twelve months (in Eckersley, 2004, p.154).

Eckersley's own research involving young Australians aged 15-24, found that while they want a society "motivated by generosity", they see one "motivated by greed". He urged the education sector to take up "the challenge to help young people create and work towards a new vision and a different way of life that reflect more closely their dreams of a more socially equitable and environmentally sustainable society" (2004, p.200).

Highlighting "resistings" rather than the attributes of Resisters, acknowledges students' "creativities" in making sense of their experience rather than the "rigidities" that mark their behaviour. This avoids a negative and possibly self-perpetuating label for them. As I addressed their questions and confusions better, the resistings became less aggressive. Accurately identifying students' concerns and fears may have given them fewer reasons to feel defensive. The immediacy of electronic feedback meant that they could complain or query something and get an answer rather than feeling an invisible member of a distant "sea" of students.

Sense-Making searches for patterns in terms of processes and things, instead of nouns. In describing interviewees, Dervin suggested alternative categories to the demographic, psychological and geographical. The alternatives describe the user at a particular moment *in* time and space rather than statically *across* time and space. Hence *Geoffrey* and *Lady Arwen* faced similar challenges, despite their culture and gender differences. This may help to explain *Paris'* very different perceptions of and reactions to some Chinese students. I saw *where* they were on their learning journey whereas, at that point in time, she saw *who* they were. This was based on her existing stereotypes of "International students", an internal struggle she was aware of. Moreover, since she was marking journals for the first time, she may have been experiencing the negative effect of reading journals from students who complained about having to work with International students.

> *I was forced into seeing the Australian perspective and I guess because of the journal situations, a bit of anonymity, they really spilt the beans and talked to me very openly about frustration in working that way and they weren't being racist or nasty in any way. They were saying, what could I do, if I hadn't learnt Chinese, that was the only way to fix the situation and I felt for them (Paris).*

It is possible that for whatever reasons, these students and their groups avoided rather than embraced the learning opportunities that this could have offered. Their "loudness" may have deafened her to the voices of the many students who were working in healthy and cooperative ways with the diversity of their groups.

6.6 Conclusion

As Sense-Making claimed, the interviews produced more data than one study can address (Dervin, 2003. p.265). Rich information emerged whether interviewees were highly articulate or students with difficulty expressing

themselves, either because English was not their first language (*Harry*), or because they perceived themselves to be poor communicators (*Geoffrey*). The analysis of Gaps should be useful to educators who would like to use Reflective Journals but are unsure of the "terrain". This chapter identified where the gaps occurred for these students and therefore at what points support was most needed and most effective. It should contribute to the need for more practical explorations of how teachers can foster transformative learning in everyday practice, "promoting critical reflection and establishing trusting and authentic relationships with students" (Taylor, 2000, p.321). It is particularly relevant because it also engaged with diversity (ibid, p.322).

The new "uses/helps" categories proved entirely compatible with the most recent work into Transformative learning and added information in areas such as feelings, and regression. It also added descriptions of changed behaviour, thus contributing to identified gaps in the research. This was an unexpected benefit. The role of support includes the role of the teacher. I cannot take myself out of this process, nor do I wish to. The research suggested that "authenticity of the instructors was a significant factor in facilitating learning" together with the fact teachers take the learning process seriously (Pierce,1986, cited in Taylor, 2000, p.314). I was genuine when I promised the students "no-one will fail because of me!" *Fluffy*, despite not being a "tall man who taught cement", won respect for the unique and "risky" drama expertise she brought to oral communication work. The tutors all generously shared their experiences of the "real world" with students.

The last section considered Sense-Making's claims regarding its benefits as a methodology and how these were met in this study. Because it is a metatheory guiding methodology and methods, it was complex, mainly because I was

learning to use methods I had not seen practised. However, the interview technique did mean students gave their own answers to issues important to them. A unit designed around identified gaps with various entry points for those with varying needs would require hard work to establish but may be more effective in the long-term.

The next chapter returns to the personal theme of the Preface, as indicated, but this time I engage with my role as a teacher methodologically, testing my claims to be a reflexive practitioner.

Table 27: Sample of analysis of interviews "uses" and *Globo sapiens'* qualities

Interviewee	Got respect	Got Connected	Got healing	Got insight	Got courage	Got inspired	Got transformation	Globo sapiens' qualities
Alexander [Acc]	Respect others Respect yourself, your surroundings "key in relationships".	Connected my life experience, my imagination and my work experience. You can influence people, gain support and friends. Peer interview: I understood where he was…he was able to see the power of positive thinking	Makes you a more holistic human being	Engineers are powerful people. They affect communities civilisations, economies the environment. Greater insight into self and topic.	[formed opinion] I am using it outside BNB in another social context.	Being professional is a noble trait thinking about these wonderful things inspires you. My imagination was sparked, stimulated. I want to make my writing interesting.	1.Epochal. "suddenly there was a presence in my mind of what a professional is..in my opinion. 2.Another formed opinion - that's it! forward thinking and backward thinking .[revelation] 3.It changed my life.. "more complete human being".	**Q:1** have the ability to understand what others are saying **Q:2** I could have an effect on the earth **Q:3** forward thinking/b/ward thinking **Q:5** I participate rather than watch.
Andrew [Acc]	Respect for others Team members each other & their ideas Our own and other people's culture	I want to contribute to the world around me		Took my understanding to a new level of what they were talking about with my own slant as well.	pushed out of my comfort zone- get to know others	All these excellent and wonderful things I'm doing as an engineer. Makes me think what I		**Q:2** Just because we can do it doesn't make it better for the world **Q:3** It's okay to come up with something

	Be respected					can do that other people will come to appreciate and help in their lives.		new but if people aren't going to use it or need it, it's not really worth it. **Q:6** We can be a model for others- respectful, courteous, have integrity **Q:6** makes me think what I can do ….
Interviewee	Got respect	Got Connected	Got healing	Got insight	Got courage	Got inspired	Got transformation	Globo sapiens
Bo [Con]		The two professions are similar	I'm not as silly as people think for changing professions	The qualities article opened my mind	I'm not as silly as people think for changing professions		Epochal : I felt a shift /a change of thought processes	**Q5:** courage to be
Bruce [Acc]		Maybe I should worry about what's going on in the world.		Without the journals I would struggle and not know I am struggling. Trying to be polite and not ockerish.	more assertive, stand up for my opinions		1.Opened my eyes- got a new way of looking. 2.I had to restructure my thinking …	**Q:5** courage to be and do **Q:1** good to hear what she had to say

Clarke [Con]		1.to creativity. 2. What's it going to do for the community?	1. moved barriers you put in front of yourself 2. be more open with yourself, don't have to hide things			Brings out best in you..so the community gets the best	1.set in progress bigger agenda to find creative side. 2. to be a sustainable engineer is the only way you can be 3. changed the way I address people and speak to them	**Q:1** felt sorry for the people facing racism **Q:2** what's it going to do for the community? **Q:2** do your bit to help planet survive **Q:5:** courage to connect, to feel **Q:4**: what's going to happen 20 years down the track?

Chapter Seven: Researcher as Researched

> *Transformation can only come from those who have come into collision with each other and with themselves, run into dead-ends, problems and impossibilities, been through conflicts and confrontations (Chambon, 1999, p.181).*

> *Context is something you swim in like a fish. You are in it. It is in you (Dervin, 2003, p.130).*

Introduction

The Preface summarised the genealogy or history of my values. I knew that,

> *Taken at face value, autobiographical stories are suspect and subject to the dangers of distortion and overgeneralization. But when critically analysed and combined with other sources of reflection, such as colleagues' experiences, students' perceptions, and formal theory, autobiographies can be a powerful source of insight into the resolution of problems (Brookfield, 1995, p.20).*

Therefore, this chapter revisits that personal theme methodologically and tests my claims to be a self-conscious, self-reflexive practitioner (Dervin, 2003, p.144) as described in Chapter One. I share this critical reflection to shed light on my actions and my own transformative process along with that of the students I taught. "Education…and many other professions are all processes of facilitating the other to grow. A practitioner cannot support another in growing if they are not growing themselves" (Bolton, 1999, p.196). Hicks warned that teachers can "get it wrong when teaching about global issues, because they are not equipped, personally or professionally, to deal with the affective or the existential domain" (2002, p.108). So how do we help ourselves to grow?

In order to answer this question, I first present a detailed analysis of the appropriateness of my chosen metaphor for the unit, the "oasis", as well as other significant personal and global metaphors that emerged during the study, "river", "feet" and "garden". My Sense-Making self-interview, together with those of colleagues and students and their informal communications, gave a bigger picture of how I perceived and experienced my teaching in BNB007 and how others experienced my work.

7.1 The role of metaphor

7.1.1 Metaphor analysis: The 'oasis', "the river", "feet" and "garden"

In my True Simplicity stage of thinking, in Somerville's terms, I chose "oasis" (Boud, 1999) as an ideal metaphor for the learning environment that I was trying to establish in BNB007. Deshler identified three domains that can be the focus of critical reflection, the Personal, Popular Culture and Organisational (1990, p.298). The Popular Culture domain includes products, while the Organisational Domain includes educational institutions. Referring to education as a 'product' involves a domain shift, which helped to explain why I and others resist the language of the market to describe education (Singh, 2002; Apple, 2001). Deshler's method has eight steps but I began at Step 4, (since I had already chosen the primary subject, "education", and a metaphor, the "oasis"), by reflecting "on the values, beliefs, and assumptions that are embedded in the meanings of the metaphors" (Deshler, op. cit., p.299). At Step 5, I unpacked these "in reference to the primary subject," which in this instance was the Reflective Journal section of a unit of learning in a higher education context (Ibid). The "sets" I identified in relation to "oasis" are summarised in Table 28 below together with what I took them to mean in the BNB007 context. I then explain each set in detail.

Table 28: The Oasis metaphor analysed by sets and embedded assumptions

Oasis Metaphor	Embedded assumptions, values, beliefs in BNB007
Set 1: Product Trees, palms, dates, food, trade, money, success	Economic focus Internationalisation as education for profit Corporatised education - Globally Portable students
Set 2: Life in the desert - Healthy Water, essential for life, health. A fixed point, certainty, sustaining	Content & skills to meet engineering and business requirements - Globally Portable Meet business demands for skilled professionals - Globally Competent Meet needs of first year transition, supportive environment - Globo sapiens
Set 3: Life in the desert - Struggles and Fears Water as scarce resource, commodity, Orientalism, power, struggle, control	Competitive, selfishness - Defensive, vulnerable to outside forces; human or nature. Individualism, compete for resources Corporatised education – Beat the competition Globally Portable
Set 4: The Campfire Companionship, communication	Connections, communication, equality Unlearning-Learning- Relearning Globally Competent / *Globo sapiens*
Set 5: Time Friendly tradition, learning from the past	Slow time, Cultural time, engaging with self and peers as "other" , sharing "stories" through journals, Peer Interview and teamwork Globally Competent / *Globo sapiens*
Set 6: Soul food Memory, images, peaceful, soul food, alternative visions An education oasis	5H's - Connecting "head, heart, hands, habit, habitus" (Dervin, 2003, p. 343). Responds to and contributes to sustainability education, Reflection <-> Reflexive< -> wisdom <-> *Globo sapiens*

7.1.2 Explanation

Having identified the six sets and what I perceived to be their embedded assumptions, I moved to the complexity of the Chaos stage (in Somerville's model) of my thinking, as I took up Deshler's recommendation to researchers to question

> *the validity of each metaphor's meanings by comparing these with their own life experience, knowledge, information, and values or belief systems that confirm or deny the meanings derived from the metaphors. Ask… if they now affirm these same assumptions, beliefs, values or understandings (1990, p.300).*

The "oasis" and life experience. My understanding of an "oasis" began with illustrated Bible stories[61]. Movies later superimposed Hollywood versions, with a strong Orientalist subtext[62]. There is no space here to engage with it, but the "West" is reaping a sorry harvest from our ongoing refusal to engage critically but respectfully with the Muslim world as social or cultural equals (Said, 1978; Sardar, 2002, 2004; Kelly, 1994). However, my response to the oasis was overwhelmingly positive. I regard it as a special place where all are welcome and whose sustainability depends on assumed rules or a code of conduct. The metaphorical oasis likewise needs to be a place of "truce" where humans, like animals at a waterhole, may live peacefully together, even though in other times and places, they may be enemies. Having established the basis of my

[61] "Sunday School" was a non-negotiable aspect of my 1950s suburban Australian childhood. 9 am to midday every Sunday was spent in activities designed to teach the Christian faith through colouring in Bible story pictures and singing.

[62] They featured the "trustworthy" Arab who often sacrificed himself to save the Western (white) hero/heroine; the "treacherous" Arab who betrayed the 'good guys' (with appropriate retribution) and an occasional Arab "girl" who fell in love with the hero and usually died saving him, thus saving him the "embarrassment" of taking her home.

understanding, the next section expands Table 28's six set analysis of the oasis metaphor, exploring its links to these students and this unit.

Set One: Product. The first set of images relate to the content and the economic drivers of the unit. These students are paying large amounts of money for their education, about $750 for this unit alone. They want a job at the end of their study and the university wants their graduates to be "employable". Therefore the better the oasis, the better and more "marketable" is the "product". At the most obvious or litany level in CLA terms, the clients (local and global employers) must be "happy" with the "product". This is understandable but can lead to *ad hoc* responses and short-term thinking as universities gyrate to accommodate Business's latest market "thrust". These responses inform and are served by a tame Discourse level (Sidhu, 2003, 2006; Kelly, 2000; Chen, 2002).

Set Two: Life in the Desert – positive. The main role of an oasis is to sustain life, through providing life-essential water and its corollaries, cleanliness and good health. This prepares travellers for the next phase of their journey. This unit/subject always used the term "learning journey" and many students adopted this. "You can lead a horse to water, but you can't make it drink", is a very common English expression about unwilling students. Camels are different. They can last a long time on stored reserves. In CLA terms, I was responding at a problems-based level. I believed that these students were unlikely to have many other such experiences in their engineering education and that this experience, like water for the camels, might have to last them a long time[63].

Set Three: Life in the Desert – negative (struggles, fear, limitations). Underlying fears and concern relate to the unit as a site of struggle and

[63] Several students did express this concern. As Fiza said, Professional Studies in second year was about "cement".

uncertainty, both features of the last few years. There were early well-justified criticisms particularly when the initial, hastily devised assessment did not match our aims, or in response to the heavy work load involved in a unit that combined so many elements, and when the readings were not available in 2002. Less justified criticisms came from some 2001 Resisters, as reported in Chapter Five. These were fed by the overt lack of support from some senior administrators and colleagues, evidenced in their critical comments about the unit to students and other staff, and their disheartening unwillingness to read students' work or to make the time to ask about what we are doing.

> *A colleague I was talking to about another matter dismissed the RJs, saying everyone thought they were a joke and just wrote what they thought we (the markers) wanted to hear**...**When I offered to send the colleague some journals (which I have students' permission to use for research purposes), the reply was, "Oh, I don't have time for that" (Kelly 2004, p.9)*
>
> *When I mentioned I was correcting these journals to someone, the staff I know, they said, 'Yes, hm, they'd never done themselves and remained to be convinced that they were what engineers should be doing'. (Paris 2004)*
>
> *To this day no-one has asked me what I teach in the unit. To this day! (Georgia, 2003)*

It is not a source of comfort to know that this disinterest is not unusual in engineering environments, having been reported in detail elsewhere (Burrowes, 2001; Tonso, 1996, 2001; Godfrey, 2002; Newhouse-Maiden, 2004). One positive effect is that it can spur research.

The oasis is a small speck of life in a large desert. Australians know the dangers of travelling in the desert without proper knowledge or equipment. So did I see the 'oasis' as a place of certainty for 'foreigners' in particular, assuring them of

support they may not have obtained elsewhere? In this case, why did I assume they needed support? This was a potentially matronising aspect of the metaphor or my interpretation of it. I made clear that my support was available for *all* students. It was easily accessed (email) and voluntary. Unfortunately, it can take time for students to realise that they need support and more time before they take the first step to ask. This "growth time" conflicts with the time constraints and regulations of universities. Each year a few students asked for help very late in the semester, in the form of personal consultations or electronic communication - usually when they realised that they were in danger of failing.

"[I]t requires a special effort for individuals to make explicit the taken-for-granted framework of cultural understanding; it also requires a special ability on the part of the teacher to facilitate it" (Bowers & Flinders, 1990, p.33). This is work at the Discourse level in CLA terms. While the oasis is accessible to anyone familiar with the Abrahamic traditions, it may be less so for students from Asian backgrounds for whom the oasis may mean nothing or something very different. However, one of the effects of a global 'mediascape' (Appadurai, 1990) is the wide reach of global images. It seems likely that most students had seen images of an oasis and could respond to many of these connotations. In relation to inappropriate metaphors, Deshler's relevant remaining steps called for creating new metaphors to "express meanings that they now want to emphasise", and considering implications for action from any new metaphor (Deshler, op. cit., p.300).

The isolation aspect of the oasis revealed a fundamental flaw in this metaphor. It represents the vulnerability of the unit and its lack of support within the Faculty, which led, with many other factors of which I have no knowledge, to its end. This study therefore serves as a record of its successes and failures.

Set Four: The camp fire. The fire that accompanied my oasis image does have close cultural links with Australian bush campfires by a *billabong* (water-hole). The oasis is usually drawn as a circular body of water bordered by date palms. The circle has many links with Australia and the mythical camaraderie of the campfire. And although the dominant Australian image rarely included Aborigines in the inner circle, as an adult I became aware that many Aboriginal dot paintings feature semi-circles, which usually represent people, often around a circle representing water.

I did want students to feel valued and welcome in BNB007. The assumed equality in a circle, with its non-hierarchical seating, challenges the dominance of any group. It also draws on the healthy potential of all the circle-based models discussed in Chapter 2. At a Problem-based level, one Internationalisation issue was domestic and international students, males and females and different age groups not mixing. The campfire expressed my aim of taking up the challenge to create an 'active' learning environment in which students were valued, encouraged and supported to move outside their perceived "comfort zones" (Volet & Ang, 1998). This phrase clearly meant something to the students as they often used it in their journals and interviews. One student actually used the term "camp-fire effect" to describe his group.

Set Five: Time Friendly. Oases are places to stop, to refuel and refresh, literally and metaphorically. In my interpretation, the oasis metaphor called if not for a timeless zone, then at least a time-friendly zone. Oases are thus the antithesis of the "one-minute manager". They are one response to Velamoor's criticism of the "criminally short time frames" of most western futures thinking (2000), which lead in turn to the "hurry sickness" defined in Chapter Two (Gleick in Tonn, 1999, op. cit.) and illustrated by the following quote.

> What a sad comment on modem educational systems that most learners neither value nor practise active, critical reflection. They are too busy studying to stop and think. Sadder still, many educators don't reflect either. They must be too busy 'teaching' (Hammond & Collins, 1991 p. 163. cited in Walker & Finney, 1999, p.531).

There are problems inherent in an accelerating "science time" versus the "ethical time" we humans need in order to consider the ramifications of scientific and technological advances (Somerville, 2001, p.280). In this "dilemma of our age: technical innovations race ahead, but human agency, human values and purposes become eclipsed" (Slaughter, 2003, p.18). At the social problem level, I was trying to encourage reflective thinking in an environment whose continuance depends on discouraging such approaches as "airy-fairy" and not relevant to the "real–time, real world", which is competitive and adversarial.

The critical set readings helped the students to understand this issue. As noted in Chapter Five, one reading included a life-wheel which invited readers to ascertain where their priorities lay and to think about a more balanced life (Thaler, 2002). A leading Australian Engineering academic recently warned that "the work ethic has become pathological" and concluded, "What this world needs is not more work - it needs more wisdom…a society in which people have time to contemplate, time to think about the problems and time to think about the solutions" (Beder, 2005, p.39). Corporatised Globalisation actively discourages such thinking. This clash of values may lie beneath some students' resistance to the idea and process of reflective thinking. Who do they believe and why should they change? The paralysing effect of this thinking has been explored in detail in an interesting case-study (Freese, 2006).

Set Six: Soul Food. As well as survival, oases offer intangible but equally valuable comforts. This final set represented my deepest aspirations for the unit. I hoped it would be a source of inspiration, intellectual and spiritual sustenance for the complex, demanding and possibly "scary" futures students will face when they graduate. I increasingly tried to model, encourage and overtly support "'democratic habits of the heart': respect for others, self-respect, willingness to accept responsibility for the common good, willingness to welcome diversity and to approach others with openness" (Bellah, 1985, cited in Mezirow, 2000, p.14).

7.1.3 How is metaphorical analysis useful?

"Transformative learning is enhanced through dialogue and active participation" (Deshler, 1990, p.311) and metaphors require willingness on the part of the hearer to listen actively for meaning, so "if the listener is not familiar with the metaphoric subject, the meaning fails" (ibid, p.312). This is particularly relevant in classrooms with great social and cultural diversity. I am not suggesting that teachers don't use metaphors. Learning new metaphors and making new connections is one of the challenges and joys of learning any language, but metaphors should be carefully chosen, able to be explained and open to contest. There are no "innocent" choices.

This metaphorical analysis revealed far more than I realised when I chose "oasis". As a teacher, I must make the effort to be conscious of my assumptions and their implications and make these as transparent as I can. The 'oasis' may remain, but as *my* metaphor. I now invite students to choose their own metaphors for their learning journey. Detailed metaphor analysis thus added a further dimension to the reflexive practitioner concept introduced in Chapter One, as well as a tool to Futures Thinking's infinite tool-box.

Access to and willingness to engage with diverse metaphors is particularly relevant in a time dominated by a limited and limiting, globalised market language, as Lakoff's work makes clear (2004). One of the tasks facing critical futures educators (among others) is that values we try to weave in teaching time, are unpicked or at the least frayed, by omnipresent, seductive and better resourced messages dedicated to the short term individual 'right' to limitless consumption[64]. There are several issues here. As one futurist remarked, "no-one wants to be told the party is over, when they haven't got to the bar yet!" (Thurow, cited in Lowe & Paavola, 2005, p.6). Even more powerful was Eckersley's insight, introduced in Chapter Three, regarding marketing's re-packaging of the seven deadly sins as the "seven marketing imperatives" (Eckersley, in Slaughter 2004, p.11)[65]. While the concept is amusing, the consequences are unsustainable. The power of the oasis image is its presence in the vastness of the desert. It is vulnerable and can be covered by sand and affected by climate change, real or metaphorical. However there are constructive alternatives (Raskin et al, 2002; Diamond, 2005; Lowe, 2005; George, 2004). Jared Diamond has provided compelling examples of previous societies which have *chosen* to fail or survive by retaining or changing unsustainable practices (2005).

Supporting and sustaining healthy life in class-rooms contributes to sustaining the oasis that is Planet Earth. Flannery's comment on our effects on Global Warming works equally well on a metaphorical level. "[W]e are the weather makers, and the future of biodiversity and civilisation hangs on our actions" (2005, p.306).

[64] In Greek mythology, Persephone, the faithful wife of the absent Odysseus, avoided choosing another suitor by weaving a special shroud. What she wove during the day she unpicked at night.
[65] Mahatma Gandhi's Seven Sins are also relevant. "Wealth without work; Pleasure without conscience Knowledge without character; Commerce without morality; Science without humanity; Worship without sacrifice; Politics without principle". (Gandhi "A Quiet Place for the Mind").

7.2 Methodological depths

The previous section explored the strengths and limitations of my chosen metaphor. In this section I use the Sense-Making interviews with staff and myself to reveal issues not visible in the goals and motivations I stated in the Preface. Summarising and describing past events was not difficult, but analysis is more challenging. For Dervin, "information use is inherently a creative process, not a passive one in which the receiver catches messages thrown by sources" (2003, p.33). I have made my own journey from "throwing bricks" at receivers and then blaming those who do not "catch" the message (ibid, p.35). My initial responses to students emerged from my own fears in the face of the mass of mainly male students and their initial negativity. The defensive elements of value judgement and criticism are evident in my early writing. A paper I wrote about the first large cohort in 1999, scratched the surface of the powerful impact of the anonymous evaluations from the first lecture.

> At first reading, the negative comments overpowered the positive, including some which were hostile, personal and sexist. They shattered my confidence until I read their first reflective journals some six weeks later. I should have counted them immediately to gain perspective. In fact, of those [88] handed in, fifteen were neutral (17%), twenty-one were negative (24%) and fifty-two (60%) were positive (Kelly, 1999).[66]

My responses are understandable and not unusual. Brookfield's honest report of his similar experience (1995) gave me much needed emotional and professional sustenance (2000, p.146) as did Weinstein & Obear's (1992). There are two possible learnings from this. Firstly, innovators need to make the time and have the courage to evaluate early sessions. This will ascertain the level of resistings

[66] The early figures may support the idea of a sea change over time, since the negative responses six years ago (24%) were more than double the average numbers of resisters in this study (10%) and more than three times the level in 2005, 7%.

and acceptings, and will reassure them as well as help them to develop better responses. Secondly, the role of supportive critical friends, either in person or through reading others' experiences, is essential.

Previous Sense-Making studies found ways that the institution involved "could change itself", as opposed to its clients/patients (Dervin, 2003, p.229). This changes the focus from people to circumstances and what teachers can do to make those circumstances more effective (Kelly, 1997, 1998, 1999; Freese, 2006). So, having identified the problem of inappropriate behaviours in groups, I set up the Personal Learning Agreement. This meant that students had to think about the impact of their behaviour on themselves and others, but without being blamed or "told". The first time I set this, I wrote that many seemed to "treat it like a joke" and it wasn't until I marked their journals six weeks later that I realised most had appreciated it. The strong dominant culture at that time, meant that only a very courageous student would have admitted publicly to liking any such "uncool" activity. Brice's "virus model" (2004), explained in Chapter Five, adds to this argument. The large tutorials in the unit, (35+) work in favour of the "loudest" voices. Only the tutors' dedication and skills bring some kind of balance, but at the cost of enormous personal effort, as *Fluffy's* interview showed.

There is no space in this study to do justice to the myriad personal, professional and pedagogical issues raised in the staff interviews. There were four staff interviews, with the coordinator, *Georgia*, with two Reflective Journal markers, *Fluffy* and *Paris* and one Tutor/Coordinator, *Kym*, who did this work for one semester only. I mention some issues they raised below because they offer other perspectives of teaching these students, of the Reflective Journal process and my role in it.

7.2.1 Illuminating student issues and development

For *Fluffy,* as for me, teaching first year engineers proved "a different kettle of fish altogether". *Fluffy* was well aware of the pressure on students to conform to assumed norms of behaviour. She used the word "revelation" to describe her surprise at the differences between the individual personality behind the journals and the behaviour of the group in tutorials. It indicates the importance of assessment that allows for individuals to express themselves.

> *… it was a surprise and a bit of a revelation and … it made me realise again how deceptive outward behaviour and appearance is and I realised what enormous peer pressure they are under when they are all together to behave in a way, like, you have to challenge the trainer. You can't possibly not, as it were.*
>
> P: Did having that thought help in any way?
>
> *F: I think next time round I will try and observe them now and in my imagination and try to imagine them six months down the track and so yeah.*

Differing staff levels of responsibility within the unit were reflected in our concerns. Coordinator *Georgia's* increasing disillusionment mirrored my own in many ways, because we had collaborated since the unit's inception. I found her interview painful to read. I do not think she was exaggerating. Her analysis of the effects of the change of government mirroring our fate and that of the unit is telling. I meant something similar when I wrote about our work being "unpicked" by stronger forces. Georgia expressed this more bluntly. "How the f**k does this happen? How does such a regressive culture maintain such energy?" Her answer was

> *The world's going backwards, Australia's going backwards and the government's not helping. … this government has*

> *reinforced that the way you think is okay. If you don't like bloody refugees, well, it's okay cause we don't bloody like 'em either. If you don't like Aborigines it's okay cause we don't either. Don't like women? It's okay cause we don't bloody like 'em either. …*

This impacted on the unit because

> *it's very difficult to design for difference and respect for diversity when you've got so much reinforcement for existing culture being okay. The existing culture is not okay. … But I'm probably the only one who thinks that in this department (Georgia).*

Johan Galtung's "three theses on social disintegration" (2004, p.84) suggests another explanation. Societies in "a state of advanced social disintegration" have their roots in a "twin process of destructuration and deculturisation, heading for structurelessness and culturelessness", which he called respectively "atomie" and "anomie" (building on Durkheim's concept) (ibid, p.87). These processes are characterised by, among other signs, interaction among organisation members shifting from the reciprocity of "mutual rights and obligations" to "what can the organisation do for me?" (ibid, p.88). Galtung called such people "predators…preying on "macro-organisations…for individual benefit, then withdrawing with the capital" (ibid). This echoes *Georgia*'s criticism of the first proposed redesign of BNB007, in 2002:

> *The people are so unconscious about the way they conduct themselves that they don't see that the way they are conducting themselves is for self gratification and self development rather than placing their community and their client first.*

When I asked her what she thought the ethos of that proposed new unit was, she replied "people pushing their own barrows", a conclusion I had come to myself. In the past six years, no-one was prepared to make what she called a "dangerous

decision", in this case, "speaking out about truth, teaching a fluffy subject and being proud of it" (*Georgia)*.

Georgia's response to invisibility could have been my own:

> *I guess I started to question myself, cause when you don't get support from your colleagues and the banter is that it's this fluffy unnecessary bullshit subject, that you start to question your own judgements and your own identity really and question whether what you are doing is right, appropriate and whether you really are making a difference or just kidding yourself. So I guess it was a time of erosion of self esteem and erosion of professionalism.*

She identified clearly the schizophrenic consequences of trying to do the "right" thing as a teacher in the light of the professional reading that was part of our job and the policies that guided it and yet finding that this was unvalued.

> *I mean all the literature we have read suggests that it supports the fact we need to put more of this in the curriculum so either they weren't reading the same literature that I was reading or they were choosing to ignore what was being recommended but once again I felt surrounded by ignorance and um trivialised and marginalised and not supported.*

She also made the point that now Sustainability is central rather than peripheral,

> *They're trying to deliver the same content in a different way and expecting that the delivery will offer the learning that BNB007 gave them, by default.*

7.2.2 Tutor interviews

Kym was not happy with her role or the organisation of the unit. She reported one effect from the stressful combination of her own personal difficulties, five

large tutorials in a row late afternoon and evening, culminating in a student comment "Good luck getting engineers to think in grey":

> *… physically it was draining, emotionally because I even had one good student say well good luck getting us to think about … good luck getting engineers to think in grey. [laugh] so yeah it was a little bit challenging in that way trying to get them to sort of be interested and also at the time um I can't take myself out of the equation. (Kym)*

It may have helped if she had known that over 5% of the sampled students' journals specifically described their understanding that engineering was increasingly dealing with "grey" rather than the traditional perception of it as black and white:

> *As a 21st century, undergraduate engineer it is, and will be, my professional duty to act and conduct myself in an ethical manner in the best interests of the client, society, and indeed humankind. In doing so, it is these grey areas that I have to be capable of recognising. (Male, ESB, 2001, Unthinking Resister)*

7.2.3 What the Interviewer learned

I conducted part of my self-interview in the presence of *Fluffy,* a trusted colleague. It was helpful to express my accumulated anxieties about the unit. Until 2002, I was one of an ever-diminishing number of staff development academics, all trying to deal with the ever-changing concepts of "core business". This affected every area of my life. After 2002, I was a casual employee of the Engineering Faculty, with neither status nor influence. Feeling invisible, whether this was real or perceived, hindered me by leading to self-doubt and loss of confidence in what I was doing. As *Georgia'*s interview showed, she was busy with her own survival. Given her levels of stress, I felt increasingly hesitant,

particularly in later years, to provide constructive criticism of the unit or to ask for more support.

In Sense-Making terms, I was also "hurt" by knowing that the work was not valued and almost a "joke". Conversely, this "helped" me by driving me to try harder in my own teaching and to conduct this study. *Fluffy* helped to put this into perspective with humour, since she saw my efforts as overcompensation in relation to how much attention a marker was expected to give the journals. She had a large tutorial workload as well as marking Reflective Journals.

> *Well, at one point Pat, I must confess I thought, "Oh my God, Pat's sitting there day and night giving them all this love and care and laughter, and I'm sitting there, "Gee, I'm a bit cross" (Fluffy).*

I was conscious of my responsibility for the Reflective Journal process, because I knew from the journals how important it was for students to believe that they were listened to and to get responses to their confusions, which I blamed on my teaching.

> *I felt really scared to be responsible for this huge thing and this huge number of students… Like you I've got the days where I want to slash my wrists, so it was helpful to me to hear what you said, to hear you grappling with it, to hear your practical suggestions for improving it but to hear your… metaphorical understandings of it. (Self interview)*

Like *Fluffy,* when I first worked with engineering students I was struck by their physicality, masculine energy and their confidently crass behaviour, which I described in an early paper (Kelly, 1998, p.4). *Fluffy* described the impact this had on her.

> *I walked in and there's like 25-30 of them all raucously talking to their mates and being very boyo about it all and sort of ner, ner, ner. And I took a deep breath and thought if I ever need to hold my ground this is it. (Fluffy)*

The dominator paradigm, "tight culture" of engineering was reflected in the behaviour of the dominant group of students, whom I originally believed were the majority. Their understanding of engineering and the attitudes this entailed was tacitly encouraged by the ethos of the Faculty, itself populated by successful "products" of such systems. The Engineering buildings reinforced a functional and all-male (white) domain. For example, when I first saw it, the long, dingy corridor of the main Engineering building was lined with large, faded black and white portraits of bearded, white, engineering patriarchs[67].

Reflective Journals and a supportive environment not only made a space for students' gentler sides to emerge and grow but individualised and changed my view of the students I "faced". It also led to questioning the continuing validity of that view of engineering. Both *Fluffy* and I, like the librarians in one of the Sense-Making studies, were helped to see the students from a different point of view and to understand them better (Dervin, 2003, p.227). It made *Fluffy* "feel extremely sort of um humble and …but relieved in a way, that there's a humanity underneath the student".

As *Paris* also realised, marking Reflective Journals can be a transformative experience:

> *… I can see why you're doing a PhD on them cause there's an amazing, I don't know, there's something going on in them….*

[67] Pressure exerted through the Faculty Equity committee saw these "culled" and more spaces made between them. In 2005, in another building new photographs were being mounted, prominently behind Perspex, but still in black and white and still all male.

there's a lot of developmental things and there's a lot of honesty and they are very powerful documents .

7.3 Personal globalisation

In CLA terms, Metaphor 1, "the streams of the river" with which I began, represented the Litany levels of my own life. It offered a geomorphic or "helicopter" view of what happened and how I responded at the time. I expressed this carefully, revealing only those personal details I felt were relevant. My later metaphors are personal and global. From 2003, I shared with students a metaphor in the form of a picture of my feet, half-way through the Coast-to-Coast walk across England – when I was wearing badly-fitting boots. I first used it, for myself and for them, in what I thought was a "positive" stoic sense of "*No pain, no gain", "Pay whatever the price", "You can do it!"* On reflection, this was an unhelpful and unhealthy interpretation. The obvious question was "Why did I keep wearing them?" The answer was that despite the extremely painful evidence, I persisted in thinking my feet would adjust. The boots were expensive and I could not admit that I had made a mistake and buy a more suitable pair when I had the (one) opportunity. The result is visible in Figure 13 below. Later insights include that in sharing this picture as a pedagogical strategy, I both "revealed" my personal vulnerabilities in the form of my bare feet and asked them to acknowledge me as a human being sharing a (learning) journey with them. The image was significant to me personally because the physical pain both reflected and deflected the emotional and spiritual pain I experienced as a result of family and work-related events earlier that year. The metaphorical "pain" of moving on was expressed and resolved through my feet on that long journey, which began and ended in the sea, that most powerful healing metaphor.

Figure 13: My feet: half-way across England, 2002.

Transferring what I learned to teaching and learning and to society generally, I concluded that we need:

1. to be alert to early signs of discomfort or distress;
2. the evaluation skills to judge when strategies aren't working;
3. to know where to get advice and support;
4. the humility to face looking foolish for having persisted or chosen wrongly in the first place and
5. the courage to take steps to change.

I shared this learning and these conclusions with the 2005 student cohort in the first lecture, before asking them to think about their own metaphor for learning. However, all five conclusions assume and depend on a system which nurtures and rewards honesty. *Fiza* provided a good example of healthy decision making, when she realised she needed help and came to see me. Despite her initial misgivings, with appropriate emotional and academic support, she had the

positive personal and professional outcomes she deserved, academically and professionally.

A global metaphor that *re*-emerged for me is Voltaire's recommendation to "look after our own garden" (*On doit cultiver son jardin*) (Voltaire, 1947)[68]. I now understand his phrase to mean not simply that the struggle isn't worth it and we should retreat, since in the end we can only control our own small environment. This could be seen as "Distraction-based Avoidance", one of three possible responses that Australian scientist and futurist Eckersley suggested individuals, organisations and governments make when faced with the need for systemic change (2004, p.255). Consumerism is the obvious, current example of avoiding engaging with complex personal and global issues. The other two responses are "Inertia" (or resistance), "characterised by trying to prove that change is not necessary rather than facing change", a favoured governmental response, and "Activism, working together to change the world" (ibid, p.256).

"Jardin" in the 21st century has both personal and global aspects. Taking responsibility for the global garden requires tending our interior garden. Judge asserted that "planetary globalization will *only* prove sustainable with an adequate degree of personal globalization" (Judge, 2001, p.1) [italics mine]. Richardson made a similar point, (1990, pp.6-7, cited in Hicks, 2002, p.14), that "political struggle to create wholeness in society" depends on and should "strengthen and sustain…the search for wholeness and integration in individuals".

> Personal globalization is a matter of selectively reducing barriers between modes of experience such as to ensure the emergence of a richer pattern of checks and balances within one's awareness (Judge, 2001, p.2).

[68] 1984 (Orwell, 1946), *The Handmaid's Tale* (Atwood, 1987) and the brilliant depiction of a 21st century dystopia, *Oryx and Crake* (Atwood, 2003) have been equally significant.

This definition attributes a porous aspect to reflexivity that requires literal and metaphorical vocabularies to describe the flows. The desire for new vocabularies led me on a parallel personal journey. I began in 2000 with a Master Class in spiritual healing and transformation and continued with a Certificate and a Diploma course. Davies' very different approach challenged me in similar ways to the ways BNB007 challenged those with different expectations (1998). For example, this is learning in "slow time", where what can seem agonising amounts of time is given to each person's story in order to create a group history. Like the Resisters among the Engineering students, I was sceptical of the content and the learning approach and wondered what use it would be to me. I remain sceptical, but the work has been important in regaining an authentic self, connected to all life. In engaging with and jettisoning internalised personal or institutional judgements, I have become less judgemental of students. Knowing that my actions supported most students, I had more courage to model respectful assertiveness on behalf of stated core values and to ask for and expect it in return. By being less threatened by the connotations of "Resisters" and "Resistance", I was genuinely interested in the source of their "resistings" and confident that I could find better solutions or alternatives to instances that arose. I also regained my sense of humour, which "heals and keeps us whole" (REACH, 1996).

Feedback from the interviews and the Reflective Journals led to revising the lectures I gave and the study guide; to focussing on different points in the Frequently Asked Questions site; and to giving more helpful answers and sample responses. In the final semester of BNB007 in 2005, I used some of the main questions from students' interviews as access points to understanding Reflective Journals, rather than the previous headings I thought were helpful but obviously were not relevant to the exact concerns students had. I had neither the time nor

motivation to create an entirely new website along Sense-Making lines, since this was the final semester of the unit. However, the study has provided information that could guide more effective entry points to any such unit by combining the questions students asked, the gaps they identified and the support that proved most effective. Dervin's detailed example of one web-based Sense-Making approach to learning provides a useful model (2003, pp.336-7).

It is difficult to connect with hundreds of students in a lecture theatre and changing this aspect would have involved a major systemic and curriculum change beyond my sphere of influence. In 2005, however, I successfully re-introduced some interactive discussion activities in my lectures without fearing losing "control" of such a large group. The 2005 Discussion Line operated and all postings were constructive and polite, with students willingly offering advice to others in response to their questions.

7.4 Conclusion

This chapter offered a retrospective theoretical analysis of my intuitive metaphor choices. This revealed the complexity embedded in decisions that affected my pedagogy as well as providing a reflexive check on my motives. The process also led me to deeper understandings of my real and metaphorical journey, symbolised by my feet. In this sense, my work contributes to other educators "struggling to transform their life-worlds, institutions and communities" (Brookfield, 2000, p. 145). I briefly considered the way colleagues perceived the reflective journal process and their roles. Their interviews and their and my learning and un-learning deserve intensive further analysis for which there is no room in this student-based study.

In Chapter Eight, the final chapter, I summarise the main pedagogical, theoretical and methodological learnings from the study.

Chapter Eight: Unlearning – for *Life*: Policy and Professional Development Implications

> *The disorder we see all around us reflects a prior disorder grounded in the paradigm of human domination that has now nearly conquered the entire world. That paradigm must be replaced by one that places us in the web of life as citizens of the biotic community. We must come to see ourselves as implicated in the world, not simply isolated, self-maximising individuals. This battle will be won or lost in the schools, colleges and universities around the world (Sterling, 2001, p.8).*

Introduction

This final chapter summarises the study's findings and their theoretical, methodological and pedagogical implications. I began the study wanting to contribute to more effective Internationalisation of one unit of study in one Engineering curriculum. It became clear that the study concerned effective/affective internationalisation of the curriculum as a foundational, contributory element in the transformative, sustainable education we need at all levels if we "choose to survive rather than fail" in the 21st century (Diamond, 2005). In the theoretical summary, I begin by using CLA to generate "maps" of the three graduate visions that emerged from the literature and students' responses, followed by describing the future scenario that each of these visions serves. I also use CLA to develop a picture of the study itself.

I briefly recap the methodological compatibility of the two methodologies and then turn to pedagogy. I summarise the implications for internationalisation of the curricula, in particular the qualities of a globally competent teacher. This includes intersections with the "interesting intimacy" of online teaching and an answer to

the main question of the study, whether Reflective Journals were a useful strategy in transformative education and under what conditions. I then summarise six effective elements of this particular transformative pedagogy before considering some of the issues raised in relation to education and sustainable futures. These impact on all areas of teaching and learning. The chapter concludes with the limits to the study and some suggestions for further work.

8.1 Theoretical summary

In this section I develop the three possible graduate visions I have used in my study, Globally portable, Globally competent and Globo sapiens into three brief CLA "maps" (Inayatullah, 2003). Inayatullah identified six elements as essential for a vision to succeed. "It must:

a) Enable

b) Ennoble

c) Have doable time horizons (20 years)

d) Be participatory

e) Be based on evidence-based research

f) Have champions at all levels of society and organisation" (2003, p.11).

I then describe the possible education scenarios that these visions represent, unpacking the various dimensions involved (Tables 29-31 below). These scenarios are useful at several levels. At the Strategic level, they suggest what should be done, at the Educational level, they can map that particular future. They also have a "Cautionary" level, which outlines what should be avoided (Inayatullah, 2003, p.6). Solutions or strategies must be directed at all three

levels if they are to be effective and they must respond to the differing time dimensions involved in meeting short term needs and long-term visions.

Table 29: CLA-based scenario 1 - Globally Portable *Homo economicus*

CLA 1	**Globally portable Vision: *Homo economicus* Dominant**
Litany	We do any job - No limits Engineering Boys and Big Buildings
Systemic (role of state, other actors)	"Pig headed" model, economy as driver Business as usual Satisfy system, gain recognition Learning as *transmission* of uncontested knowledge "Cope with - manage" diversity as temporary problem
Worldview	Serve the market – it will serve you Teachers "produce" student "products"
Myth-Metaphor	"Earth yields to the dominion of 'man'" (sic)

Table 30: CLA-based scenario 2 - Globally Competent *Homo globalis*

CLA 2	**Globally Competent Vision: *Homo globalis* Emerging, reforming**
Litany	We do it smarter
Systemic	Disguised pig-headed model – porous boundaries make spaces Detailed research describes problems Creative industries Critical reflection
Worldview	Progressive, adapt to change Capitalism with a "human face" Learning *for* change Expand democracy, make spaces for the other Reflect on why we are learning
Myth-Metaphor	"We manage the earth" - Techno-fix

Table 31: CLA-based scenario 3 – Wise global citizen *Globo sapiens*

CLA 3	**Wise Global Citizens Model: *Globo sapiens* Preferred, transformative**
Litany	We do better things, see differently
Systemic	"Eco-nested" - "view from space" – ecology sets limits Sustainable futures, shift of consciousness Transformative education Learning *as* change – individuals and institutions make changes necessary for sustainability
Worldview	Deep sustainability Changing society based on social wisdom <-> learning society (Barnett, 1997) Challenge foundational assumptions (Inayatullah, 2003, p.3)
Myth-Metaphor	Heal ourselves - heal the planet Includes unconscious fields of awareness, "microvita", alternative "memes" (Inayatullah, ibid)

8.1.1 CLA 1: Globally portable vision: *Homo economicus* - Dominant

Homo economicus represents the traditional version of engineering, "big tough men who build things". Any changes to the "tight" white, male culture are resisted. *Homo economicus* will go anywhere and do anything and, if ethics are considered, s/he assumes that the organisation is responsible and has taken care of it.

The education associated with this vision is mainly transmissive, as there is no need for reflective methods. At the systems level, research is reactive and often 'ad hoc', responding to the loudest demands for new techno-fixes to emerging problems. These demands are themselves based on an unsustainable "no-limits" view of the world. In cultural terms, the dominant group is the norm, against whom others are judged. Diversity is a temporary "problem" that lecturers have to "deal" with. Internationalisation means sending "language-deficient" students to language advisers who will "fix" their grammar and spelling and short stays teaching the standard curriculum at overseas venues. Globalisation and

homogenisation will eventually solve the problem of diversity in favour of the "norm", who in the meantime see no need to do the personal and professional work necessary to engage with the other as equals. Change is poorly understood. As one staff member stated, “No-one asked me if I wanted to be multicultural!” This means that the symptoms of sexism and racism remain in behaviours and in exclusive curricula.

If sustainability features, it is the latest hot-topic in an on-going series of hot topics. Teachers quickly learn to apply it, as they did with “diversity”, as another gloss to satisfy quality control and earn grants. In terms of the Great Transition, it is a Conventional Worlds – Market Forces scenario based on Growthmania or business as usual, represented by the Pig-Headed model. The myth is “The earth yields to the dominion of Man” (sic). In Diamond’s terms, this education is part of a society choosing to fail.

8.1.2 CLA 2: Globally competent – *Homo globalis-Emerging*

This is the emerging scenario, represented at the Litany level by glossy images of successful graduates who are making it in the “real world”. *Homo globalis* is ideally, still young, white and male. These graduates “fit for a global market” are used to sell “brands” of engineering education. This image is now the preferred one, and although consultation with communication experts has resulted in widening the “tight” culture to make spaces for images of women and minority groups, they are small figures in the background.

In education, the teacher is still the producer but is under greater pressure to deliver a good “product”. This level addresses culture in terms of how to “use” diversity, mainly in order to avoid business losses or in so far as it can serve the current system as a resource, “productive” diversity. Internationalisation means

selling degrees overseas or luring overseas students into existing courses, but providing little or no support to staff or students to do this effectively.

There is detailed research into identified problems and moves to improve courses, to introduce critical thinking and provide creative solutions for emerging crises, but based on short-term thinking. Sustainability could feature here at two levels. Firstly it could be acknowledged as an increasingly important, but controllable "add-on". Learning is about transmitting knowable, uncontested "sustainability" as a separate subject. In Sterling's terms this is First order change/learning or "learning as maintenance of current paradigm" (2001, p.15). This is "Education about sustainability" (ibid, p.60). The more progressive level is "Education for sustainability" (Sterling, 2001, p.60). This would be "learning for change" and includes examining values, but still assumes that "we know what is needed". It examines the assumptions of the first vision and "first-order thinking" and engages with the metacognitive dimension of learning about learning. This emerging, reforming scenario co-exists and will probably subsume the previous one.

In terms of the Great Transition, this is still Conventional Worlds but it represents progressive, Policy Reform, capitalism with "a human face", rather than business as usual. It is still a growth-based, Pig-Headed model (Lowe, 2005, op.cit.) but the borders of the circles are porous and allow flows and exchanges. The myth is that humans can "manage" the world's complex eco-systems in the same way as a business. In Diamond's terms, there is a small but shrinking window of opportunity for survival.

8.1.3 CLA 3: Scenario: Wise Global Citizens model – *Globo sapiens - Transformative*

The final scenario is the preferred, transformative vision in this study. This vision does not simply challenge assumptions or question values but emerges from and represents a changed world-view. The image is the "Eco-nested" (Inayatullah, 2005) or View from Space, (Lowe, 2005) which means that we do better things and see things differently (Sterling, 2001). This means a changing society based on social wisdom, so it is also a "learning society" (Barnett, 1997). It is transmodern in that it is prepared to learn and re-learn from cultures that have "survived" and to reappraise values that are no longer helpful or appropriate. In terms of diversity, there is a respectful engagement of equals. In terms of the Great Transition, this is part of or moves beyond a new sustainability paradigm.

At the systems level, this would involve Third order change or "learning *as* change which engages the whole person and institutions" (Sterling, 2001, p.61). This kind of education and these educators would facilitate the development of some kind of *Globo sapiens* who live and work with a futures awareness. In this vision, Engineering would contribute professionals with appropriate understandings and capacities, who work through sustainable designs and projects to provide jobs that fulfil and integrate self, nature and society. This response is the most difficult as it is most in conflict with current structures, values and methodologies (ibid). At this level, alternative futures are based on long-term thinking and would involve shifts of consciousness such as neo-humanism, re-sacralisation of the earth and a Gaia mentality, perhaps a *"Cosmo sapiens*". The guiding metaphor is healing. "We can heal ourselves and the planet". Healing is not simply a metaphor but an alternative "meme". A meme is an idea that transforms, as opposed to informing (the educational perspective) or empowering (such as a strategy, or capacity building) (Inayatullah, 2003, p.3).

Healing is already challenging the current, destructive no-limits and adversarial meme underpinning the present. In Diamond's terms and if there is time, in this scenario we are choosing to survive.

8.2 The data

I also applied CLA to the study itself. Analysed this way, the surveys represented the surface or litany level of the study. They usefully documented indicators of change but little more. The journals offered evidence informing all levels. At the litany level, they indicated students' visions of engineering and their roles. At the problems-based or systems level, they showed that identified problems related to writing and speaking were being resolved as a result of the teaching strategies used. They also showed changes in the way students saw personal, cultural, professional and global issues

These effects encompass what Sterling described as "education about sustainability" (which maintains the present paradigm), but move beyond it, because the teaching approach included a "values and capability bias" (2001, p.61). This was reflected at the Discourse/worldview level in the language students used to describe the issues, indicating metacognitive shifts in levels of understanding of themselves, global topics and the engineering profession.

Their reflections and critical thinking indicated that the unit was at least a response at the level of "education for sustainability." While this level of education reforms, it does not challenge current growth-based paradigms. However, at the deepest level of Myth and Metaphor, many students used healthy metaphors to describe their experiences and their intended futures. The insights from each level reinformed an updated vision for engineering that needs active support.

The interviews detailed the processes behind these changes for the interviewees, particularly at transformative levels. According to the interviews, analysed using Sense-Making methodology, the reflective journal process and its associated supports enabled many students to "get connected". Those connections supported them to get the insight, inspiration and courage to make epochal or incremental moves to change how they saw the world and themselves in it. This suggests that we offered "education as sustainability" (ibid, p.61), at least on a personal level. Many of these students have developed the intellectual and emotional foundations they need to become sustainability professionals. At the ideas level, they are capable of and some are already contributing to "memetic change" in organisations and society (Inayatullah, 2003, p.3). Without institutional involvement however, the unit and its approach proved unsustainable.

8.2.1 Methodological

The two methodologies offered complementary methods because they shared deep connections about the democratic and evolving nature and purpose of communication. CLA provided a meta-view of the deep levels uncovered by Sense-Making interviews and is a useful tool for Sense-Making researchers. Likewise, Sense-Making methods provide respectful access to worlds that CLA can analyse and inform so productively, in the hope of creating something better.

The Sense-Making interviews and the concept of "uses" enabled me to identify significant new "uses" that justified the interview process, expanded Sense-Making's categories and indicated that BNB007 provided elements of a transformative education process. These findings have thereby added to research showing transformation as a recursive, not linear, process based firmly in the affective domain and highly dependent on supportive and trusting

relationships. This is useful for curriculum development and for the professional development of teachers in Higher Education.

8.2.2 Pedagogical

Based on the data analysis and in conjunction with emerging literature, I have drawn general or specific implications for each of the following areas of interest:

1. Internationalised curricula in higher education emphasising
    - o 'globally competent practitioners' (Badley,1999) and
    - o Intersections With On-Line/Offshore Teaching: "an interesting intimacy".
2. Reflective journals, "airy- fairy" or transformative pedagogy?
3. Sustainability education

Within the broad perspective of internationalisation of the curriculum and in the light of the study's findings, the next section first considers what "global competence" might mean for academics and how this intersects with online teaching. I then summarise the elements of one transformative learning environment.

Internationalised curricula: "Globally Competent" teachers. I explained what I regarded as the shortcomings of current interpretations of Internationalisation of the curriculum in Chapters One and Two, one of which was the preparedness of teachers. This raised the question, what qualities do teachers in Higher Education need and how do they acquire, challenge and or extend them?

Badley (2000) analysed the skills and attributes of "Globally Competent" practitioners as academic competence in a content area, (knowing what),

operational competence and the increasing pressure for academic staff to acquire formal teaching qualifications (knowing how). He added to operational competence, a new "socio-cultural" competence, based on, (among others) "the need for a transformatory and democratic approach to one's own teaching" (1999, p.245). When I introduced this concept at a seminar in my own university, one uneasy senior academic said, “You don’t want to be preaching revolution, do you?” The remark indicated that he was not aware of the “reciprocity between democratic theory and Transformation Theory” (Mezirow, 2000, p.28) by which public institutions that empower individuals, reap the rewards in the collective transformative effects on society. This is because, as these students demonstrated, empowered individuals are “more public spirited, more tolerant, more knowledgeable, more attentive to the interests of others and more probing of their own interests” (Warren, 1992, p.8 cited in Mezirow, 2000, p.28).

Such remarks are entirely consistent with Badley’s comment that “given the growth of managerialism in our universities…the principles and practices of collegiality and democracy have been somewhat diminished and…university teachers will have to be encouraged and helped to re-discover their democratic credentials” (1999, p.251). This means “having the courage to stand up and be counted” (Martinez in Ehrenfeld et al., 1999, p.27) which these authors warned, “means putting one’s body on the line alongside of the brain” (ibid). I do not urge this lightly, because teachers who choose to be reflexive practitioners in the 21st century face the challenge that “our frameworks of value, understanding, self-identity and action all have to be continually in the dock” (Barnett, 1997, p.174). This has to take place within the pressured hyper-reflexivity of the higher education system itself, as cautioned in Chapter Two.

Intersections with on-line teaching: An "interesting intimacy". The findings also inform electronic communication and academic professional development. The current emphasis on the use of educational technologies means that much staff development has focused more on training *in* the technologies rather than on the values, qualities and skills needed in order to teach effectively, face to face and online, in increasingly diverse and complex contexts, within countries and internationally. The diverse cohorts of BNB007 included students from remote areas within Australia and overseas, who had little or no previous access to computers[69].

Paris aptly described online teaching as "an interesting intimacy". To take advantage of the powerful learning tools provided by technology most effectively, E-moderators "need to be able to engage in reflective practice themselves" (Orsini-Jones & Davidson, cited in Salmon, 2002, p.387) and be "democratic and open about their roles" (Hunt, 1998, cited in Salmon, ibid). Using Reflective Journals and reflective thinking, implies a corresponding responsibility to have thought about our own progress as reflective and reflexive practitioners (Hicks, 2002, p.108). "[R]eading and writing one's own narrative of practice" helps us to understand ourselves and our work (Connelly & Clandinin, 1994, cited in Freese, 2005, p.103).

There is a potential conflict here with corporatised universities which are concerned to market course content, but not necessarily the process supporting it. Halliday called homogenized curricula "shopping malls of the mind" (Smith, 2000). If an offshore unit included the assessment we designed, the following

[69] In 2004, one mature age student from a tiny Pacific Island nation had never used a computer or the WWW. One unforeseen effect was that he did not realise that the "notices" I sent out via email were 'global' notices, clearly stating that they were automatic and not to reply. When the student finally asked for help using the correct email address, it did not reach me until almost too late. In order to give him the support he needed, I granted an extension and offered very rapid turnaround of draft journals until they were all completed. In an unresponsive system, he would simply fail.

questions must be answered. Who will assess the reflective journals? What training and professional support will be given to those responsible for marking the journals? What guarantee could we give students in off-shore sites, that the content of their journals would remain confidential? "Serious reflection requires the student to write openly and this requires safety" (Beveridge, 1997, p.41). One obvious answer is that any student concerned about such issues would and should, carefully craft a sanitised comment on their learning. Alternatively, the journals may need to be re-negotiated. In some contexts, journals may simply be an inappropriate assessment strategy. Students' journals deserve to be marked by skilled tutors who understand the consequences of any betrayal of trust.

> When people feel free to say what they really think and feel, they are more willing to examine new ideas and risk new behaviours than when they feel defensive. If teachers or trainers demonstrate openness and authenticity in their own behaviour, this will be a model that learners will want to adopt *(Knowles, 1995, p.7 in Badley, 1999, p.247).*

There are implied and demanding professional and personal development implications. In increasingly diverse contexts, within and between nations, academics need to add at least an "understanding of language and cross-cultural issues" to their skills. This may be a tall order for tutors in particular, who are often pressured post-graduates with little teaching expertise or background and who may themselves come from a variety of linguistic and cultural backgrounds (Olivas & Reyes, 1995)[70]. This makes it even more critical for universities to acknowledge and support the development of these and other skills as integral to the role of a globally competent profession, in which learning to "hear" and

[70] Despite the deficit discourse embedded in the title "New trouble: Teachers with language deficiencies", these authors suggested that "all potential new teachers should be screened for oral proficiency" (p.25), criticised the laissez-faire attitude by most institutions toward the preparation of new faculty and first -time instructors" (p.20) and called for better support and preparation of oral skills for teachers and tutors.

understand a variety of accents in English is a global skill (Morris & Hudson, 1995, p.70)[71].

Appropriate personal qualities are also a critical factor in successfully modelling and managing the Reflective Journal process. Demanding lists have been identified, including "supportive, clear, facilitative, interactive" (Bolton,1999, p.199) as well as “trusting, empathetic, caring, authentic, sincere, and demonstrative of high integrity” (Gallagher, 1997, cited in Taylor, op. cit., p. 313). Salmon (2002), working on reflective on-line practice with Associate Lecturers as part of their development as effective E-moderators, also identified the personal qualities of “sensitivity and courage” as essential in working with adult learners. ”The role of the supportive faculty is critical in facilitating students in making their paradigm shift, turning their emotional response into a positive learning experience” (Kember et al.1999 p.21-22). It is essential to show "a human face", to make constructive comments and to respond to personal input. Previous research, (Krol, 1996) noted that the response itself encourages dialogue. He categorised teacher comments as affirming, nudging, “giving information and personal connection comments” (in Maloney, 2002, p.40). I addressed some specific language and TESOL issues related to online teaching in BNB007 in detail in a separate paper (Kelly, 2004).

A global perspective reveals additional areas of difficulty with teaching a unit like BNB007 offshore. Establishing “offshore” teaching sites is an increasingly cost-effective option for nations faced with educating growing numbers of students[72]. However, a reflexive education should challenge the status quo and as such is often problematic (Minnis, 1999).

[71] One of the suggested causes of an August, 2005 plane crash in Greece was that the German and Cypriot pilots found each other’s English hard to understand.

[72] Estimated to grow from 48 million worldwide in 1990 to 97 million in 2010 and 159 million in 2025 (Blight, 1995, in Smith, 2000, p.1).

> I note that critical reflection/analysis as I applied the concept in my classes had certain limitations … and I was unwilling to point out a path that I was not also able and willing to walk. I could always flourish my U.S. passport and leave. That road was not open to most of my students (Higgins, 1998).

Badley also advised an "ethnographic approach' to one's teaching, including actively exploring our own value orientations and biases and being cautious about offering any "privileged view of the world…which may appear to reject or deny other perspectives" (2000, p.248-252).

BNB007 included a radical agenda in its process and content, although not all lecturers would agree with this or want to see themselves as part of it. These differences, inherent in a democratic system, formed another challenge to students' thinking, by presenting differing and sometimes inconsistent points of view. Reflective Journals were an integral part of the success of this unit in helping students on the path towards critical thinking and critical being.

If a unit like BNB007 were taught without a reflective aspect, to students who might do only the last year of their course in Australia, they will not have had the same opportunities to develop writing or critically reflective skills that their peers have had. Moreover, the journals and the team project were complementary aspects of Action Learning and consequently both supported and were integral aspects of a transformative process.

Reflective Journals: "Airy-fairy" and a "waste of time" or transformative pedagogy? Returning to my original question, was I correct in my perception that Reflective Journals were an effective strategy for bringing about change and transformation with large, diverse first year engineering cohorts? Yes, according to the detailed evidence provided by the surveys, the Reflective Journals and Sense-Making Interviews. The analyses in Chapters Five, Six and Seven also

helped to answer some questions posed by Taylor about teaching and transformation. "When during the transformative process are supportive relationships most helpful? What do helpful relationships look like?" (2000, p.308) and "How [do] adult educators establish these conditions within classes that meet a few hours each week"? (ibid, p.314). Using this strategy effectively with successive, large cohorts of first year engineers was arguably a stern enough "real world" test.

What must be stressed is that Reflective Journals do not bring about change by themselves, as others have found (Boutin et al., 2002). In fact without support, Reflective Journals can be counter-productive as a teaching strategy (Boud & Walker (1998); Palmer, 2000; Freese, 2005; Kember et al., 1999). Significant changes and transformative learning occurred for many students in this study because enough aspects of the learning environment supported and encouraged them. The significant role of relationships in transformative learning is well-established but much of it was discovered as the outcome of that learning. This work is directly relevant to the identified need for work on *how* transformative learning can be "initiated, manifested and managed" in the context of a classroom (Taylor, 2000, p.308).

In Chapter Three I identified a variety of supportive strategies in this particular learning "oasis", particularly Scaffolding, the Personal Learning Agreement, the Peer Interview, Formative Feedback and On-line Support. These were core, interconnected and integrating elements of the module design which I highlight below as pillars of one form of transformative pedagogy.

Element 1: Integrate valuing and respecting diversity. Effective units/subjects formally and clearly state this commitment and embed it in assessment, lecture content, consistent lecturer/tutor attitudes and in tutorial and project design. Only

then students *may* feel confident enough to incorporate their cultural or gender-based or other experiences as a natural part of their work. Formal curriculum statements are needed to move lecturers beyond "accommodation – if pushed" to integrating diverse perspectives because this is appropriate and effective pedagogy for all students. The BNB007 unit outline and website formally acknowledged and welcomed the great diversity within the cohort itself. [73] This was restated in the introductory lecture and in the lectures relating to culture. It was clear from the journal responses that students noticed this and felt confident to make references to family, community and faith.

Element 2: Engage with others and with ourselves as other. The "cultural osmosis" model of Internationalisation as discussed in Chapter Two, has been criticised as inadequate for some years (Volet & Ang, 1998; Smart, Volet & Ang, 2000; Biggs, 1999). This study was based on an example of academics taking responsibility for creating an environment which supported cross-cultural communication, in those areas we controlled. The first tutorial, the Peer Interview and the teamwork project did combine to help many students out of their comfort zones to acknowledge not just the "other" but that *each* of them was "someone else's other" (Gentile in Ellsworth, 1989, p.322)[74]. As the interviews showed, they formed opportunities to "learn-by-living", since these strategies were "authentic experiences…'memorable' events that engage that person in an individual way, so that they determine and guide transformations" (Ehrenfeld et al., 1999, p.34).

Element 3: Has an ethos that encourages trans-generational thinking. Trans-generational thinking means "preparing students to be knowledgeable and

[73] "Please note: We acknowledge the diversity of the group in terms of age, gender, work experience and cultural backgrounds. We encourage you to include this as part of your journal responses wherever you feel it is appropriate" (BNB007 unit outline).

[74] In late July, 2005, I read the first journal for 2005, from a young male (Accepter), who remarked (as had so many before him) on how these activities had made him aware of the need for respect and how once you got past initial differences most people were easy to get on with.

respectful participants in [the] process of carrying forward (which means both to conserve and to renew) memory that will serve as a guide to the future" (Bowers, 1995, p.177). This requires examples, in terms of role-models or written or visual resources, which engage respectfully with the past as a source of wisdom. For example, the video featuring the Late Bill Neidje, or Julia Tao's use of Confucianism to guide Sustainability (2004). Examples can also warn of mistakes that should not be repeated, such as Chernobyl or Bhopal. Many students understood that we are making decisions that will affect future generations.

> *What you are doing to the land and environment will have a great effect on future generations and it is very important that you keep it in mind. The world is not yours to take but for every of all generations to look after and enjoy. (Male, ESB,23, 2001,Accepter)*

Element 4: Scaffolds learning. For the students, writing Reflective Journals required a) writing, b) a new genre of writing and/or c) one expressed in their second or other language. I wanted the content and process to support students to develop the writing and thinking skills they needed not just for their profession, but for their own self-confidence. This support was described in Chapter Three. Up until 2002, students only shared their writing with the marker, guided by the literature and as my cautious response to what I perceived as general "resistance" to "touchy feely" activities. The interviews convinced me that students were *very* interested in what other students thought but hesitant to ask, for reasons already stated. Not sharing challenges and fears can serve and perpetuate competition and anomie. Recent work in transformative learning supports this conclusion, moving away from seeing transformation as "autonomous and formal" to seeing it as a "learning process that is much more

dependent of the creation of support, trust and friendship with others" (Taylor, 2000, p.308). This student-led interest led me to introduce the Peer Interview.

The Peer Interview. I described the Peer Interview concept and process in Chapter Three. From a teaching point of view, the strategy also had practical advantages. It made plagiarism difficult, as students needed to include information about their interviewee and their journals. It enabled students to get feedback from their peers before they handed in their journals for formative feedback from the markers, with dramatic effects on some students when they realised that other students were taking the journals seriously and were prepared to say so. It had the effect of weakening the "tight culture" and Litany level thinking that *everyone* "hates" reflective Journals and that saying what you think or feel is not "cool", as *Lady Arwen's* comments showed so poignantly. This was reinforced by the Formative Feedback in the form of corrections and constructive criticism and encouragement, which when done well and efficiently, created a link between marker and student and showed students that they were being listened to and taken seriously[75]. Some students found it hard to trust their "own voice" and use the first person, as I encouraged them to do. I also asked them to practise Plain English, in which the burden of responsibility for understanding is placed on the writer rather than the reader (Solomon, 1994; Brown, 1993)[76]. This is a much needed element in the "sophisticated range of writing and communication skills" they will need in professional life (Thomas, 2004, p.40).

Element 5: Has a "human face" – Tutors/markers. Appropriate personal qualities are a critical factor in successfully supporting, modelling and managing

[75] I assured students in the lecture that no marker would criticise their writing in a negative or disrespectful way. I understood from my own experience as a distance student the destructive impact of such comments.

[76] Brown, an academic who teaches effective writing, cites the example of Watson & Crick who began their Nobel prize winning paper on DNA with the words, "We wish to introduce… .

the Reflective Journal process. "The role of the supportive faculty is important in facilitating students in making their paradigm shift, turning their emotional response into a positive learning experience" (Kember et al., 1999, pp.21-22). Desirable teacher qualities were identified earlier. Trying to mark journals with limited staff numbers is cheaper in the financial short term, but counter-productive in the long term, since lack of timely and appropriate feedback increases students' stress and feelings of anger or frustration towards the journals and those who set them. This style of marking is a demanding, highly skilled and sensitive task. Leaving it to inexperienced tutors or lecturers is unfair to them and the students and could be detrimental to both groups personally and professionally.

Element 6: Fosters Futures Thinking through its content and process. Tasks such as the Personal Learning Agreement and the exercise that asked students to examine their communicating strengths and weaknesses, developed students' awareness of the need for professional and personal foresight. Topics like Sustainability, Ethics and Socially Responsible Technology, combined with reflection, necessarily involved global issues and thinking beyond the individual, to the world and the future.

All these elements created or supported many of the suggested bases needed for Reflective Discourse (Mezirow) defined in Chapter Two. The cumulative effect of these elements can be seen in the qualities of *Globo sapiens* that these students demonstrated, or indicated that they were developing, through their reflective journals and their interviews. These qualities were summarised in Table 1, Chapter One and expanded as outcomes of the data analysis in Chapter Six. Transformed "meaning perspectives seem to be more global and metaphorical in

nature, reflecting a more inclusive worldview" (Taylor, 2000, p.297). This is an integral aspect of education as sustainability.

8.3 Education as sustainability

Education as sustainability will be based in and foster understanding of the interconnectedness of all life. Many teachers and lecturers trying to do this are discouraged, as we were, when their efforts are ignored or actively devalued. Knowing that this work is a site of tension at the ontological or world-view level may help. The students' journals and interviews showed that they were prepared to consider changes to their lives, for the greater good. This involves renewal at all levels, personal and societal. It has implications for communication skills and cross-cultural communication skills, whether face-to-face or in online learning and teaching and applies to both individuals and institutions. "Merely having a web-page does not mean one is communicating with others except at the banal level of an electronic business card" (Inayatullah, 1998 p.238). For many individuals, renewal involves exploring the many dimensions of spirituality (not religiosity). In organisational terms, this would be observable as "movement from the command-control model to the learning organisation model, to a vision of a living, learning and healing, conscious organisation" (Inayatullah, 2005, p.577).

8.3.1 Sustainability or "business as usual?"

Sustainability, for all the reasons outlined in Chapter Two, is becoming "marketable" in the same way as Internationalisation did. "As Thrift (1999, p.60) notes so evocatively in his discussions of the complicity between the business world and intellectual communities, "there is no theory that cannot be made complicit" (Sidhu, 2006, p.317). The negative aspect is that Sustainability may be approached in similarly shallow ways as Internationalisation, by over-worked teachers with limited awareness and preparation. As noted above, effective

communicating requires understanding and attending to the "six 'H's," - head, heart, hand, habit, hegemony, and *habitus*" (Dervin, 2003, p. 343). Without such a basis, any course will find it hard to bring about the fundamental and radical values changes argued for in the literature and in this study.

Sterling argued for "world-minded, future-orientated and whole-system approaches that place sustainability values at the heart of all education, not as an add-on curriculum topic" (2001, cited in Taylor, 2005, p.7). Using Reflective Journals as a strategy allowed communication and values to develop and reinforce each other, since the values were in context and the context required communication. If sustainability is taught as "content" or "product", then transdisciplinary integration is more difficult to achieve. Curricula in which sustainability is contained, codified and transmitted (Sterling, 2001, p.60) keep engineering "stuck" not just in an out-dated paradigm, but in one antithetical to personal growth, the best interests of the Engineering profession and ultimately the planet upon which engineers continue to have such an impact.

8.3.2 Teaching and learning for sustainability professionals

Indian writer/activist Vandana Shiva defined "living democracy" as "the movement to relocate our minds, our production systems and consumption patterns from the poverty creating global markets to the sustainability and sharing of the earth community" (Shiva, 2002, n.p.). Ironically, the deep compromises and commitment universities have made in responding to the 'real world' of business and marketing may drag universities towards more responsive, sustainable futures. Progressive businesses are only too aware of their vulnerabilities in the face of global crises. Over 45% of the world's top companies are already

publishing triple bottom line reports (Colquoun, 2003 cited in Inayatullah, 2005, p.573).

8.4 How do the findings advance knowledge?

8.4.1 Pedagogically

Global topics need to be taught or engaged with at all levels. This evidence suggested that an alarming number of students in this study, despite much-vaunted information availability, had not thought about many important global issues at all or in any depth, or about their implications on their personal and professional futures and the future of the planet. Unfortunately, this is not unique. Nearly three–quarters of students aged 11-18 in a UK-based study "felt they'd learned little or nothing about global issues at school" even though 98% thought it was important" (Hicks & Holden, 1996, cited in Hicks, 2002, p.37). It seems incredible that this should still be true in current education in Australia and many other countries.

Using Reflective Journals as a teaching and learning strategy obviously requires planning and thought and yet the literature suggested that engineering Faculties (among others) have adopted it without preparation and have to learn from their mistakes (Boutin et al., 2002; Palmer, 2000). A well supported and planned Reflective Journal strategy could be the foundation for a long-term personal and professional program that would become more open and collaborative each semester of a course and would acknowledge and *build on* the skills, attributes and ethos encouraged in a unit such as BNB007. Effectiveness also relies on tutors or markers, carefully chosen and prepared with the increasing and demanding list of qualities, values and skills already identified, rather using than the newest and cheapest links in the academic food chain.

> Graduate programs should prepare all adult educators to work with people who are encountering common problems in negotiating life transitions, times when adults are most ready for examination of assumptions and major perspective transformations (Mezirow, 1991, pp.205-6).

Askew and Carnell's view of education as "transformation" saw everyone as "proactive learners who can use intellectual and emotional skills to initiate, negotiate, evaluate their experiences and bring about actions for change" (1998) p.167, cited in Badley, 1999, p.246). Jones (2002), expressed deep concern about the pressures within Australia that are creating an academic world with ever fewer spaces for challenging units of study.

"Teachers are embedded in the existing social paradigm" (Chapman, 2002, p.11). Like our students, we are sites of a values struggle between marketised or corporatised futures and sustainable futures. The effects of this are evident in my experience and mirrored in *Georgia's* understandable disillusionment and increasing alienation from the institution and from teaching itself. There is "challenge in struggle and opportunity, but I'm getting a bit tired of it" (*Georgia*).

At the practical level of teaching, our reality was that in order to support students in the recommended ways they deserved and needed, I and other tutors worked far beyond the hours for which we were paid as casual workers. As a teacher, I could not do otherwise, but I knew that our unpaid labour was supporting an inequitable system that breeds resentment by relying on such "hidden" contributions and by exploiting the economic vulnerability of many of those who provide them. This is not equitable, healthy or sustainable.

The significance of the study also lies in the alternative it presents to the continuing stereotype of engineering. All engineering students suffer from its

continuance but who benefits? Research may have concentrated on describing and understanding the loudest voices, that is, the surface or litany of engineering responses rather than muting these voices into perspective by researching how to nurture the "seeds for growth" of the healthier alternatives that most students indicated they prefer. The CLA-based maps of the differing approaches to engineering and engineering education above offered a glimpse of who benefits and who loses. They also show which paradigm is promoted by each of the three visions of graduate qualities used in this study - Globally Portable, Globally Competent and *Globo sapiens.*

"The new engineer". "Increasingly, engineers are aiming to be community leaders rather than technical functionaries" (Beder, 2003, p.309). This outstanding engineering educator called for education to provide young engineers with skills and understandings of social context, but deeper understanding depends on the understanding of *self*. The majority of these engineering students consistently showed that with support and encouragement, they are concerned about *who* they are and what they do and how it impacts on their relationships with others and the Earth.

Neo-Humanism. In the introduction, I stated that the study and its findings would eventually move the discussion to deeper Neo-humanist interpretation of sustainable education practices at personal and cultural levels (Bussey 2000; Judge 2001). We "are called to renew our minds if we are to transform ... [our classrooms] so that the way we live, teach, and work can reflect our joy in cultural diversity, our passion for justice, and our love for freedom" (Hooks, 1994, p.34, cited in Tipton et al., 2000). This necessitates a deep understanding of sustainability itself and the willingness to unlearn. This approach is useful because "becoming aware of one's bias is not facile…since our sense of self and

order, the production of our identities, are themselves complicit in contemporary conversations and in our texts" (Inayatullah, 1990, p.133).

First year in higher education. The first year at university, like the beginning of any new experience, is an especially vulnerable time, challenging and frightening for many students. It is also exciting and full of opportunities for change and growth. "Adult educators create protected learning environments in which the conditions of social democracy necessary for transformative learning are fostered" (Mezirow, 2000, p.31). This includes creating environments which model and support cross-cultural communication.

Large first year units would benefit from being supported by a staff member whose main or only responsibility is online support for students' learning. In this study, it seemed to reduce the number of first year students not completing. One dedicated, support person is a minimal cost, since it would probably be done by a suitably prepared "casual" employee. This role could be taken by a tutor involved with the unit, but sensitivity, maturity and excellent (cross-cultural) communication skills are critical to this role. Teaching large first year cohorts is demanding of staff in terms of time, effort and emotion. This should be recognised by any system and appropriate time, support and encouragement offered to those involved in teaching them. Instead, the opposite seems true (Sidhu, 2006).

8.4.2 Gaps addressed

Transformative education will only be useful to adult educators if it can show how they "can improve their teaching practically and theoretically" (Taylor, 2000, p.286). This study contributes to that aim in one of the most demanding Higher Education contexts, large first year vocational cohorts.

The role of reflective journals in transformative pedagogy

Four interviews were conducted one year after the unit and the evidence from *Gir Bob* and *Bruce* in particular, confirmed recent findings that participants cannot begin critical reflection until they recognise, express and deal with "past resentment". For *Gir Bob,* racism was an understandable source of repressed anger and resentment. The lecture "triggered" reflection on this painful issue and a year later, he was able to articulate the benefits of the deep cultural journey that he had denied and resisted at the time. The journals, constrained as they were by topic and word limit, provided a transformative stimulus, process and methods, which enabled him to continue "evolving" even after transferring to another course.

Supportive environments

The study contributed to the on-going discussion around the question "What strategies best support the development of learning and cross-cultural communication skills in a large, socially and culturally diverse first year, student cohort?" Engineering can be regarded as a particular challenge because its culture has been identified so strongly in the West with a dominant white, male culture. The issue is that all students represent diversity. Effective 21st century pedagogy integrates that into curricula at every level, in the content and strategies and the attitudes and approach of those who teach it. There are students who, for various reasons, require extra or different support at various points. Healthy relationships are essential to in-depth and critical reflection and this study contributed to knowledge about how to initiate and sustain these in the classroom (Taylor, 2000, p.308).

8.5 Limits of research

What are the limits/boundaries of the study? Although informed by Futures Studies, I was teaching into an Engineering unit. I changed my own approach in

response to students' expressed needs and concerns, but I could have actively been working with them to uncover and unpack their preferred futures as part of a futures generation thinking-based teaching study (Inayatullah 2002, p.91). The principles behind this teaching approach were summarised in Table 2 in Chapter Two. It was significant that even small examples of alternative futures, such as the article "Little Feats," stimulated their thinking about what futures they did or did not want or could or could not contemplate[77].

Taylor identified a gap in long-term research into looking back at transformative processes in order to understand regression or on-going differences in lives marked by a transformative experience (2000, p.292). Re-interviewing these students after they graduate and enter the work-force is a desirable long-term follow-up project. It would also be useful to repeat the questionnaires and conduct some Sense-Making interviews with the 2006 students of replacement units to compare their attitudes to those of the students who experienced BNB007.

I only interviewed the female staff involved in the unit, not the males. On reflection, in the early years, I felt I did not have the energy to deal with what I perceived, perhaps incorrectly, as bemused indifference[78]. This was one side-effect of feeling marginalised as a female and a non-engineer. It was also a practical effect of the absence of joint planning meetings or any invitation to explain my aims to other staff working in the unit. A similar side-effect was *Georgia's* response to seeing emails with the heading "BNB007". This was

[77] This article described the efforts of a US couple to live within an ecological footprint of 1 acre. Students' responses ranged from inspired, to annoyed, to contempt, but not indifference.

[78] Signs of warmth emerged in 2004, with one tutor commenting on "how nice" I was on-line to the students and "all the information I was sending out". I also noticed that the same tutor was posting notices that were helpful and had a "human voice". He also cooperated in helping to find ways of making alternative assessment possible for a student whose lack of money meant that she could not travel to tutorials and was therefore in danger of failing.

accompanied by a dread of expecting criticism and thus she often responded defensively.

8.6 Further research

I can now articulate that, as a teacher in Higher Education, my aims were to set up a welcoming and respectful context for students with their diversities:

- to help them to communicate more effectively in writing, orally, interpersonally, interculturally;
- about issues that were important in the 21st century;
- as developing professional engineers;
- in a globalised context;
- but in a learning environment (oasis) that would nurture them to develop qualities and awarenesses enabling them to contribute to alternative, sustainable futures;
- as developing *Globo sapiens*, or wise global citizens and responsible professionals.

I realised some way into the study that these aims were the basis of a transformative pedagogy.

As isolated events, such units and their approach are vulnerable. Firstly, these students may not have other formal opportunities to develop these qualities and skills until later in their course/career. [*Fiza, Georgia*] Those students who thought that the unit's approach would be extended by further Professional Studies units seemed disappointed. Secondly, isolated units or approaches are dispensable and in the instances I know of, have not been replaced by a broader

approach[79]. Whole courses need to be redesigned with the desired skills and qualities embedded, nurtured, built on and extended throughout the course. This implies effective professional development for teachers.

"Individual practitioners sometimes attempt, at the expense of possible burn-out to rise above constraining systems and communicate differently, more responsively to system users. Unfortunately, without systems support, they cannot do so" (Dervin, 2003, p.267), as our example ultimately showed. Where students' needs are not adequately catered for, students at risk are fortunate to find teachers who notice them and take steps to help them. If such staff burn out, there are others to take their place, who in turn may make the same mistakes as their predecessors. This is a wasteful extension of the "throwaway society" approach to both teachers and learners.

8.6.1 What would help?

We needed "senior management to come out and state clearly that this unit was important to their professional development and they should take it seriously and realise that without that they're not going to make very good engineers" [*Georgia*]. Student and staff fears and doubts should have been addressed consistently, by the Head of School or similar authority figure introducing the unit and the staff involved. They needed to stress that it had faculty support and that the students' chosen profession supported the ethos behind it and its anticipated outcomes. For convenience, such support could be delivered through a pre-recorded visual message.

An allied suggestion is that funding be provided to produce an attractive video/DVD of five minute "Engineering Insights". This would involve inviting

[79] University of New South Wales, Griffith University (Lowe, pers. com.)

leading Engineering academics, Indigenous elders, working professionals in Engineering and allied professions and representatives of forward thinking national and trans-national companies to speak for five minutes on why they value sustainability-related qualities and issues, why they think these are relevant to engineers *and* how they implement them in their own lives and work-places. At the end of each segment, there could be focusing questions for students to discuss in pairs or groups. This would not only provide an easily accessible resource for lecturers and tutors to use but it is an efficient way of using busy role-models' time and spreading the message.[80] Many students wrote positively in the journals about the video/DVD presentations that I and other lecturers used and wrote that visual presentations were a useful learning strategy.

This overt valuing by senior academics would also provide an initial confidence boost to the majority of students who do think such units are a useful part of their education but are clearly intimidated or "put off" by those who not only disagree but make it difficult for others to agree. "Resisters", although remaining entitled to hold their opinion, might face find this support provided further "disruptive" moments. Since their assumption that they are "right" is the main prop of their "rigid" responses or resistings, powerful role models may at least encourage them to face the issues.

This support is equally necessary to influence academic staff. In answer to the Sense-Making question "if you could wave a Magic Wand, what would help?" *Georgia* replied" if fairy dust fell on the heads of staff that just wouldn't embrace the enmeshing and that they'd "get it" and just help me rather than be blockers to achieving the outcomes". Positive role modelling is a simple, cheap and effective

[80] The five minute video idea is not new. Canada's University of British Columbia's "Critical Incidents" series for use in academic staff development is a good model, which has proved popular with staff and students.

way of supporting teaching staff by establishing a mutually respectful basis for dialogue. We did not have this advantage**.** "I even know that there are lecturers who think that BNB007 is a failure to begin with, which initially I agreed with when I first saw the subject" [*Zaeris interview*].

Mezirow rightly warned that adult education is not about indoctrination (2001 and Dervin also warned how easy it is to cross "the line between such self-reflexive, consciousness-raising goals and imposition of dogma or tyranny'' (2003, p.124). For this reason, Sense-Making mandates what Dervin calls "a new kind of scholarly self-reflexivity and humility" (ibid). However, education *is* about being allowed to engage in learning. Mutual respect is one of the "democratic habits of the heart" (Bellah (1985) in Mezirow, 200, p.14) present in any ideal, democratic learning environment. The media are not obliged to answer to the same high standards. Based on his research into young adults, one researcher suggested that "advertisers should be forced to include warning messages that materialism can damage one's health" (Kasser, 2002, cited in Inayatullah, 2005, p. 575).

8.6.2 How prepared is Higher Education to respond rapidly?

A question that deserves further research is how to implement curriculum changes if and when Higher Education has to change rapidly to respond to escalating global crises? How *do* you turn around Faculties that have not only set their sights on "no limits" futures, but have selected and promoted staff and developed curricula with this in mind? It will not be easy to uncouple Engineering (or any other discipline) from what *Georgia* called "this regressive culture".

8.6.3 "Tight culture" – an uncomfortable fit?

Palmer found that "oral presentation received the highest of the students' assessment ratings", contrary to "the belief that engineers dislike and shun public

speaking" (2002, p. 183). This finding affirmed this study's conclusion that the "tight culture" traditionally associated with engineering is an uncomfortable fit with the interests and abilities of most current engineering students and the world for which we are preparing them. The encrusted myths behind the out-dated Litany are not helpful to the change of culture needed for sustainability education or education as sustainability, so research should be directed less to understanding resistance than to nurturing change. If this is done sensitively and appropriately the "resistings" may resume a more appropriate place as the choice of a small group of students stuck for their own reasons, at a particular time, in their "rigidities". US researchers called for a similar approach. "[I]n attempting to diversity the culture of engineering…it may be helpful to increase the prominence or visibility of the present cultural characteristics that are most compatible with sustainable development and to deemphasize those characteristics that appear to be least compatible with this goal" (McIsaac & Morey, 1998, p.118). In Europe, an Emeritus Professor of Mechanical Engineering called for engineers whose "emotional interest in the living world can inspire all those who develop social systems to be in harmony with the environment" (Cywinski, 2001, p.15).

8.7 Conclusion: Un-learning for Life

This study showed that, with effective support, many students have taken Dator's first step towards "reconceptualising environmental values in a globalising world" (2005, p.230) in that they have recognised their "perpetual responsibility" for the Earth. Many have also taken his second step in developing "an ethical perspective that furthers our acceptance of that responsibility" (ibid). I see little sign of the critical third and fourth steps that support their development. That is, "envisioning and creating" institutions "that make it easier to accept", rather than to reject…responsibility for the Earth the human species dominates and finally,

doing the “hard” work of creating and evaluating them (ibid) in the short time available before events, seen and unforeseen, may close off this option.

This study changed with my understanding. It also changed my understanding *of* my research, the students I taught, my understanding of desirable graduate qualities, the role of Higher Education in and for the 21st century and beyond and my own role as a teacher. I now understand that becoming *Globo Sapiens* involves life-long learning and un-learning - for Life itself. In 1987 the late Tom Stonier wrote, "We can no longer afford a society whose progress depends on technologists who are humanistic illiterates" (in Lowe et al., 1987, p.91). The pace of change remains glacial. Even though the present approach is not sustainable and UNEP and others have consistently warned that “doing nothing is no longer an option” (2002), that remains ”the most common response of today’s decision makers” (Lowe, 2004, p.1). See also Nielsen, (2005); Eckersley, (2004).

This study identified some of the terrain and challenges of a post-development vision in teaching in Higher Education. It showed that two new methodologies, Sense-Making and Causal Layered Analysis, were complementary in illuminating how a large, diverse group of students resisted or reconstructed their world in the space of one semester, when challenged at fundamental levels. The study also contributed to what educators might need to know, be and do, in order to teach effectively for the daunting task of social and cultural transformation required by a learning society that is also a “wise” society. This can be seen in the context of the transition to sustainable futures and the circumstances which make this so necessary. Once “possible” futures are now “probable”. The task is no longer reinventing universities “capable of preparing people proactively for uncertain futures" as Candy et al. advised almost a decade ago (1996, p.12), but along the

clearer lines suggested above by Dator (2005). Based on the evidence, the transforming learners of BNB007 are capable of and willing to contribute positively to some kind of "post-transition, global society" (Raskin et al., 2005, p.1).

The unit BNB007 received little praise and less support. It was an imperfect response to what most would see as a "difficult" task, but it provided enough of the "Six H's" (Dervin, 2003, p. 343) to change many students' thinking in the transformative ways recommended by progressive rhetoric as essential for sustainable futures. Like Pandora's box, this study provides a note of hope, by offering a glimpse of what *might* be achieved where there *is* staff and systemic support and commitment.

I have indicated some of the possible implications, portability and adaptability of this study for other educators who, I believe, will increasingly face not just the challenge, but the demand, to "produce" sustainability professionals in all disciplines. The deeper futures work made possible by the Causal Layered Analysis approach in this project may help educators to understand better the implications of the various curriculum choices involved and their personally and professionally demanding roles in them. As an educator, I ask to which future are my actions contributing? Sidhu advised that educators choosing the path of *Parrhestiastes*

> would not be complicit in unethical power/knowledge relations which might cause environmental destruction, linguistic hegemony and cultural imperialism. Rather than promoting 'a passport to a global career' they might consider how their professionalism contributes to the 'global public good' - to democratic, humane and sustainable global futures for this and succeeding generations (2006, p.317).

I end as I began, with quotations that have lit my path[81]. It should now be clear why they are appropriate.

> [S]ustainable education is…affirming rather than dislocating, hopeful rather than soulless, where the smallest gain can be of deep significance (Sterling, 2001, p.33).

> *My personal vision for sustainable future is actually several visions. I hope for there being plenty of fresh water; I hope for there to be world peace, because without world peace, it will be hard for all the countries of the world to work together to preserve the environment and the worlds resources (Fiza).*

> Present and future generations could surely ask no less of educators today than that they should continue in this struggle to create a more life-centred education (Hicks, 2002, p.39).

> The evidence is clear. If civilisation is to survive, the next century will have to be a time of transformation, not just in technical capacity, but also in our approach to the natural world and to each other (Lowe, 2004, p.1).

> Humanity must learn to love the idea of leaving future generations a living planet (Meadows et al., 2005, p.283).

[81] I chose this metaphor carefully. I was reminded of a poem dating from the Turkish occupation of Greece, when Greek children had to attend school secretly at night to learn their language. Little moon of mine so bright, on my path shine gentle light. Light my learning of the rules, Light my way to go to school. Letters, learning, moon so bright, all are precious in God's sight (Trs. author).

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Appendices

Appendix 1: Letter requesting permission for survey/questionnaire 2000–2002

Communication Centre
School of Business

Researcher: Ms Patricia Kelly
Tel: 3864 1651
Fax: 3864 1805
E-mail: p.kelly@qut.edu.au

DATE,

Dear student of BNB OO7

As part of my PhD research and with the aim of improving this unit, I will be asking you to complete a short questionnaire at the beginning and end of this semester. Please note that you do not have to answer or respond to all the questions in the questionnaire. The questionnaire should only take 10 minutes to complete.

We will only publish aggregate data. All the information you provide will be anonymous and treated as strictly confidential. All the records will be maintained in a locked filing cabinet that only the researcher can access.

Your participation in this research is entirely voluntary and you are free to withdraw from the study at any time without comment or penalty. You do not have to put your name on this questionnaire but by completing it you are deemed to have agreed to participate in this project. I do ask you to create your own code so that I can check any individual changes, but this does not reveal who you are.

If you have any questions, I can be contacted on 3864 1651 or on e-mail at p.kelly@qut.edu.au.

If you have any concerns about the ethical conduct of this research please contact the Queensland University of Technology's Registrar, on 3864 1056.

Yours sincerely

Patricia Kelly
Lecturer in Higher Education
Teaching and Learning Development Unit
TALSS, QUT

Appendix 2: Survey instrument 2000-2002 (Questionnaire 1)

Thank you for taking the time to answer this brief questionnaire. We will repeat this questionnaire at the end of the semester. We hope you find it interesting. The information will help us to understand better your attitudes to the issues covered in this unit. There are no right or wrong answers. ***Do not put your name or student number****.*

Section One [82]

Please use this section to create a unique code that the computer can read for statistical purposes but which cannot be used to identify you.

1. **Please write the day you were born, eg. 01, or 27** ☐ ☐

2. **Please write the first two letters of your mother's given name, eg AL** ☐ ☐

Next, we ask for your opinion about 15 statements.

Please circle the answer that is closest to your opinion.

	Agree strongly	Agree	Neutral	Disagree	Strongly Disagree
1. Engineering is applying knowledge to improve the world.	1	2	3	4	5
2. Engineers need to be able to work with several fields of knowledge (disciplines)	1	2	3	4	5
3. Engineering is neutral and apolitical	1	2	3	4	5
4. Engineering rarely involves ethical considerations	1	2	3	4	5
5. New technologies create as many problems as they solve	1	2	3	4	5
6. Australia has no serious environmental problems	1	2	3	4	5

[82] The 2000 questionnaires did not include this element. Its use in later years enabled paired data to be accessed.

7. Engineers should be aware of contemporary issues and their historical context.	1	2	3	4	5
8. Engineers should understand and respect the economic, social and biological Interdependence of life on Earth	1	2	3	4	5
9. Simple technologies are often the most effective	1	2	3	4	5
10. Engineers working in teams must be sensitive to gender and ethnicity	1	2	3	4	5
11. Engineering practice involves dominating the natural environment	1	2	3	4	5
12. My cultural background is an integral part of my engineering decisions	1	2	3	4	5
13. Engineers are responsible to future generations for what they do today. (omitted from Questionnaire 1, 2001)	1	2	3	4	5
14. Respect for the past should be included in engineering decisions					
15. I expect to work overseas when I graduate				YES	NO

Section Two

This section asks you for some information about your background. Please circle the appropriate answer for each question.

1. Please write your age (in whole years) in the box provided ☐

2. Gender Male
Female

3. What is your current year of study 1st year 2nd year 3rd year 4th

4. Before you came to QUT did you:

Complete Grade 12 at a private school

Complete Grade 12 at a Government school

Enter as a mature age student

As a full-fee paying international student

As a scholarship holding international student

If you are an international student, please specify your country of origin _____

5. Cultural background

Please indicate if you are:

Australian from an Anglo/Celtic/Other background

Australian from a non - English speaking background/s

Do you identify with any particular cultural or language group/s?

If YES, please write it/them here _____

Thank you very much. I appreciate you taking the time to complete this questionnaire.

Patricia Kelly

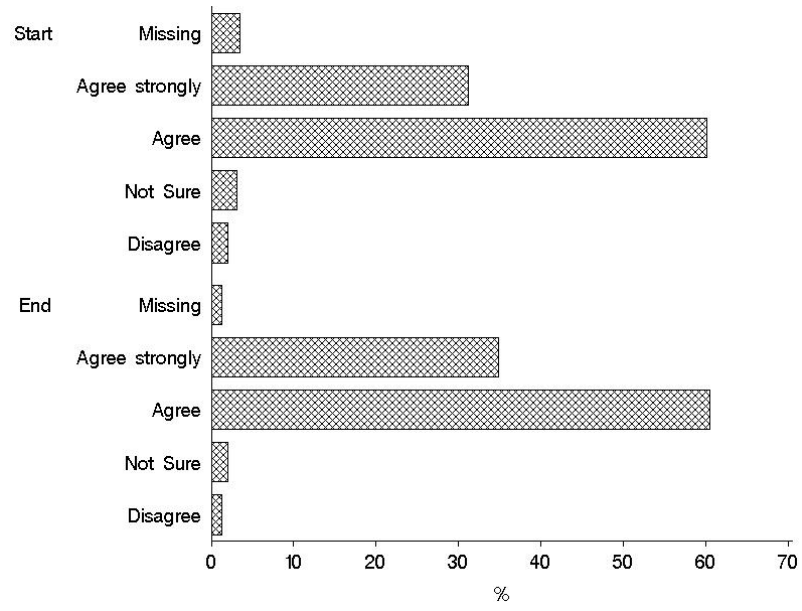
Appendix 3: 2000 Unpaired Data

TALDU questionnaire

For each question we have a table of frequencies and a chart of percentages. The graphs are not shown for the questions on the verbatim response to cultural identity or country of origin as the data is too sparse. All tables show the number and percent of missing responses which are generally quite low. 'Start' refers to the white questionnaires handed out at the start of term and 'End' to those given out at the end. For some questions, such as private or public school, only those people who answered 'yes' to the previous key question are used.

1. Engineering is applying knowledge to improve the world

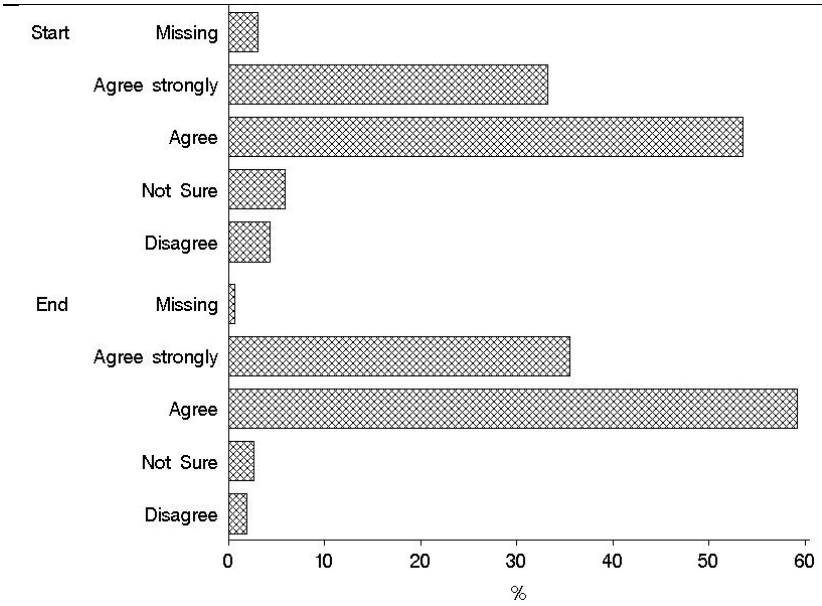
	Start		End	
	N	%	N	%
Missing	9	3.5	2	1.3
Agree strongly	80	31.3	53	34.9
Agree	154	60.2	92	60.5
Not Sure	8	3.1	3	2.0
Disagree	5	2.0	2	1.3
Total	256	100.0	152	100.0



2. Engineers need to be able to work with several fields of knowledge (disciplines)

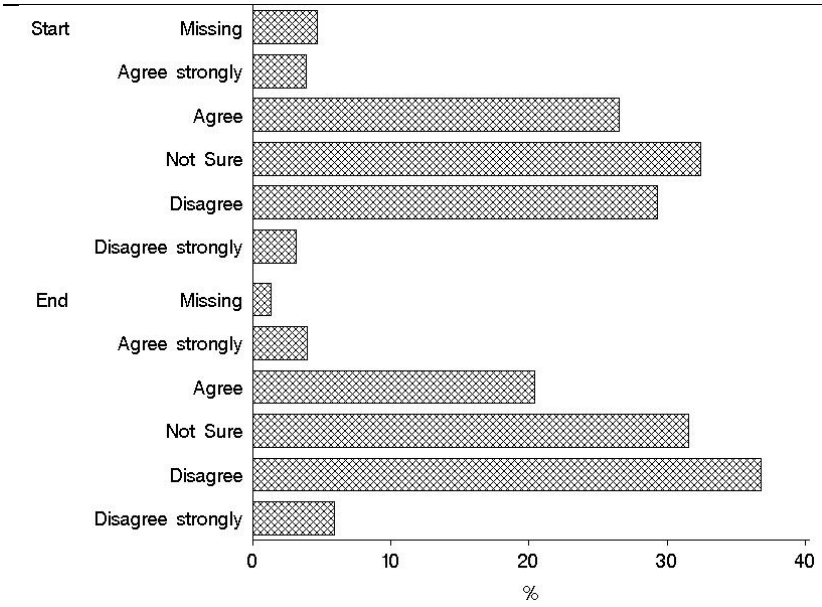
	Start		End	
	N	%	N	%
Missing	8	3.1	1	0.7
Agree strongly	85	33.2	54	35.5
Agree	137	53.5	90	59.2
Not Sure	15	5.9	4	2.6
Disagree	11	4.3	3	2.0

Total	256	100.0	152	100.0



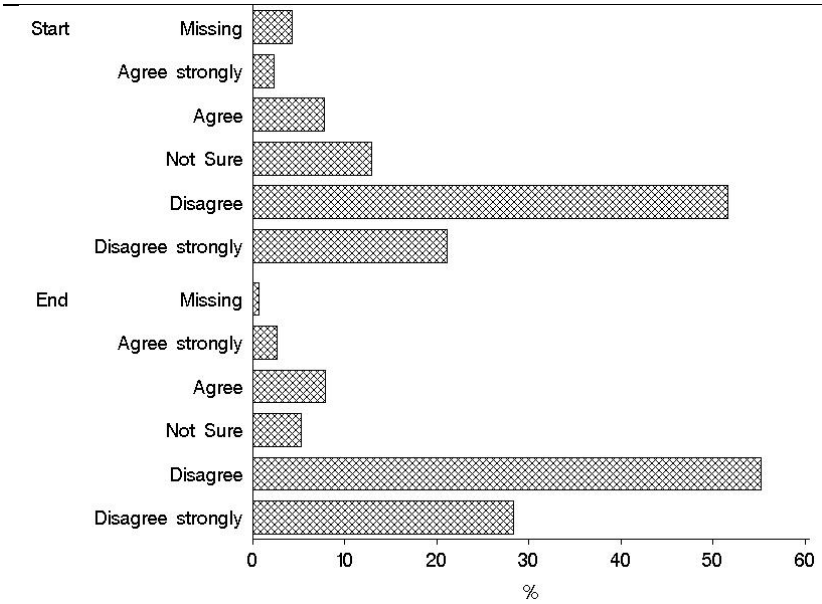
3. Engineering is like science, neutral and apolitical

	Start		End	
	N	%	N	%
Missing	12	4.7	2	1.3
Agree strongly	10	3.9	6	3.9
Agree	68	26.6	31	20.4
Not Sure	83	32.4	48	31.6
Disagree	75	29.3	56	36.8
Disagree strongly	8	3.1	9	5.9
Total	256	100.0	152	100.0



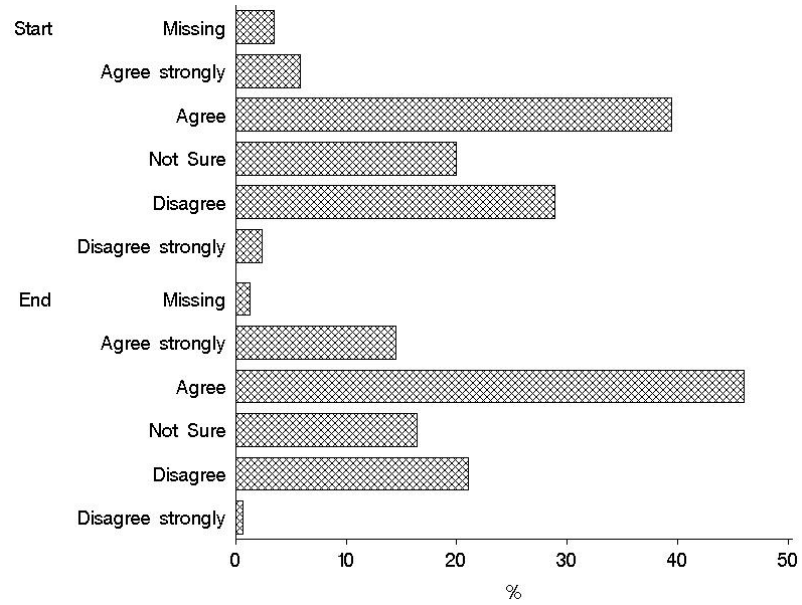
4. Engineering rarely involves ethical considerations

	Start		End	
	N	%	N	%
Missing	11	4.3	1	0.7
Agree strongly	6	2.3	4	2.6
Agree	20	7.8	12	7.9
Not Sure	33	12.9	8	5.3
Disagree	132	51.6	84	55.3
Disagree strongly	54	21.1	43	28.3
Total	256	100.0	152	100.0



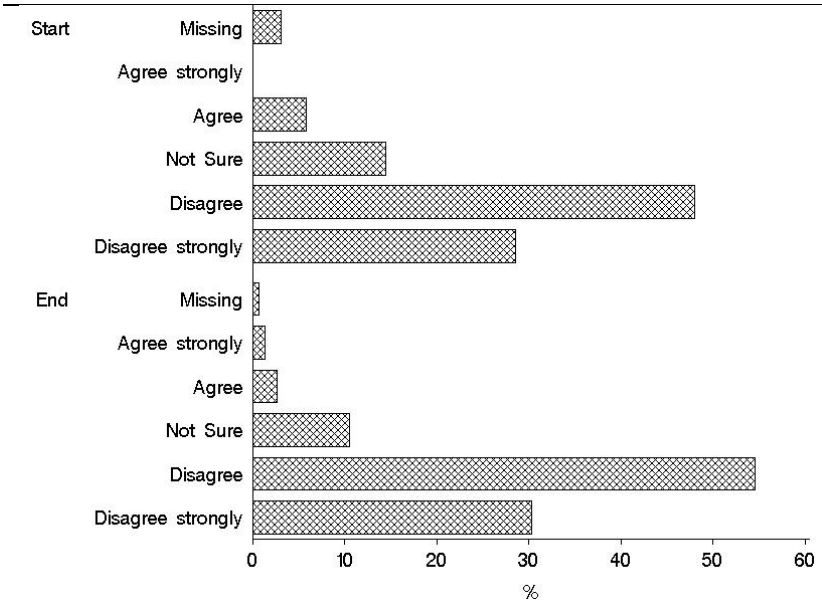
5. New technologies create as many problems as they solve

	Start		End	
	N	%	N	%
Missing	9	3.5	2	1.3
Agree strongly	15	5.9	22	14.5
Agree	101	39.5	70	46.1
Not Sure	51	19.9	25	16.4
Disagree	74	28.9	32	21.1
Disagree strongly	6	2.3	1	0.7
Total	256	100.0	152	100.0



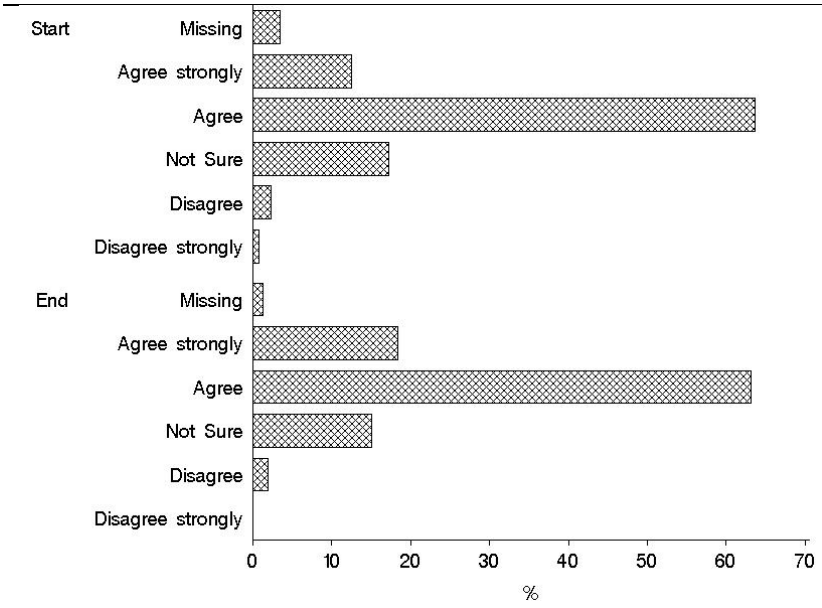
6. Australia has no serious environmental problems

	Start		End	
	N	%	N	%
Missing	8	3.1	1	0.7
Agree strongly	.	.	2	1.3
Agree	15	5.9	4	2.6
Not Sure	37	14.5	16	10.5
Disagree	123	48.0	83	54.6
Disagree strongly	73	28.5	46	30.3
Total	256	100.0	152	100.0



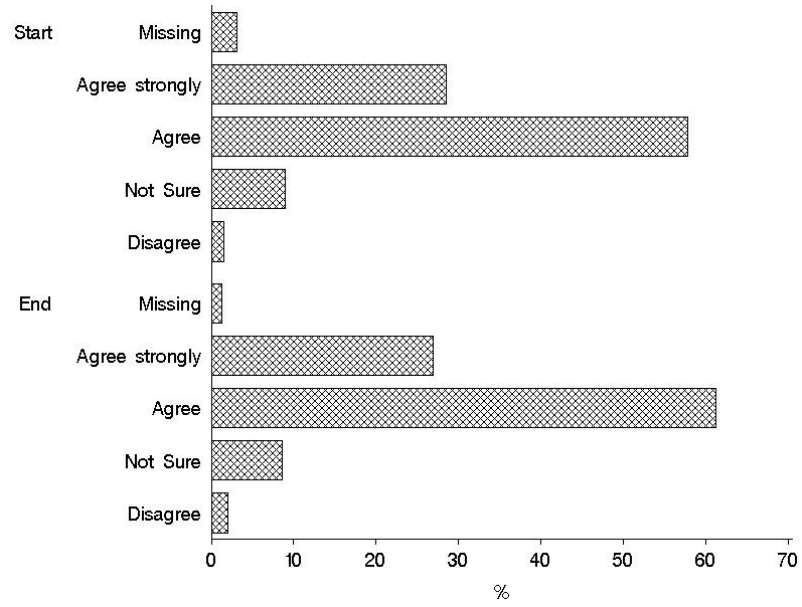
7. Engineers should be aware of contemporary issues and their historical context

	Start		End	
	N	%	N	%
Missing	9	3.5	2	1.3
Agree strongly	32	12.5	28	18.4
Agree	163	63.7	96	63.2
Not Sure	44	17.2	23	15.1
Disagree	6	2.3	3	2.0
Disagree strongly	2	0.8	.	.
Total	256	100.0	152	100.0



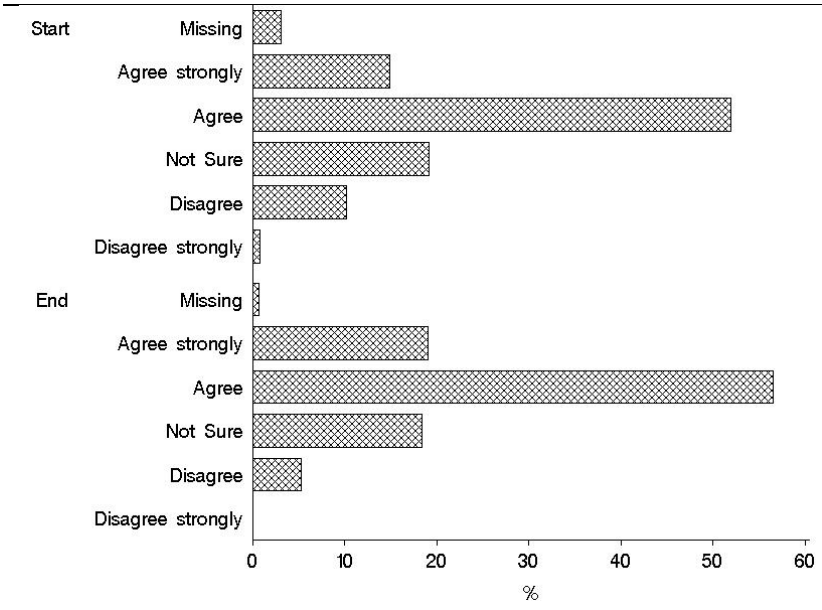
8. Engineers should understand and respect the economic, social and biological interdependence of life in earth

	Start		End	
	N	%	N	%
Missing	8	3.1	2	1.3
Agree strongly	73	28.5	41	27.0
Agree	148	57.8	93	61.2
Not Sure	23	9.0	13	8.6
Disagree	4	1.6	3	2.0
Total	256	100.0	152	100.0



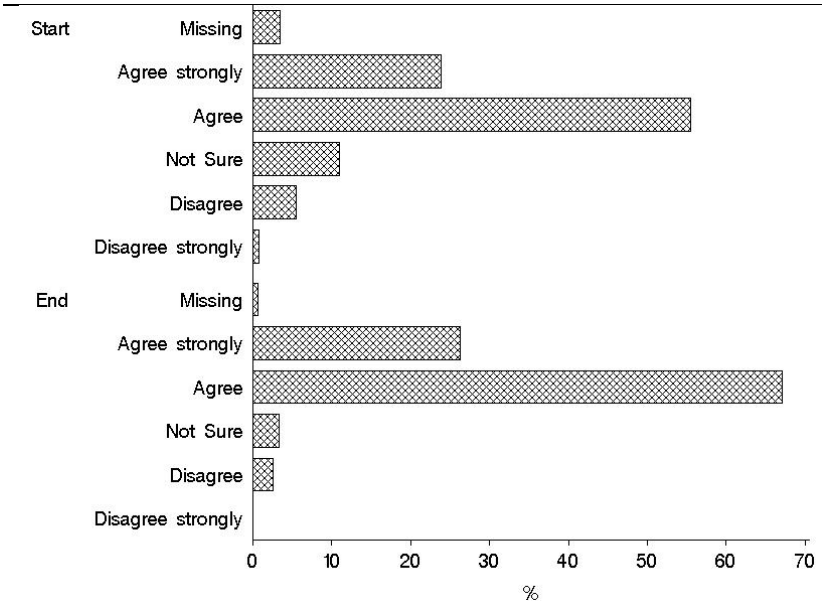
9. Simple technologies are often the most effective

	Start		End	
	N	%	N	%
Missing	8	3.1	1	0.7
Agree strongly	38	14.8	29	19.1
Agree	133	52.0	86	56.6
Not Sure	49	19.1	28	18.4
Disagree	26	10.2	8	5.3
Disagree strongly	2	0.8	.	.
Total	256	100.0	152	100.0



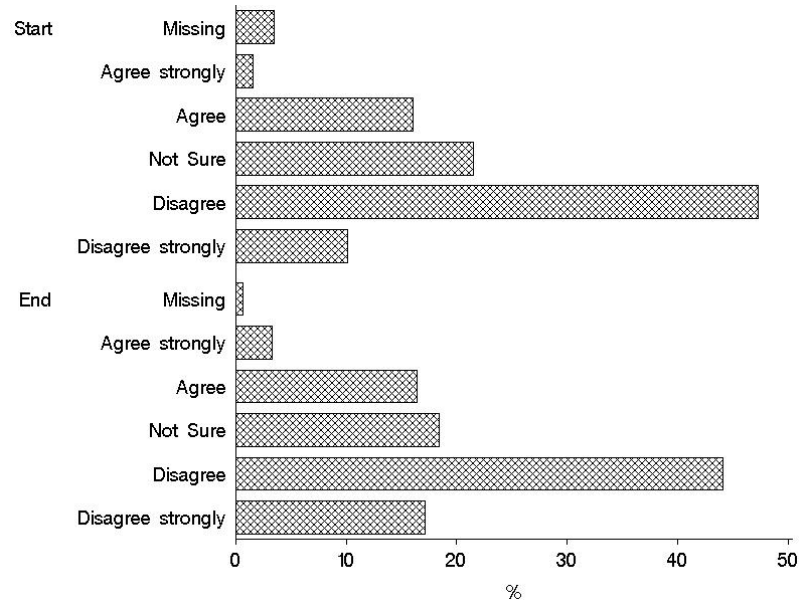
10. Engineers working in teams must be sensitive to gender and ethnicity

	Start		End	
	N	%	N	%
Missing	9	3.5	1	0.7
Agree strongly	61	23.8	40	26.3
Agree	142	55.5	102	67.1
Not Sure	28	10.9	5	3.3
Disagree	14	5.5	4	2.6
Disagree strongly	2	0.8	.	.
Total	256	100.0	152	100.0



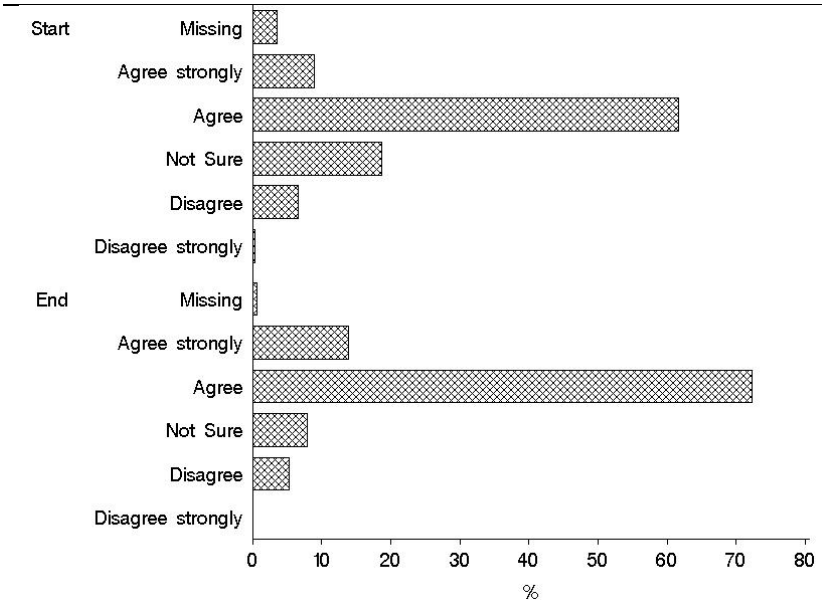
11. Engineering practice involves dominating the natural environment

	Start		End	
	N	%	N	%
Missing	9	3.5	1	0.7
Agree strongly	4	1.6	5	3.3
Agree	41	16.0	25	16.4
Not Sure	55	21.5	28	18.4
Disagree	121	47.3	67	44.1
Disagree strongly	26	10.2	26	17.1
Total	256	100.0	152	100.0



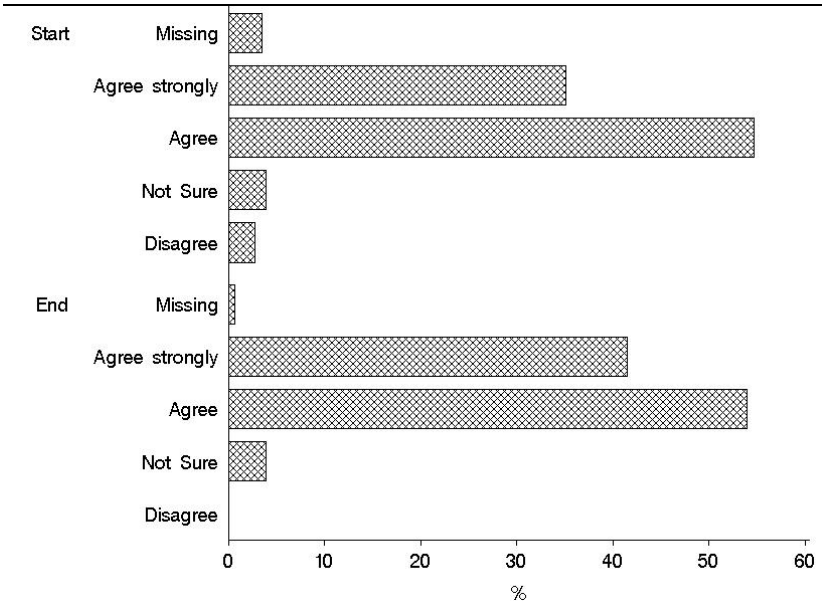
12. Culture, (how we see the world) is an important part of engineering decisions

	Start		End	
	N	%	N	%
Missing	9	3.5	1	0.7
Agree strongly	23	9.0	21	13.8
Agree	158	61.7	110	72.4
Not Sure	48	18.8	12	7.9
Disagree	17	6.6	8	5.3
Disagree strongly	1	0.4	.	.
Total	256	100.0	152	100.0



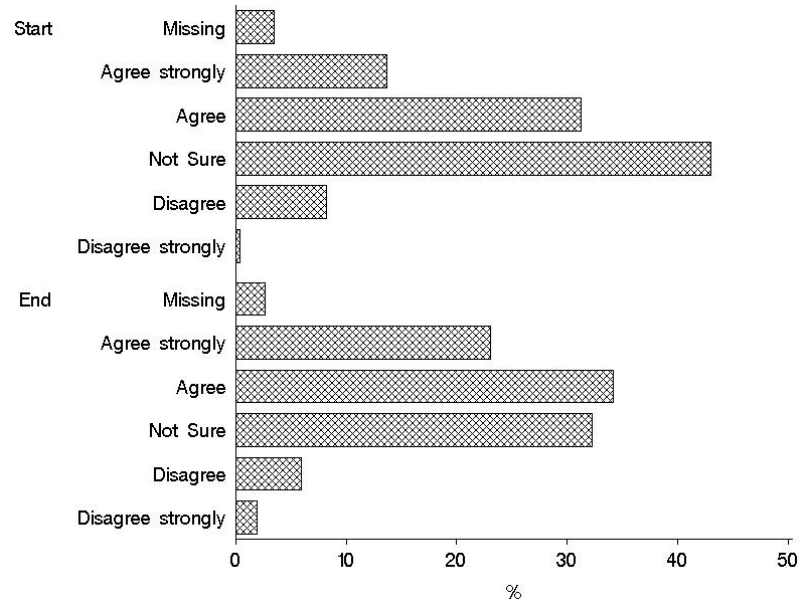
13. Engineers are responsible to future generations for what they do today

	Start		End	
	N	%	N	%
Missing	9	3.5	1	0.7
Agree strongly	90	35.2	63	41.4
Agree	140	54.7	82	53.9
Not Sure	10	3.9	6	3.9
Disagree	7	2.7	.	.
Total	256	100.0	152	100.0



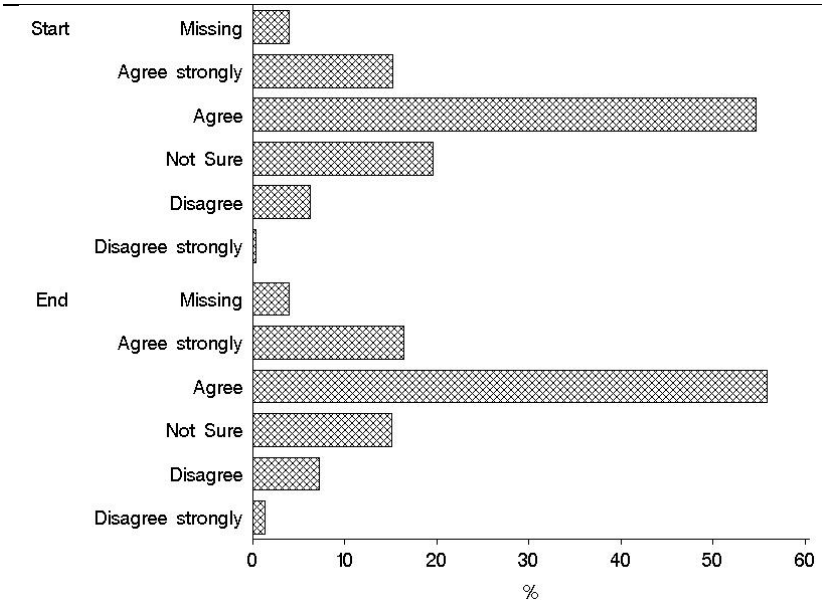
14. I expect to work overseas when I graduate

	Start		End	
	N	%	N	%
Missing	9	3.5	4	2.6
Agree strongly	35	13.7	35	23.0
Agree	80	31.3	52	34.2
Not Sure	110	43.0	49	32.2
Disagree	21	8.2	9	5.9
Disagree strongly	1	0.4	3	2.0
Total	256	100.0	152	100.0



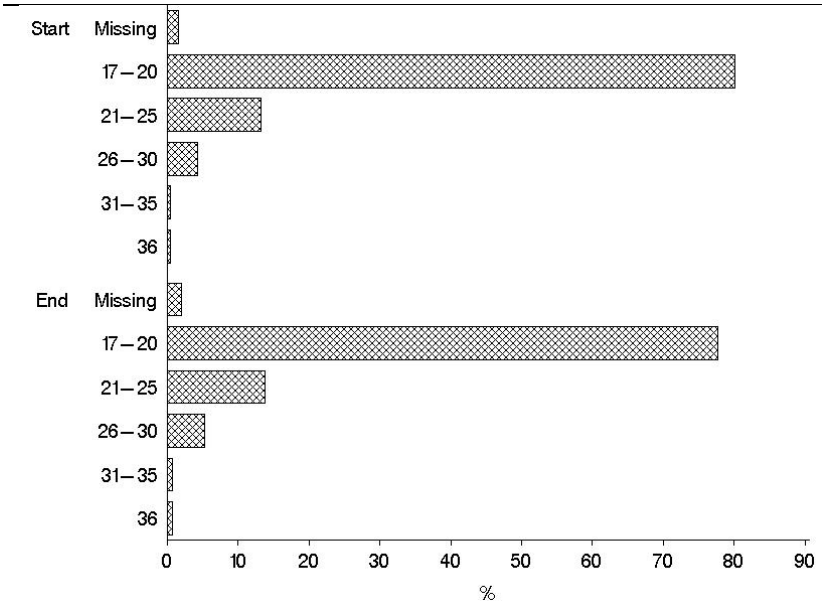
15. Respect for the past should be included in engineering decisions

	Start		End	
	N	%	N	%
Missing	10	3.9	6	3.9
Agree strongly	39	15.2	25	16.4
Agree	140	54.7	85	55.9
Not Sure	50	19.5	23	15.1
Disagree	16	6.3	11	7.2
Disagree strongly	1	0.4	2	1.3
Total	256	100.0	152	100.0



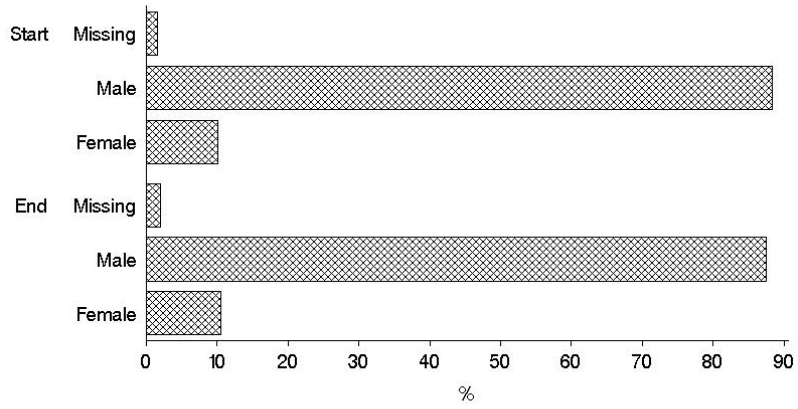
Age

	Start		End	
	N	%	N	%
Missing	4	1.6	3	2.0
17-20	205	80.1	118	77.6
21-25	34	13.3	21	13.8
26-30	11	4.3	8	5.3
31-35	1	0.4	1	0.7
36+	1	0.4	1	0.7
Total	256	100.0	152	100.0



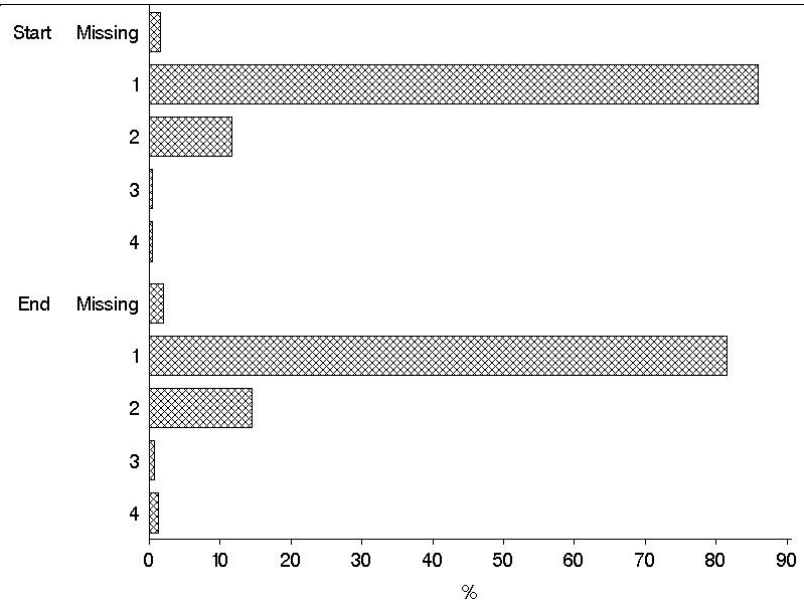
Gender

	Start		End	
	N	%	N	%
Missing	4	1.6	3	2.0
Male	226	88.3	133	87.5
Female	26	10.2	16	10.5
Total	256	100.0	152	100.0



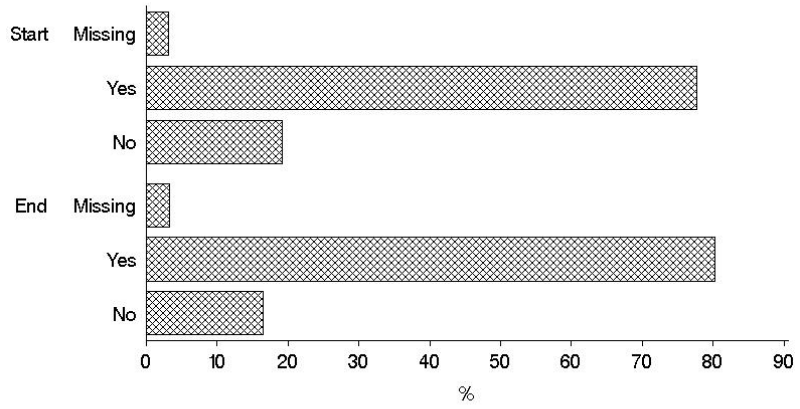
Current year of study

	Start		End	
	N	%	N	%
Missing	4	1.6	3	2.0
1	220	85.9	124	81.6
2	30	11.7	22	14.5
4	1	0.4	1	0.7
5	1	0.4	2	1.3
Total	256	100.0	152	100.0



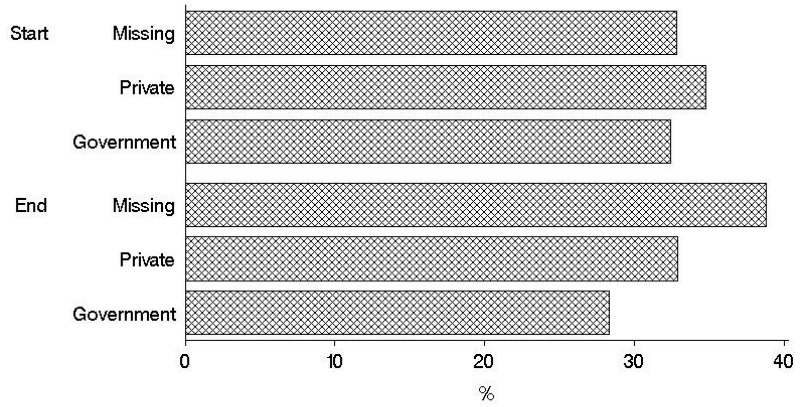
Education - School leaver

	Start		End	
	N	%	N	%
Missing	8	3.1	5	3.3
Yes	199	77.7	122	80.3
No	49	19.1	25	16.4
Total	256	100.0	152	100.0



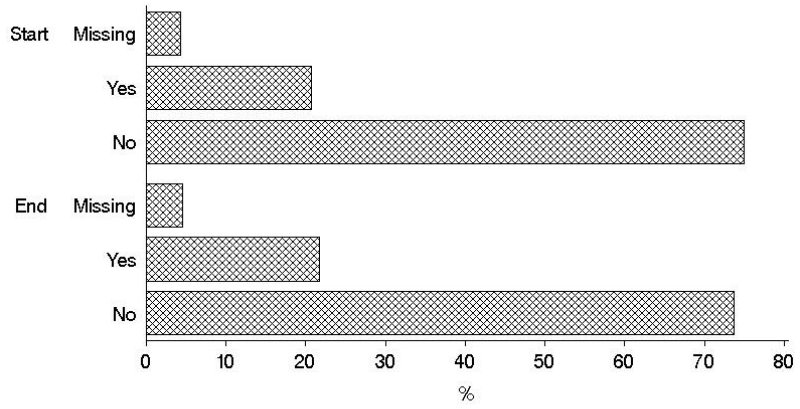
If school leaver, then private or public

	Start		End	
	N	%	N	%
Missing	84	32.8	59	38.8
Private	89	34.8	50	32.9
Government	83	32.4	43	28.3
Total	256	100.0	152	100.0



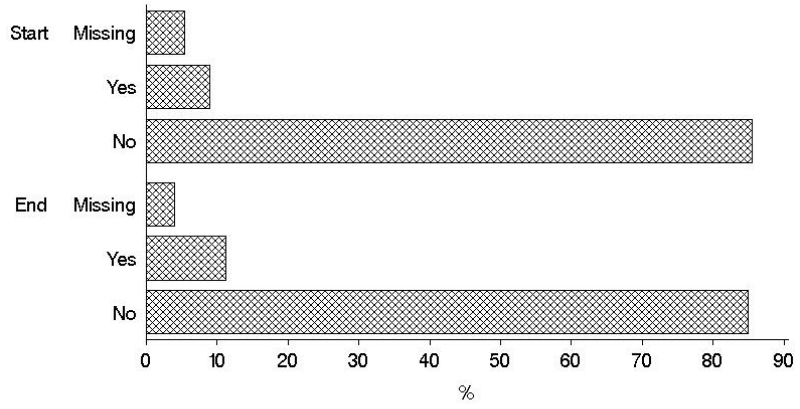
Mature age student

	Start		End	
	N	%	N	%
Missing	11	4.3	7	4.6
Yes	53	20.7	33	21.7
No	192	75.0	112	73.7
Total	256	100.0	152	100.0



International student

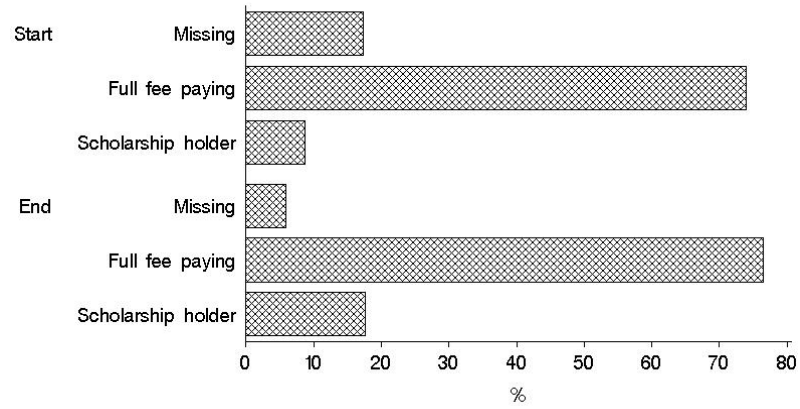
	Start		End	
	N	%	N	%
Missing	14	5.5	6	3.9
Yes	23	9.0	17	11.2
No	219	85.5	129	84.9
Total	256	100.0	152	100.0



Fee paying or scholarship

	Start		End	
	N	%	N	%
Missing	4	17.4	1	5.9
Full fee paying	17	73.9	13	76.5
Scholarship holder	2	8.7	3	17.6

Total	23	100.0	17	100.0

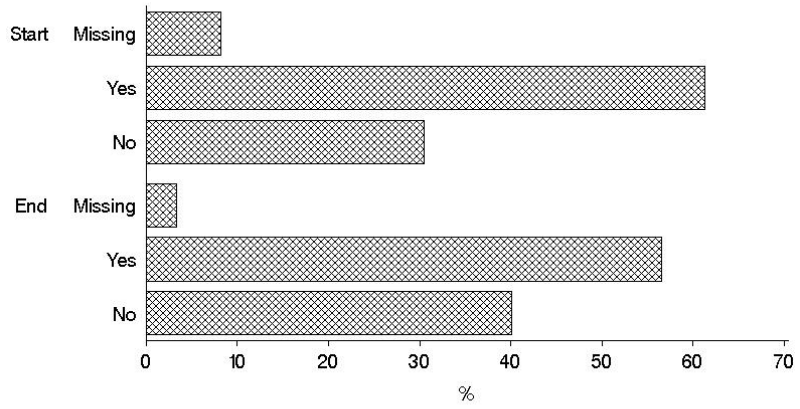


Country of origin

	Start		End	
	N	%	N	%
Missing	3	13.0	1	5.9
Fiji	2	8.7	3	17.6
Hong Kong	7	30.4	4	23.5
Japanese	.	.	1	5.9
Korean	1	4.3	1	5.9
New Zealand	.	.	2	11.8
Norwegian	1	4.3	1	5.9
South Africa	1	4.3	1	5.9
Taiwan	1	4.3	.	.
United Arab Emirates	1	4.3	.	.
Singapore	1	4.3	1	5.9
Malaysian	1	4.3	.	.
Tuvalu	1	4.3	.	.
Zimbabwe	2	8.7	1	5.9
Papua New Guinea	1	4.3	1	5.9
Total	23	100.0	17	100.0

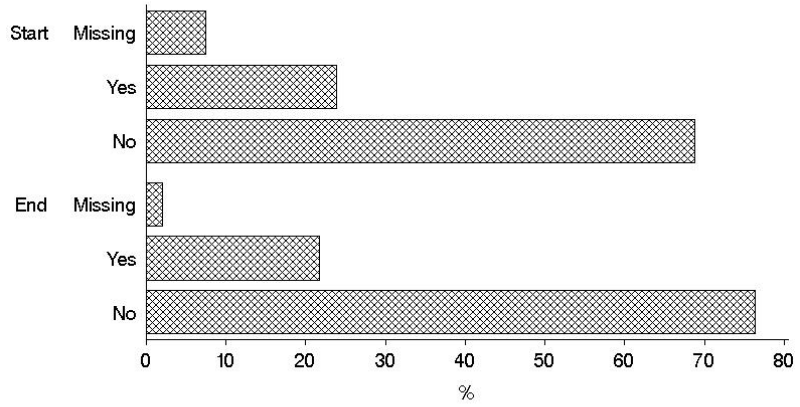
Cultural background - question 1

	Start		End	
	N	%	N	%
Missing	21	8.2	5	3.3
Yes	157	61.3	86	56.6
No	78	30.5	61	40.1
Total	256	100.0	152	100.0



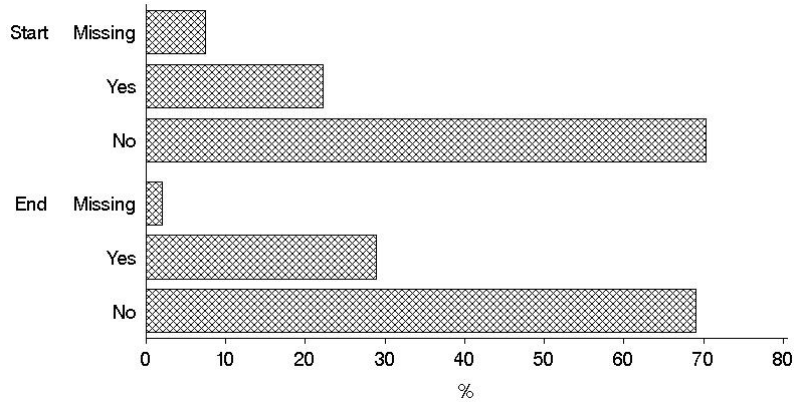
Cultural background - question 2

	Start		End	
	N	%	N	%
Missing	19	7.4	3	2.0
Yes	61	23.8	33	21.7
No	176	68.8	116	76.3
Total	256	100.0	152	100.0



Cultural background - question 3

	Start		End	
	N	%	N	%
Missing	19	7.4	3	2.0
Yes	57	22.3	44	28.9
No	180	70.3	105	69.1
Total	256	100.0	152	100.0

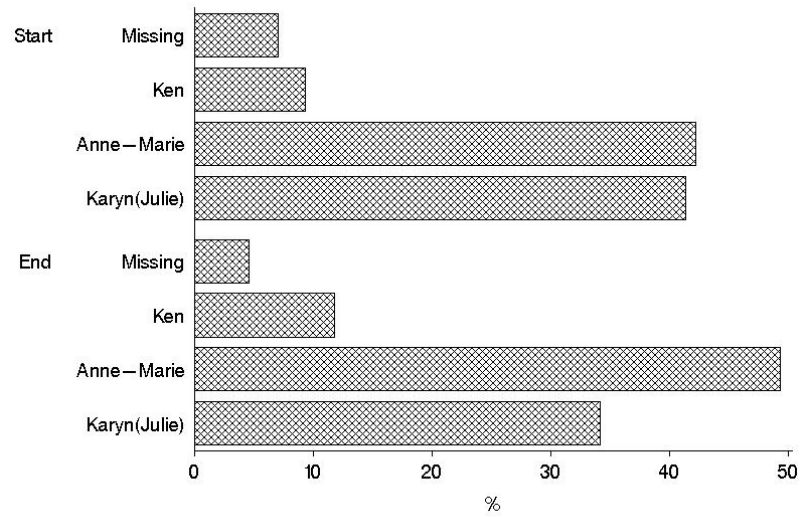


Cultural background - identify

	Start		End	
	N	%	N	%
Africa	1	1.9	.	.
Anyone	.	.	1	2.6
Arab	1	1.9	.	.
Arabindia	1	1.9	.	.
Asia	1	1.9	.	.
Asian	1	1.9	.	.
Australian	3	5.6	1	2.6
Bosnian	1	1.9	1	2.6
Cantjapmal	1	1.9	.	.
Cantonese	2	3.7	3	7.7
Chin/taiwn	1	1.9	.	.
Chinese	6	11.1	6	15.4
Dutch	1	1.9	.	.
Englishspk	1	1.9	.	.
Enusarnzin	.	.	1	2.6
Fijian	1	1.9	.	.
Filipino	1	1.9	.	.
French	1	1.9	.	.
Germannz	1	1.9	.	.
Ghana	.	.	1	2.6
Greek	1	1.9	.	.
Hindu	.	.	1	2.6
Hmong	1	1.9	1	2.6
Hungarian	1	1.9	1	2.6
Indians	1	1.9	.	.
Indonesian	2	3.7	1	2.6
Ital/germn	1	1.9	.	.
Italian	1	1.9	2	5.1
Japan/asia	.	.	1	2.6
Japandutch	1	1.9	.	.
Kiwis	.	.	1	2.6
Korean	2	3.7	1	2.6
Latin	1	1.9	.	.

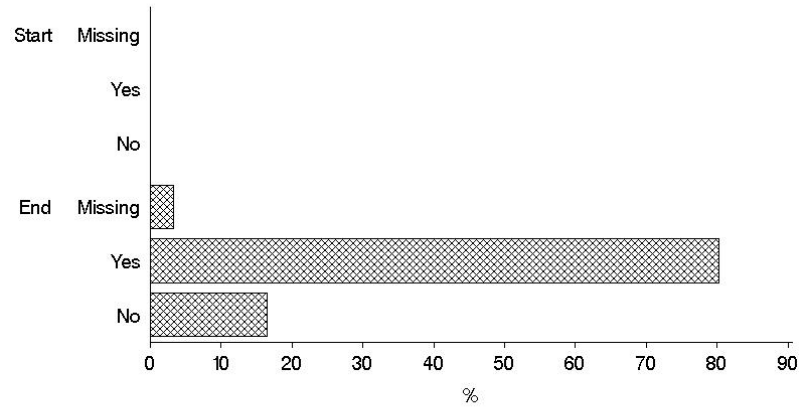
Lebanese	1	1.9	.	.
Lebonese	.	.	1	2.6
Melanesian	.	.	1	2.6
New Zealand	1	1.9	.	.
Norwegian	1	1.9	.	.
Norwegians	1	1.9	1	2.6
Nzealander	1	1.9	.	.
Nzeiregerm	1	1.9	.	.
Png	.	.	1	2.6
Polish	2	3.7	.	.
Portugal	.	.	1	2.6
Singpindia	.	.	1	2.6
Southafric	1	1.9	2	5.1
Spanish	.	.	1	2.6
Swiss	.	.	2	5.1
Switzerlan	1	1.9	.	.
Taiwan	1	1.9	.	.
Taiwanchin	.	.	1	2.6
Taiwanese	2	3.7	3	7.7
Vietnamese	4	7.4	1	2.6
Total	54	100.0	39	100.0

Tutor	Start		End	
	N	%	N	%
Missing	18	7.0	7	4.6
Ken	24	9.4	18	11.8
Anne-marie	108	42.2	75	49.3
Karyn(julie)	106	41.4	52	34.2
Total	256	100.0	152	100.0



Did you answer this questionnaire before?

	End	
	N	%
Missing	5	3.3
Yes	122	80.3
No	25	16.4
Total	152	100.0



Appendix 4: 2001 Paired Data

TALDU questionnaire data 2001

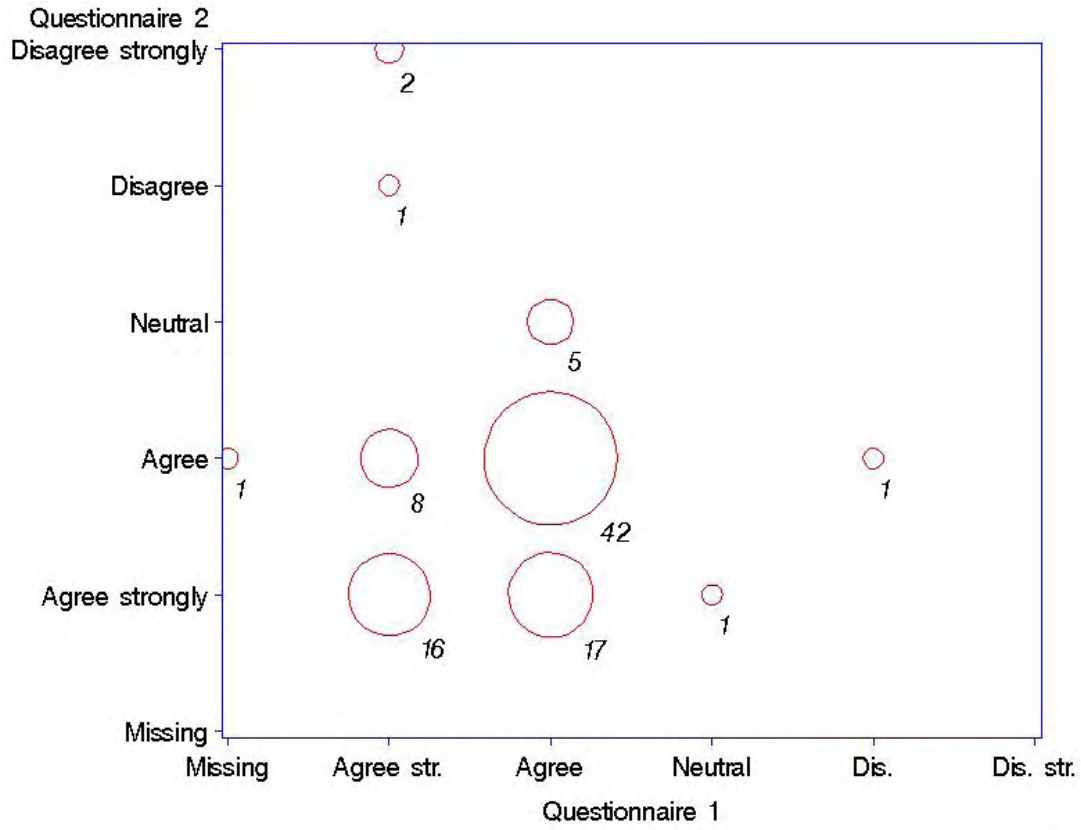
Of the 244 students who completed the first questionnaire and the 169 who completed the second only 94 could be matched using their date of birth and mother's name. For each matched question we show a table and bubble plot in order to highlight how attitudes have changed over the course. Also we show the results for all survey respondents without pairing (hence the larger number of responses) as a table and bar chart.

As the overall total is so close to 100, percentages are not presented for the paired results.

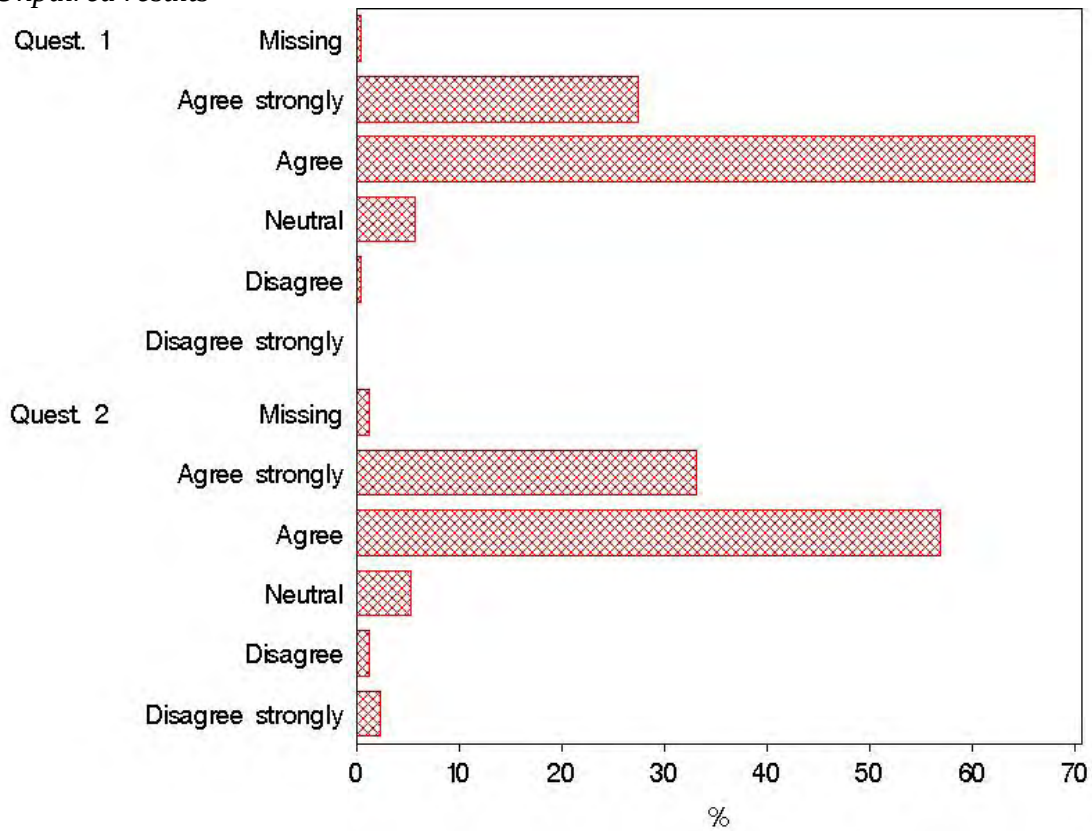
1. Engineering is applying knowledge to improve the world

Paired results

	Questionnaire 2					
	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Missing	.	1	.	.	.	1
Agree	16	8	.	1	2	27
Strongly Agree	17	42	5	.	.	64
Neutral	1	.	.	.	.	1
Disagree	.	1	.	.	.	1
Total	34	52	5	1	2	94



Unpaired results



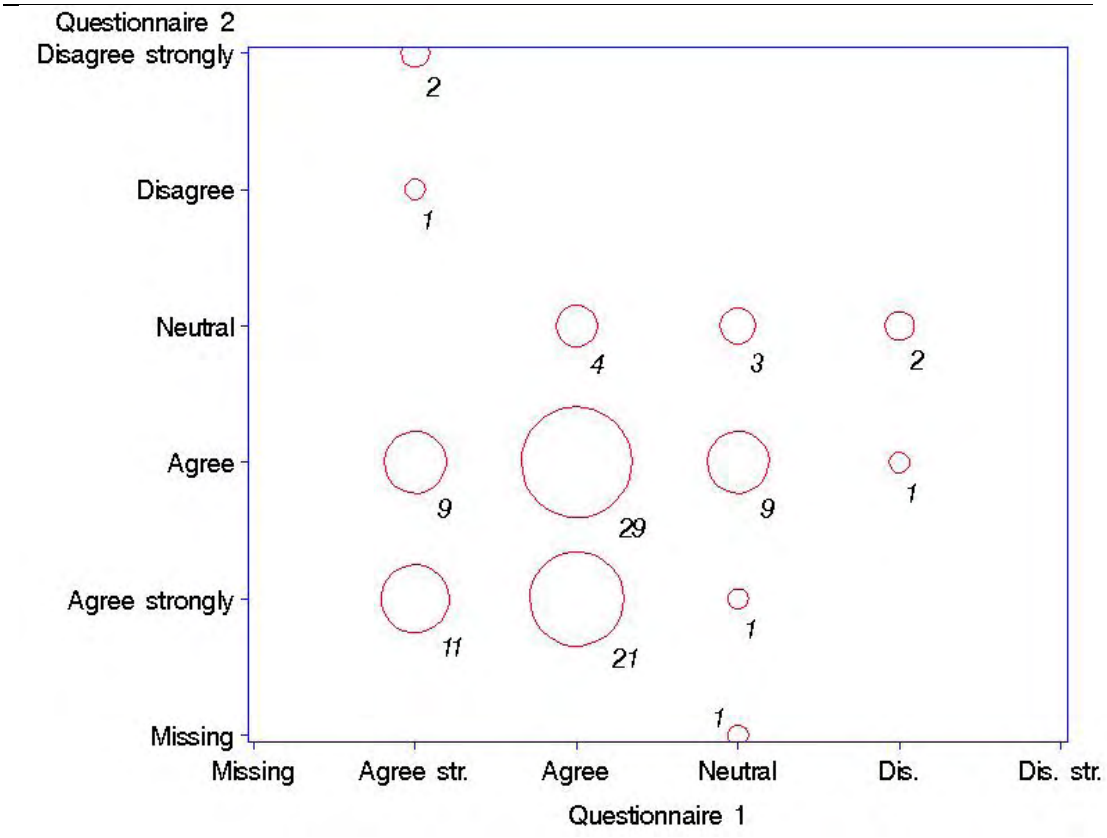
	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	1	0.4	2	1.2

Agree Strongly	67	27.5	56	33.1
Agree	161	66.0	96	56.8
Neutral	14	5.7	9	5.3
Disagree	1	0.4	2	1.2
Disagree Strongly	.	.	4	2.4
Total	244	100.0	169	100.0

2. Engineers need to be able to work with several fields of knowledge

Paired

	Questionnaire 2						
	Missing	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Agree Strongly	.	11	9	.	1	2	23
Agree	.	21	29	4	.	.	54
Neutral	1	1	9	3	.	.	14
Disagree	.	.	1	2	.	.	3
Total	1	33	48	9	1	2	94



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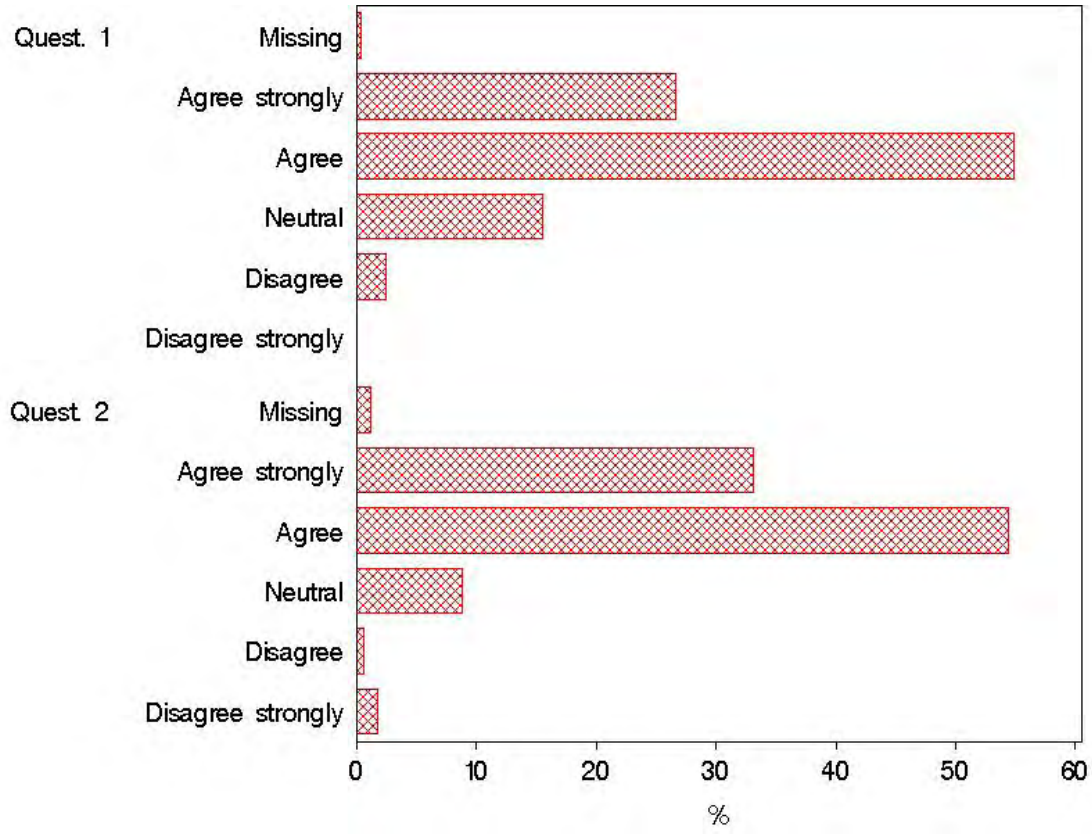
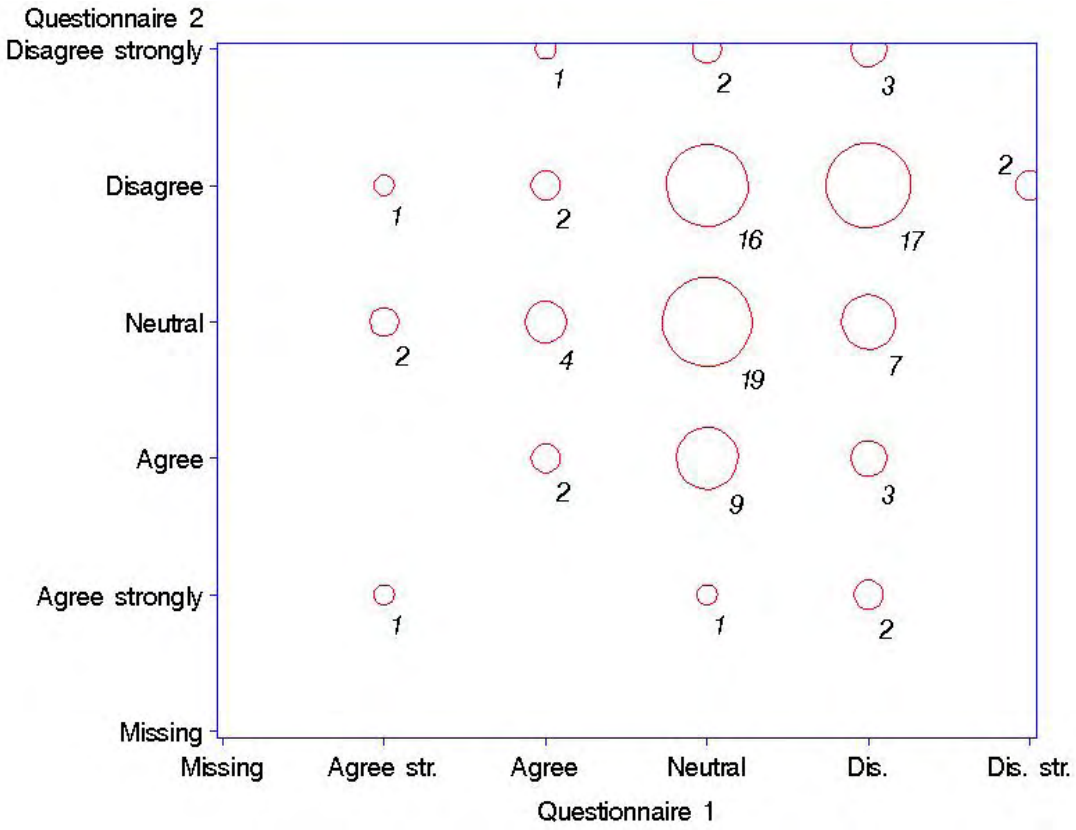


	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	1	0.4	2	1.2
Agree Strongly	65	26.6	56	33.1
Agree	134	54.9	92	54.4
Neutral	38	15.6	15	8.9
Disagree	6	2.5	1	0.6
Disagree Strongly	.	.	3	1.8
Total	244	100.0	169	100.0

3. Engineering is neutral and apolitical

Paired

	Questionnaire 2					
	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Missing	1	.	2	1	.	4
Agree Strongly	.	2	4	2	1	9
Agree	1	9	19	16	2	47
Neutral	2	3	7	17	3	32
Disagree	.	.	.	2	.	2
Total	4	14	32	38	6	94



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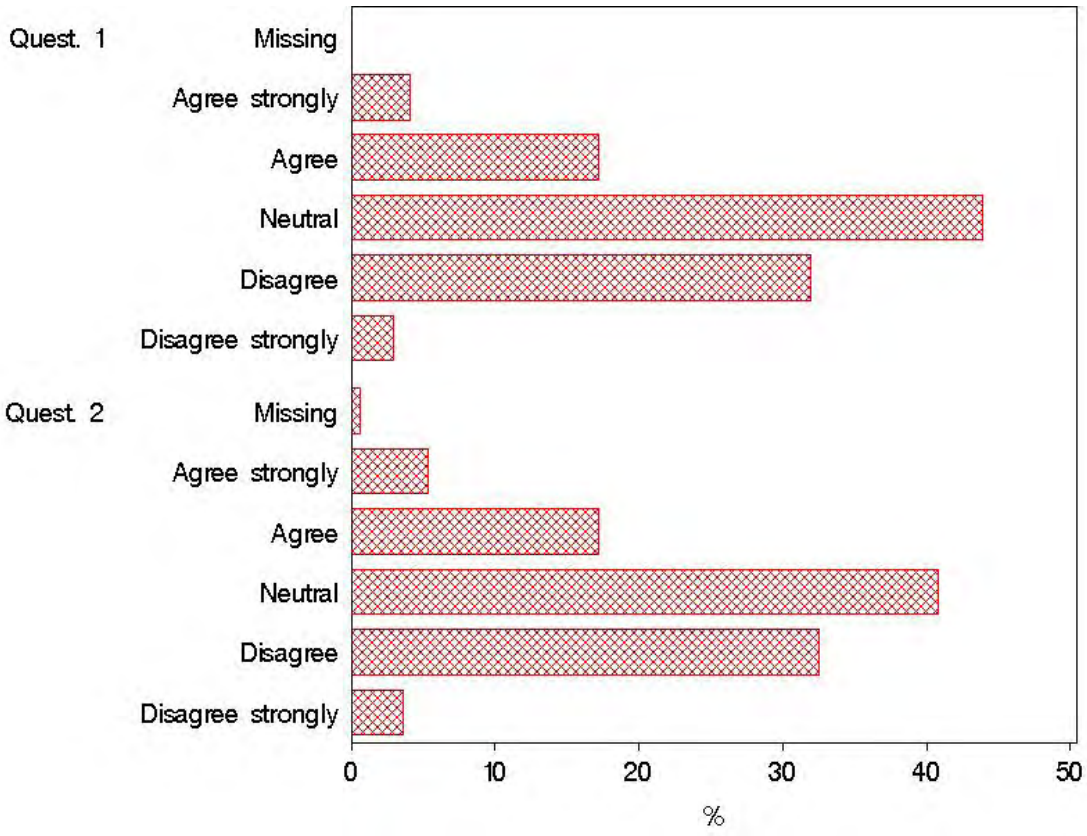


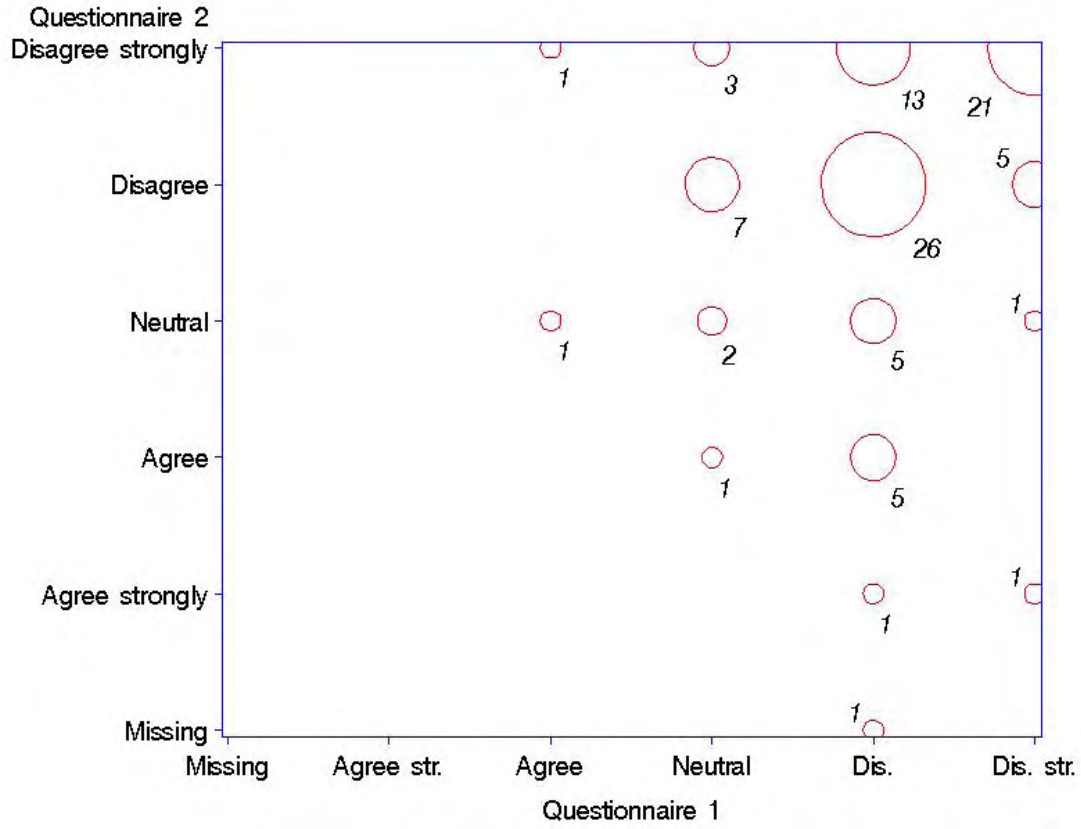
	Questionnaire 1		Questionnaire 2	
	N	%	N	%

Missing	.	.	1	0.6
Agree Strongly	10	4.1	9	5.3
Agree	42	17.2	29	17.2
Neutral	107	43.9	69	40.8
Disagree	78	32.0	55	32.5
Disagree Strongly	7	2.9	6	3.6
Total	244	100.0	169	100.0

4. Engineering rarely involves ethical considerations

Paired

	Questionnaire 2						
	Missing	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Agree	.	.	.	1	.	1	2
Neutral	.	.	1	2	7	3	13
Disagree	1	1	5	5	26	13	51
Disagree Strongly	.	1	.	1	5	21	28
Total	1	2	6	9	38	38	94



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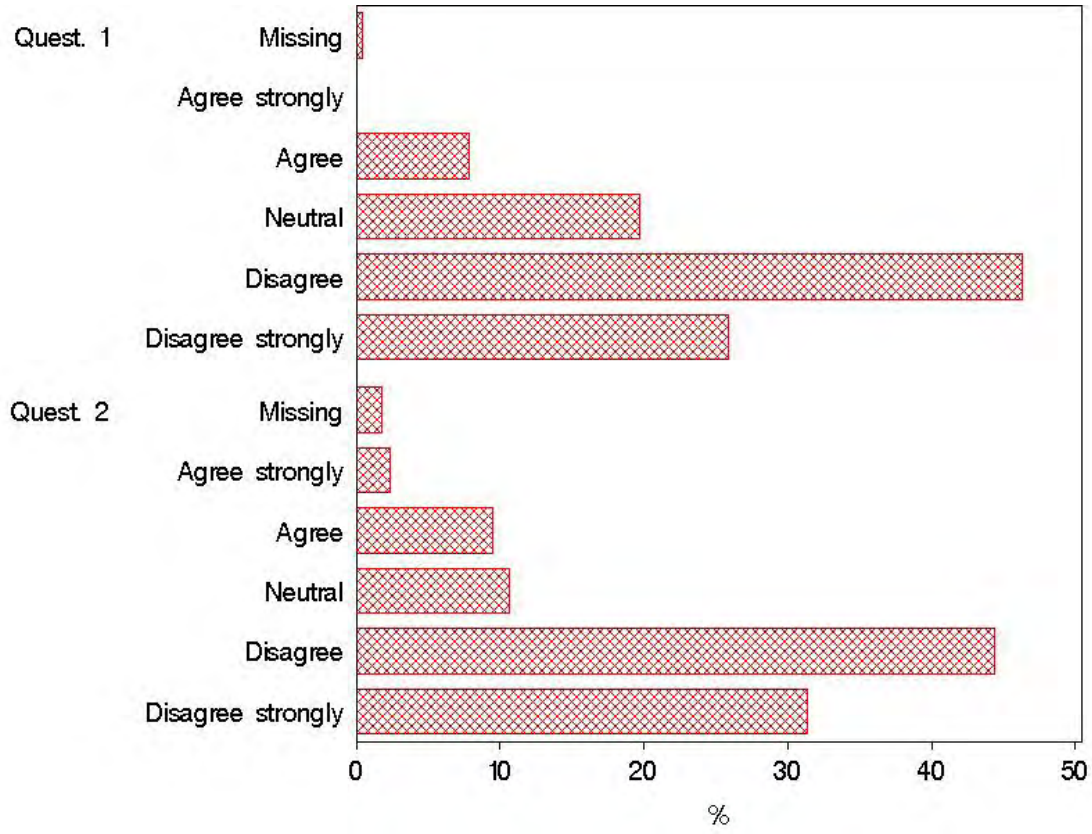
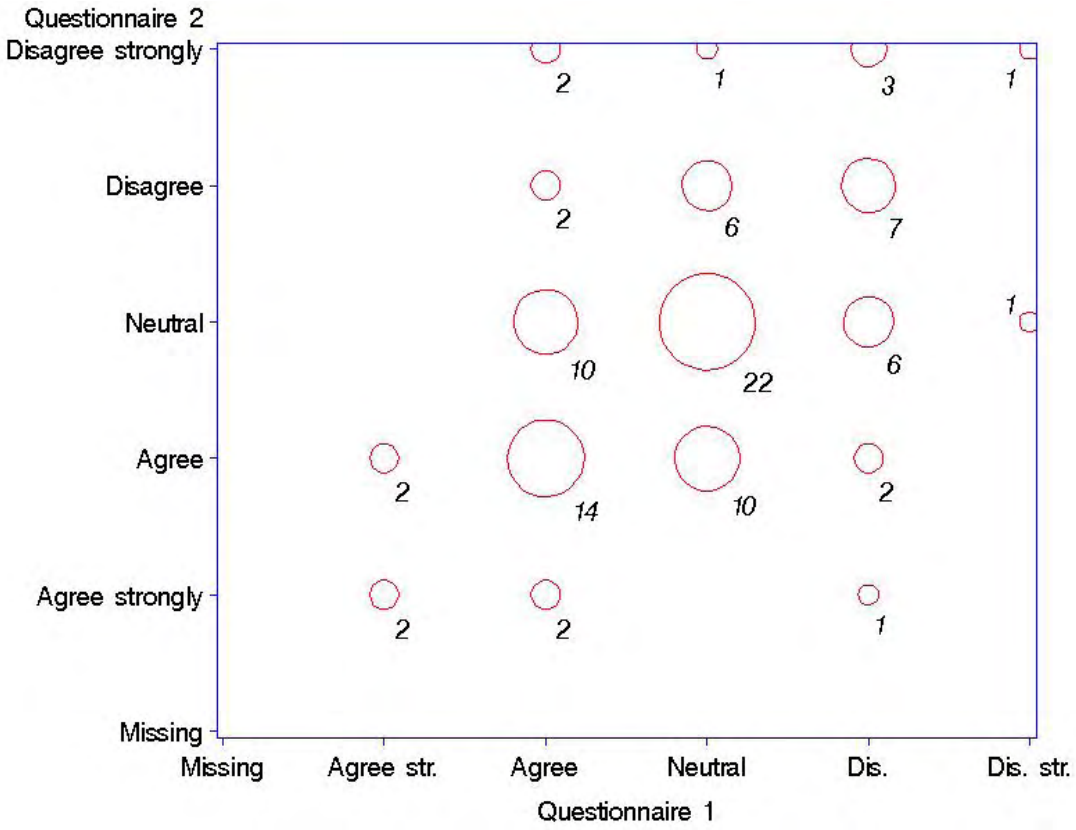


	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	1	0.4	3	1.8
Agree Strongly	.	.	4	2.4
Agree	19	7.8	16	9.5
Neutral	48	19.7	18	10.7
Disagree	113	46.3	75	44.4
Disagree Strongly	63	25.8	53	31.4
Total	244	100.0	169	100.0

5. New technologies create as many problems as they solve

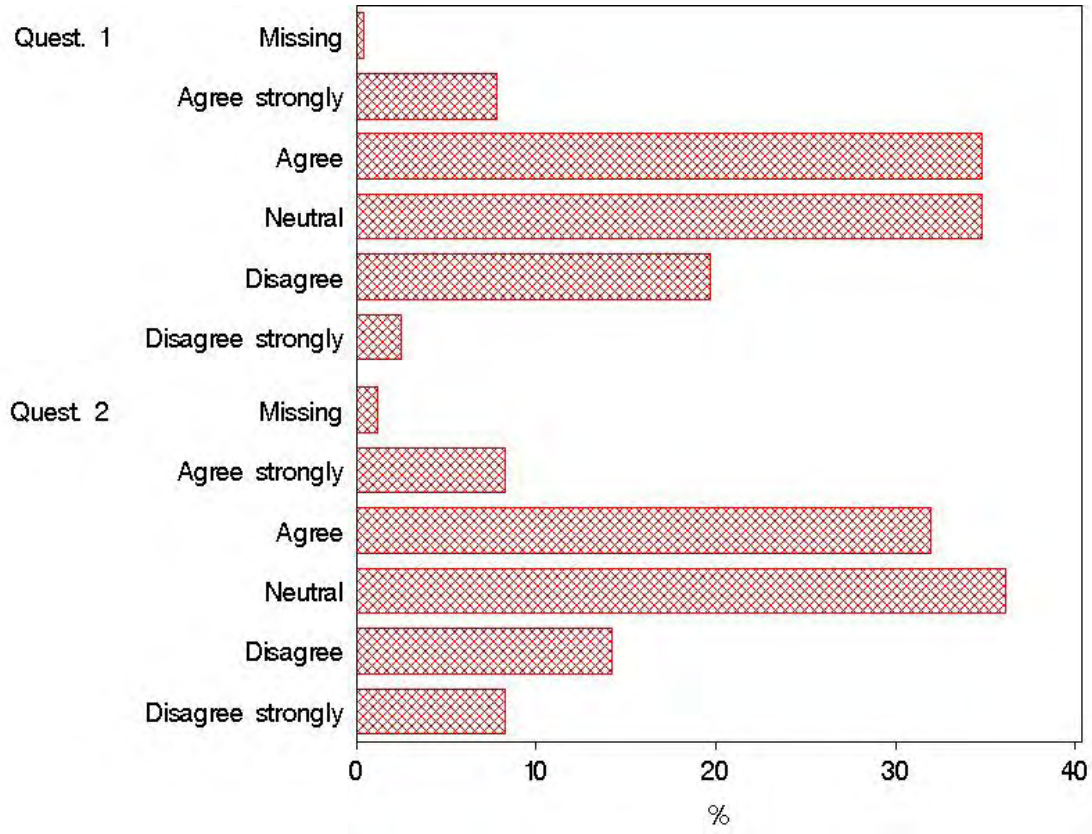
Paired

	Questionnaire 2					
	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Agree Strongly	2	2	.	.	.	4
Agree	2	14	10	2	2	30
Neutral	.	10	22	6	1	39
Disagree	1	2	6	7	3	19
Total	.	.	1	.	1	2



Unpaired

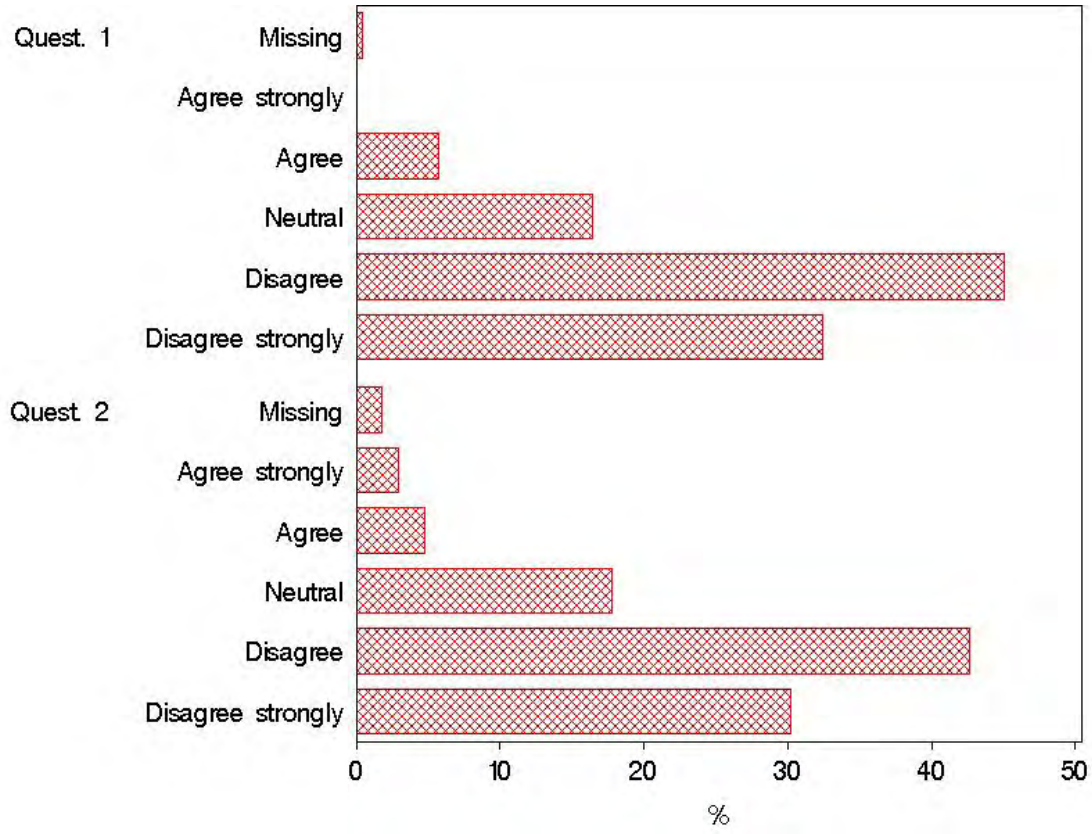
	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	1	0.4	2	1.2
Agree Strongly	19	7.8	14	8.3
Agree	85	34.8	54	32.0
Neutral	85	34.8	61	36.1
Disagree	48	19.7	24	14.2
Disagree Strongly	6	2.5	14	8.3
Total	244	100.0	169	100.0



6. Australia has no serious environmental problems

Paired

	Questionnaire 2						
	Missing	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Missing	.	.	.	.	.	1	1
Agree	.	.	.	2	.	1	3
Neutral	.	.	1	6	5	.	12
Disagree	1	1	2	6	22	14	46
Disagree Strongly	.	2	.	2	8	20	32
Total	1	3	3	16	35	36	94

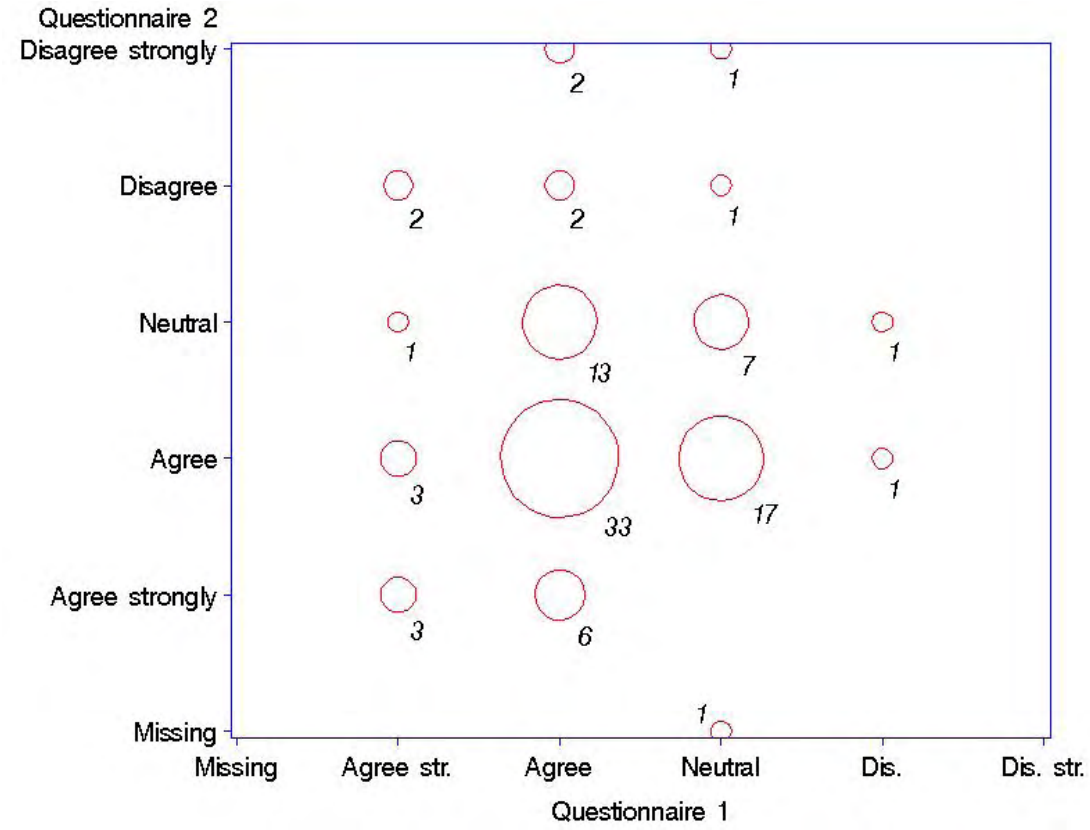


	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	1	0.4	3	1.8
Agree Strongly	.	.	5	3.0
Agree	14	5.7	8	4.7
Neutral	40	16.4	30	17.8
Disagree	110	45.1	72	42.6
Disagree Strongly	79	32.4	51	30.2
Total	244	100.0	169	100.0

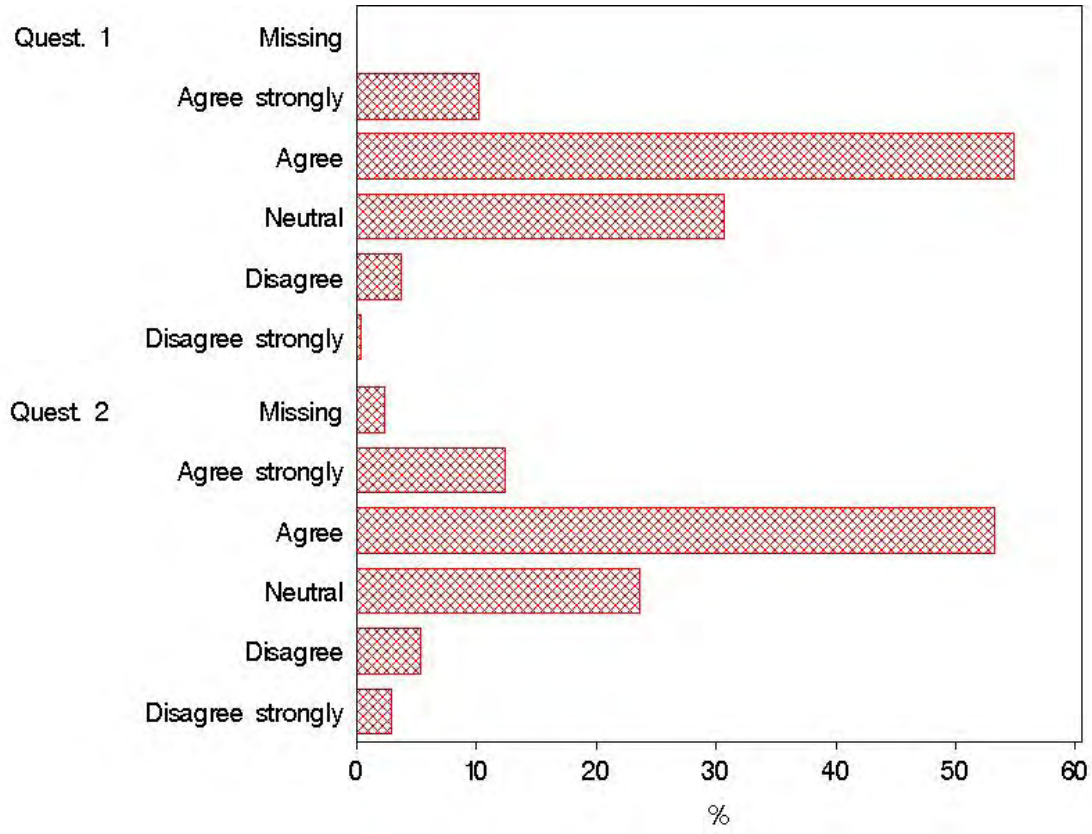
7. Engineers should be aware of contemporary issues and their historical context

Paired

	Questionnaire 2						
	Missing	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Agree Strongly	.	3	3	1	2	.	9
Agree	.	6	33	13	2	2	56
Neutral	1	.	17	7	1	1	27
Disagree	.	.	1	1	.	.	2
Total	1	9	54	22	5	3	94


Questionnaire 2
Disagree strongly
Disagree
Neutral
Agree
Agree strongly
Missing
2
1
2
2
1
1
13
7
1
3
33
17
1
3
6
1
Missing
Agree str.
Agree
Neutral
Dis.
Dis. str.
Questionnaire 1

Unpaired

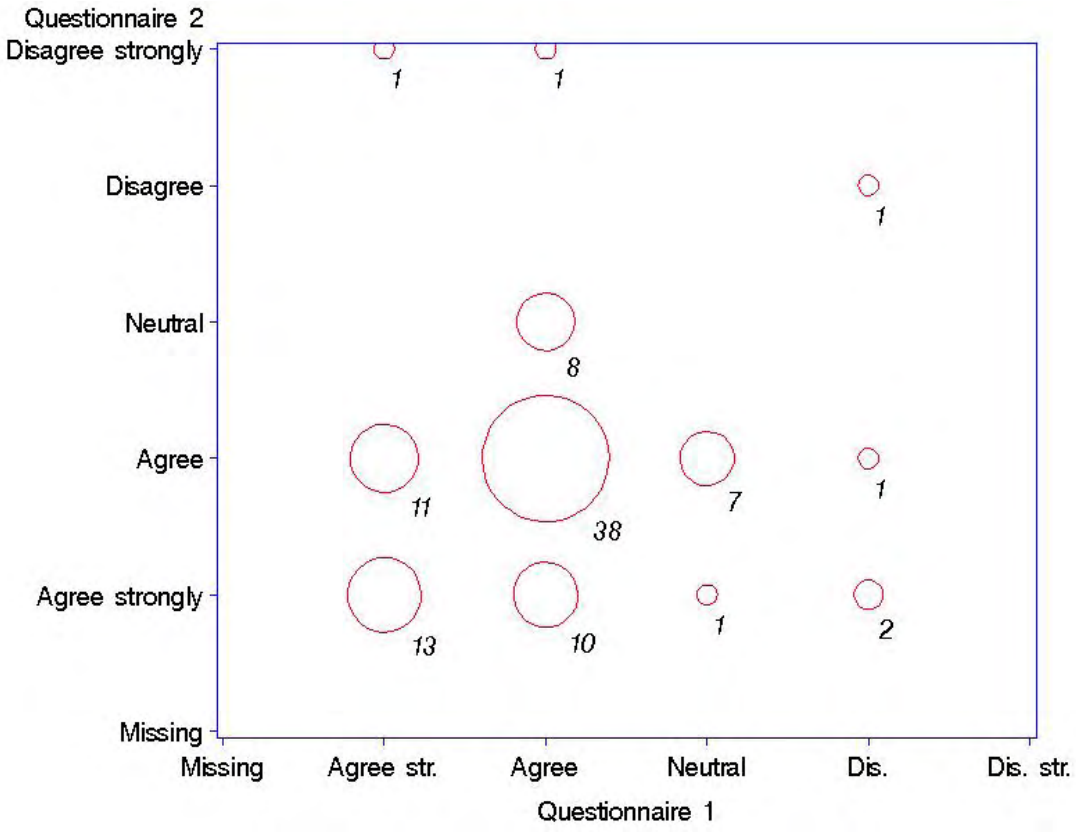


	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	.	.	4	2.4
Agree Strongly	25	10.2	21	12.4
Agree	134	54.9	90	53.3
Neutral	75	30.7	40	23.7
Disagree	9	3.7	9	5.3
Disagree Strongly	1	0.4	5	3.0
Total	244	100.0	169	100.0

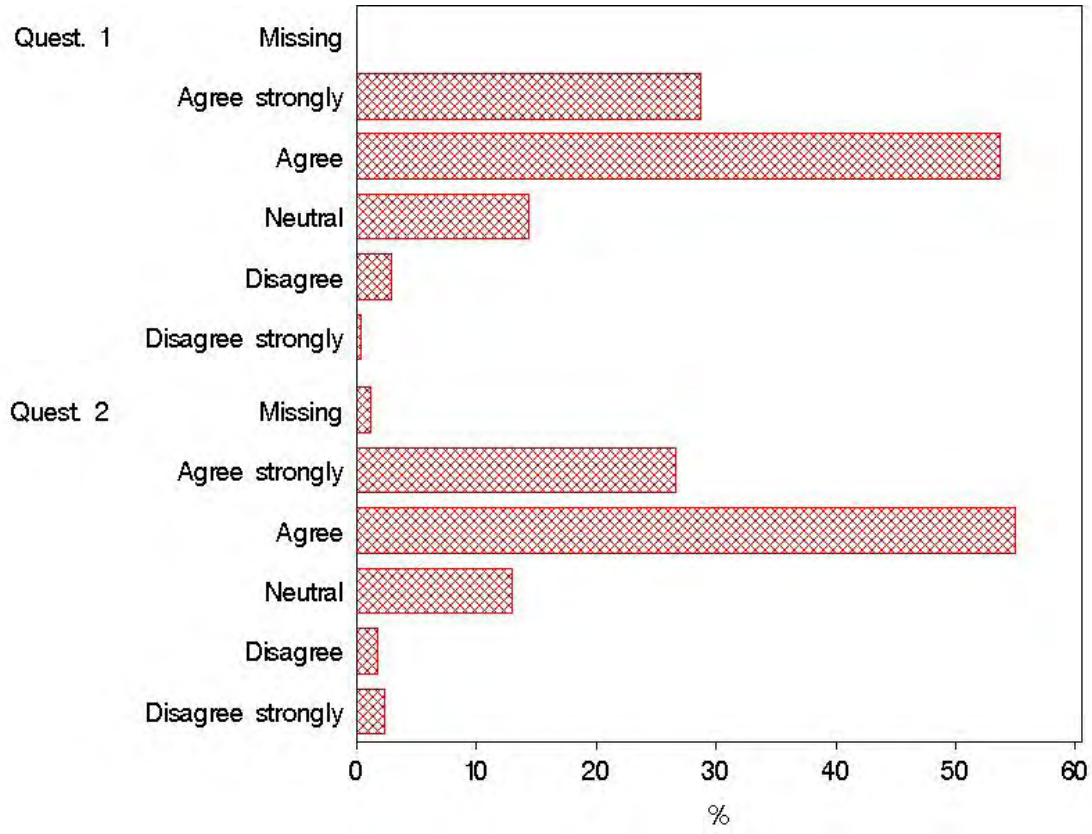
8. Engineers should understand and respect the economic, social and biological interdependence of life on Earth

Paired

	Questionnaire 2					
	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Agree Strongly	13	11	.	.	1	25
Agree	10	38	8	.	1	57
Neutral	1	7	.	.	.	8
Disagree	2	1	.	1	.	4
Total	26	57	8	1	2	94


Questionnaire 2
Disagree strongly
Disagree
Neutral
Agree
Agree strongly
Missing
1
1
1
8
11
38
7
1
13
10
1
2
Missing
Agree str.
Agree
Neutral
Dis.
Dis. str.
Questionnaire 1

Unpaired

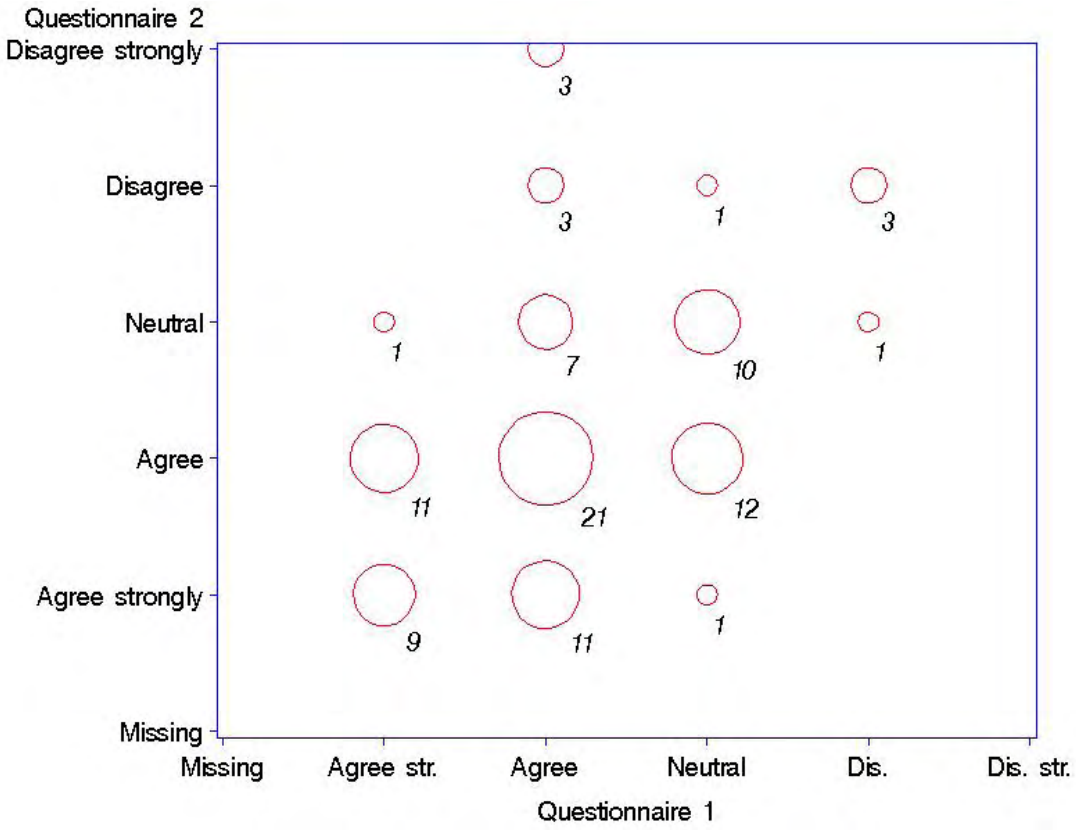


	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	.	.	2	1.2
Agree Strongly	70	28.7	45	26.6
Agree	131	53.7	93	55.0
Neutral	35	14.3	22	13.0
Disagree	7	2.9	3	1.8
Disagree Strongly	1	0.4	4	2.4
Total	244	100.0	169	100.0

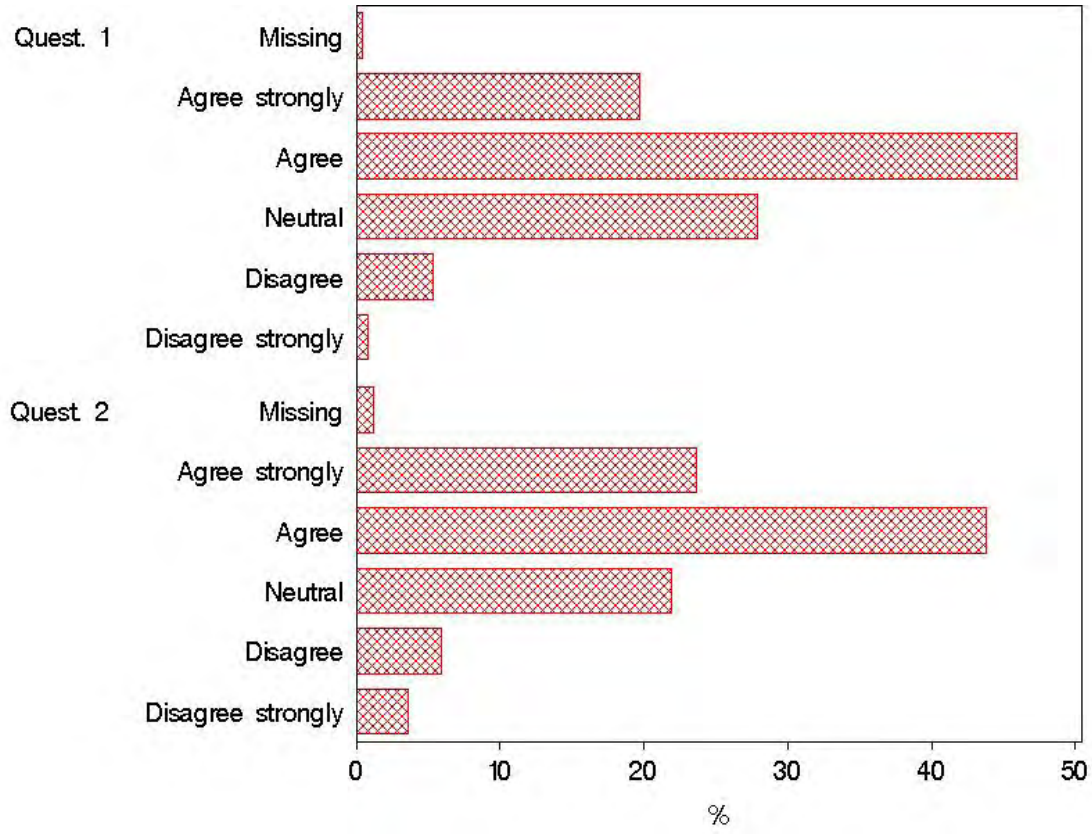
9. Simple technologies are often the most effective

Paired

	Questionnaire 2					
	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Agree Strongly	9	11	1	.	.	21
Agree	11	21	7	3	3	45
Neutral	1	12	10	1	.	24
Disagree	.	.	1	3	.	4
Total	21	44	19	7	3	94


Questionnaire 2
Disagree strongly
Disagree
Neutral
Agree
Agree strongly
Missing
3
3
1
3
1
7
10
1
11
21
12
9
11
1
Missing
Agree str.
Agree
Neutral
Dis.
Dis. str.
Questionnaire 1

Unpaired

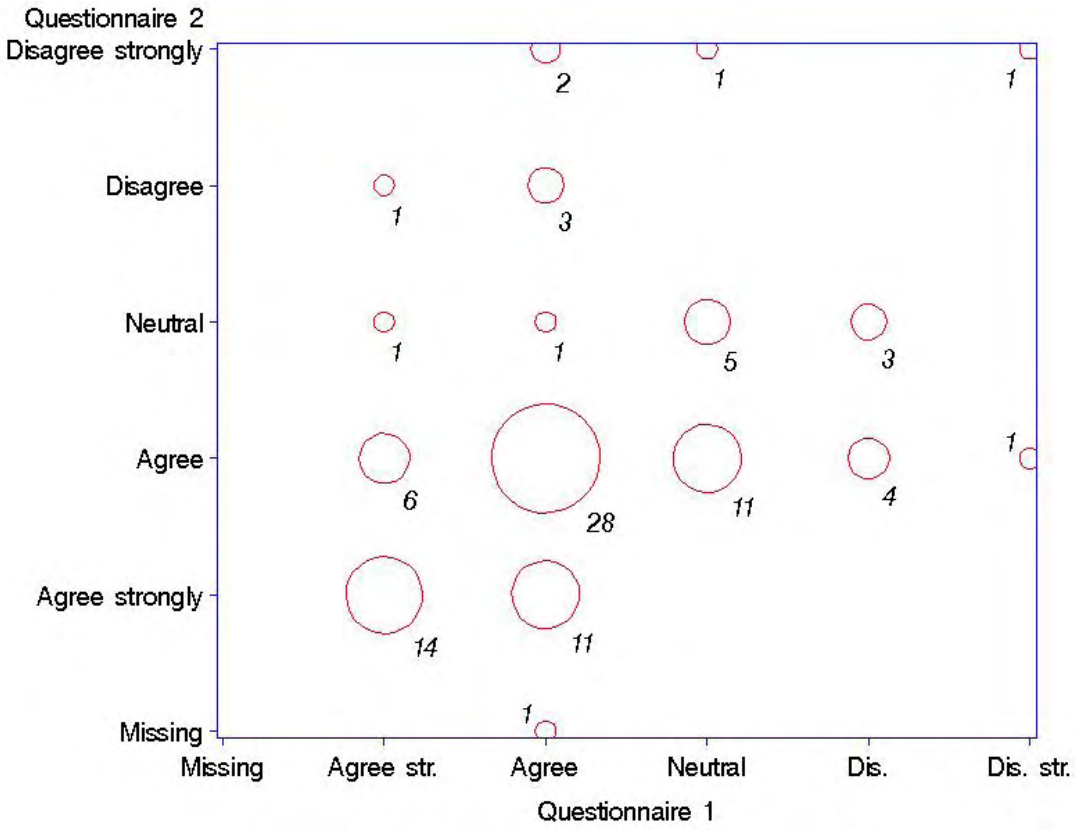


	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	1	0.4	2	1.2
Agree Strongly	48	19.7	40	23.7
Agree	112	45.9	74	43.8
Neutral	68	27.9	37	21.9
Disagree	13	5.3	10	5.9
Disagree Strongly	2	0.8	6	3.6
Total	244	100.0	169	100.0

10. Engineers working in teams should be sensitive to gender and ethnicity

Paired

	Questionnaire 2						
	Missing	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Agree Strongly	.	14	6	1	1	.	22
Agree	1	11	28	1	3	2	46
Neutral	.	.	11	5	.	1	17
Disagree	.	.	4	3	.	.	7
Disagree Strongly	.	.	1	.	.	1	2
Total	1	25	50	10	4	4	94



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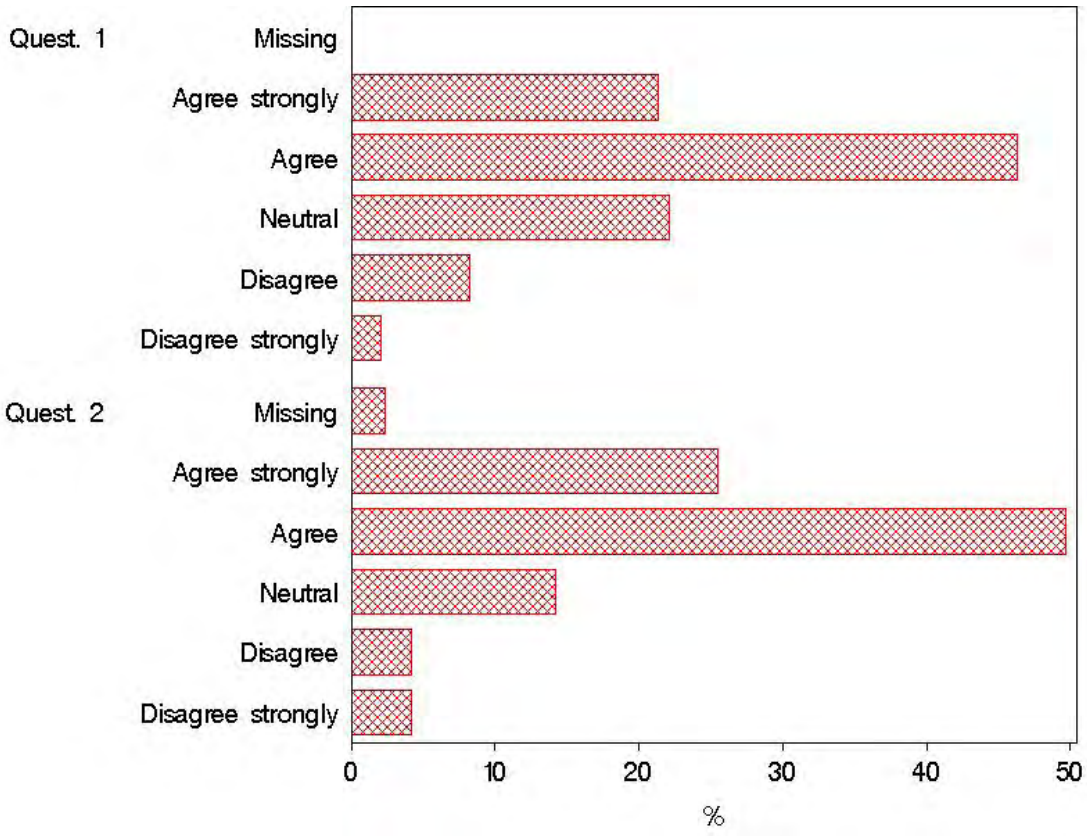


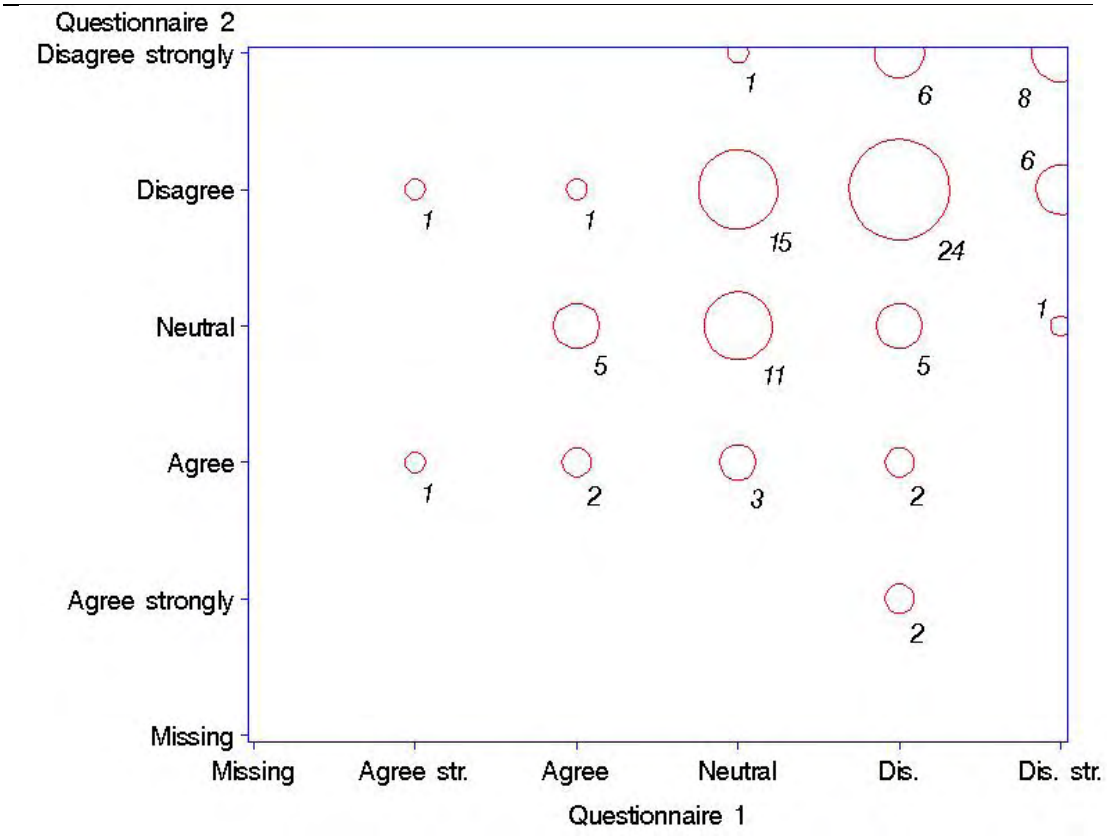
	Questionnaire 1		Questionnaire 2	
	N	%	N	%

Missing	.	.	4	2.4
Agree Strongly	52	21.3	43	25.4
Agree	113	46.3	84	49.7
Neutral	54	22.1	24	14.2
Disagree	20	8.2	7	4.1
Disagree Strongly	5	2.0	7	4.1
Total	244	100.0	169	100.0

11. Engineering practice involves dominating the natural environment

Paired

	Questionnaire 2					
	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Agree Strongly	.	1	.	1	.	2
Agree	.	2	5	1	.	8
Neutral	.	3	11	15	1	30
Disagree	2	2	5	24	6	39
Disagree Strongly	.	.	1	6	8	15
Total	2	8	22	47	15	94



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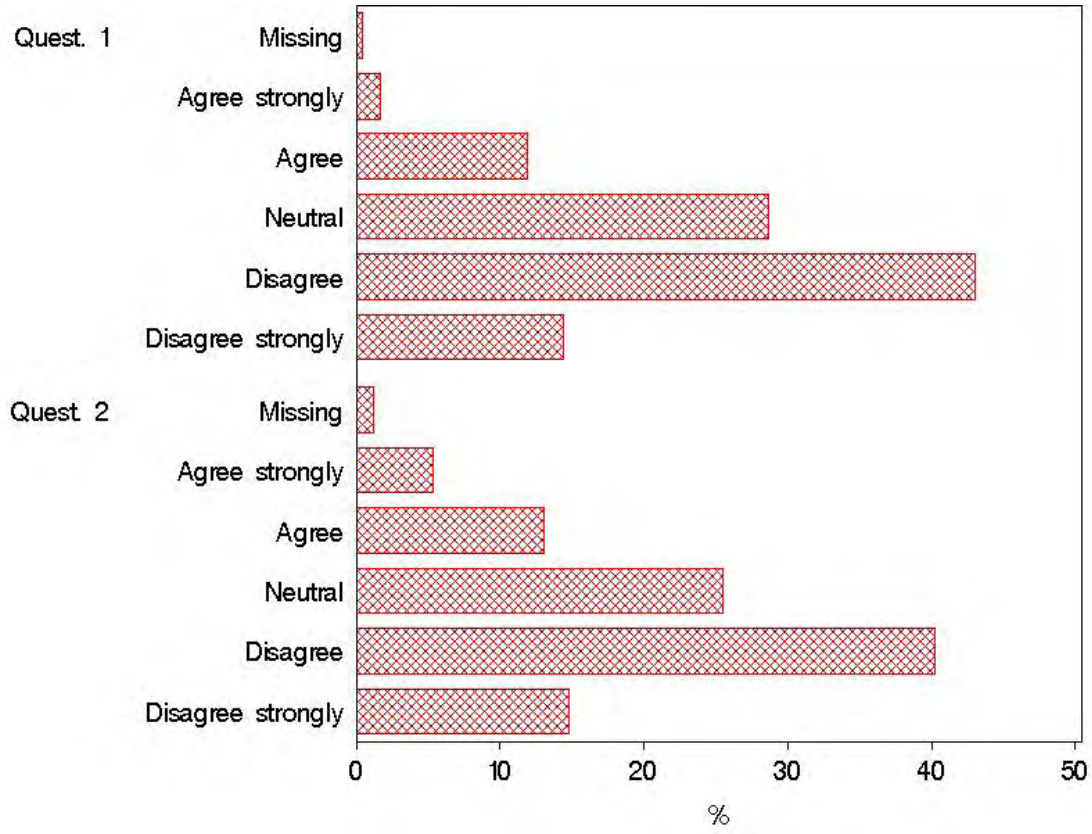
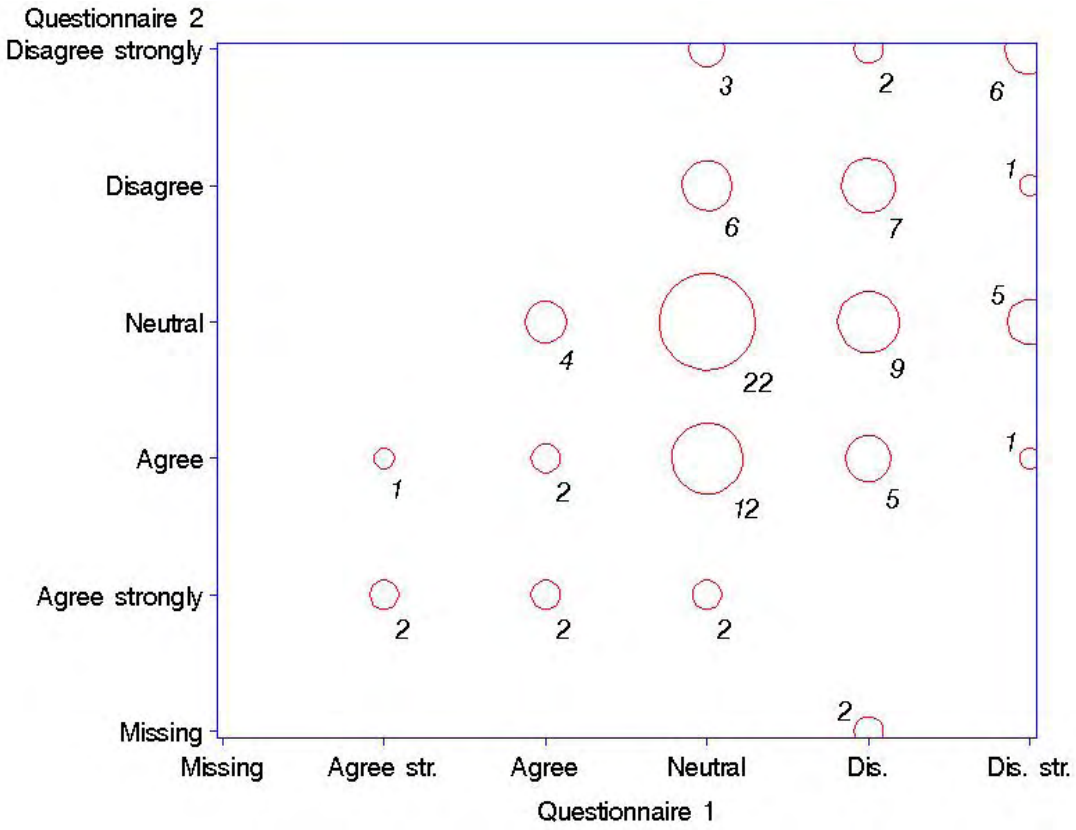


	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	1	0.4	2	1.2
Agree Strongly	4	1.6	9	5.3
Agree	29	11.9	22	13.0
Neutral	70	28.7	43	25.4
Disagree	105	43.0	68	40.2
Disagree Strongly	35	14.3	25	14.8
Total	244	100.0	169	100.0

12. My cultural background is an integral part of my engineering decisions

Paired

	Questionnaire 2						
	Missing	Agree strongly	Agree	Neutral	Disagree	Disagree strongly	Total
Agree Strongly	.	2	1	.	.	.	3
Agree	.	2	2	4	.	.	8
Neutral	.	2	12	22	6	3	45
Disagree	2	.	5	9	7	2	25
Disagree Strongly	.	.	1	5	1	6	13
Total	2	6	21	40	14	11	94



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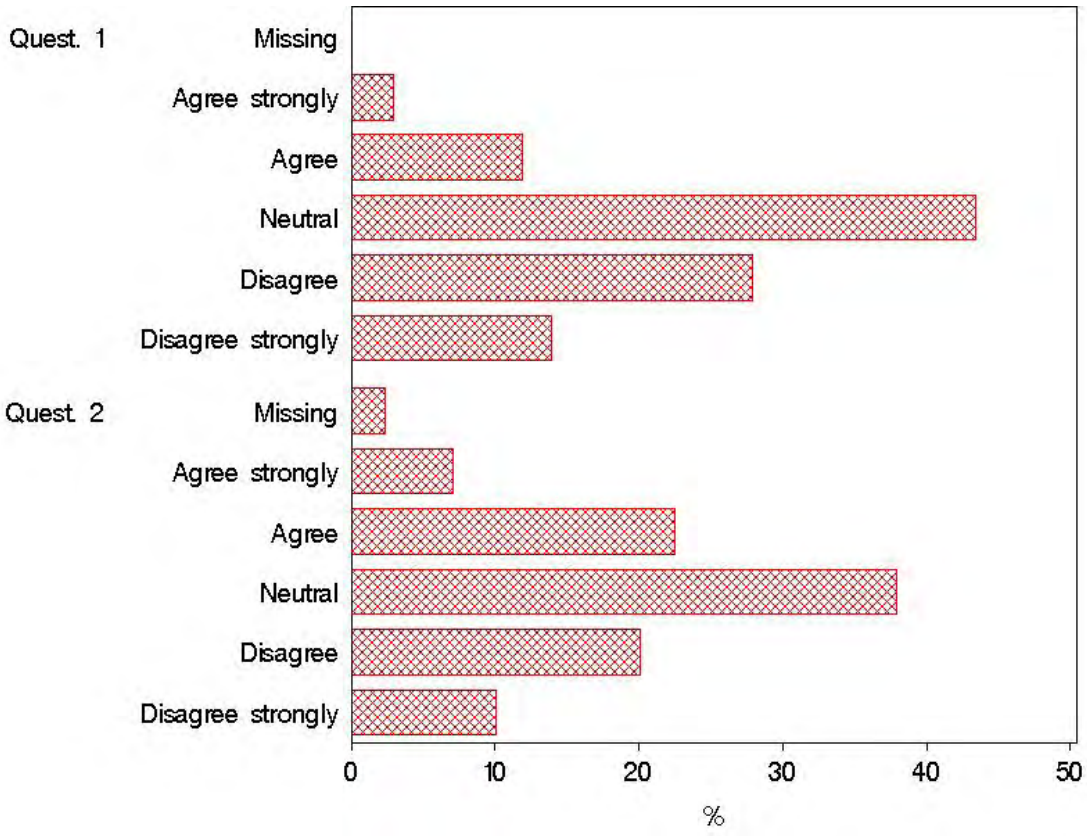


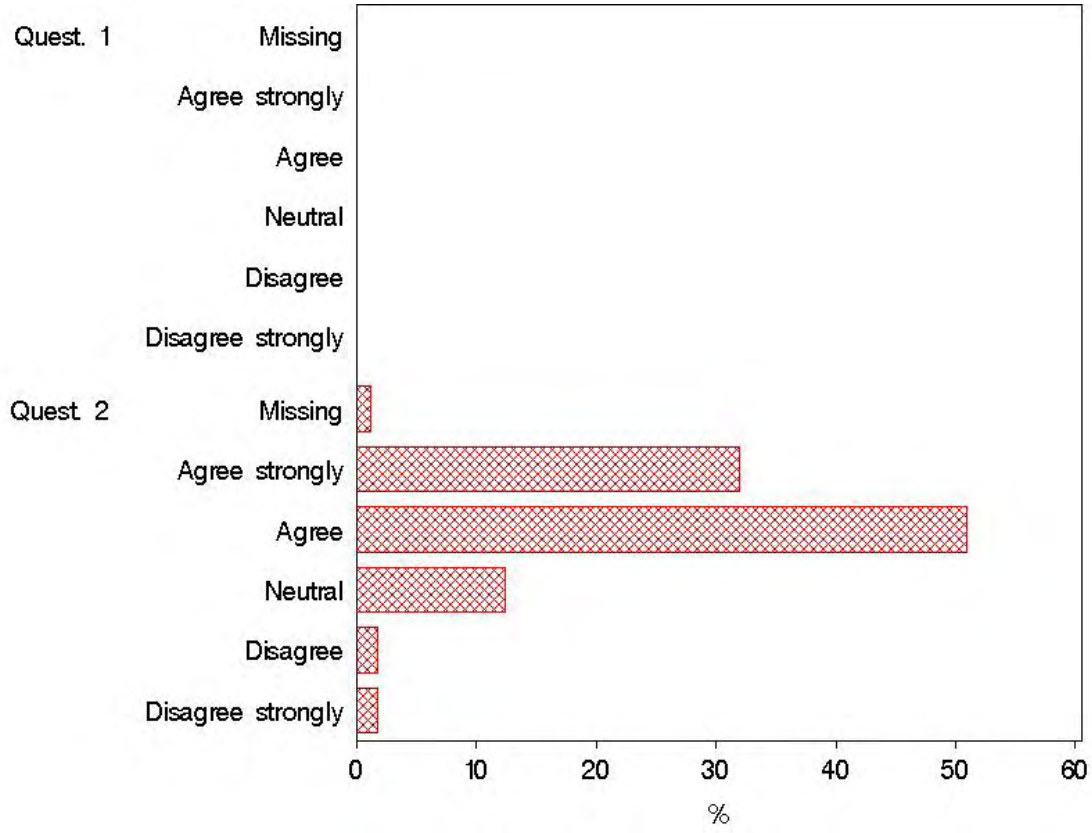
	Questionnaire 1		Questionnaire 2	
	N	%	N	%

Missing	.	.	4	2.4
Agree Strongly	7	2.9	12	7.1
Agree	29	11.9	38	22.5
Neutral	106	43.4	64	37.9
Disagree	68	27.9	34	20.1
Disagree Strongly	34	13.9	17	10.1
Total	244	100.0	169	100.0

13.engineers are responsible to future generations for what they do today.

No Paired data as this question was missing from the first questionnaire.

Unpaired



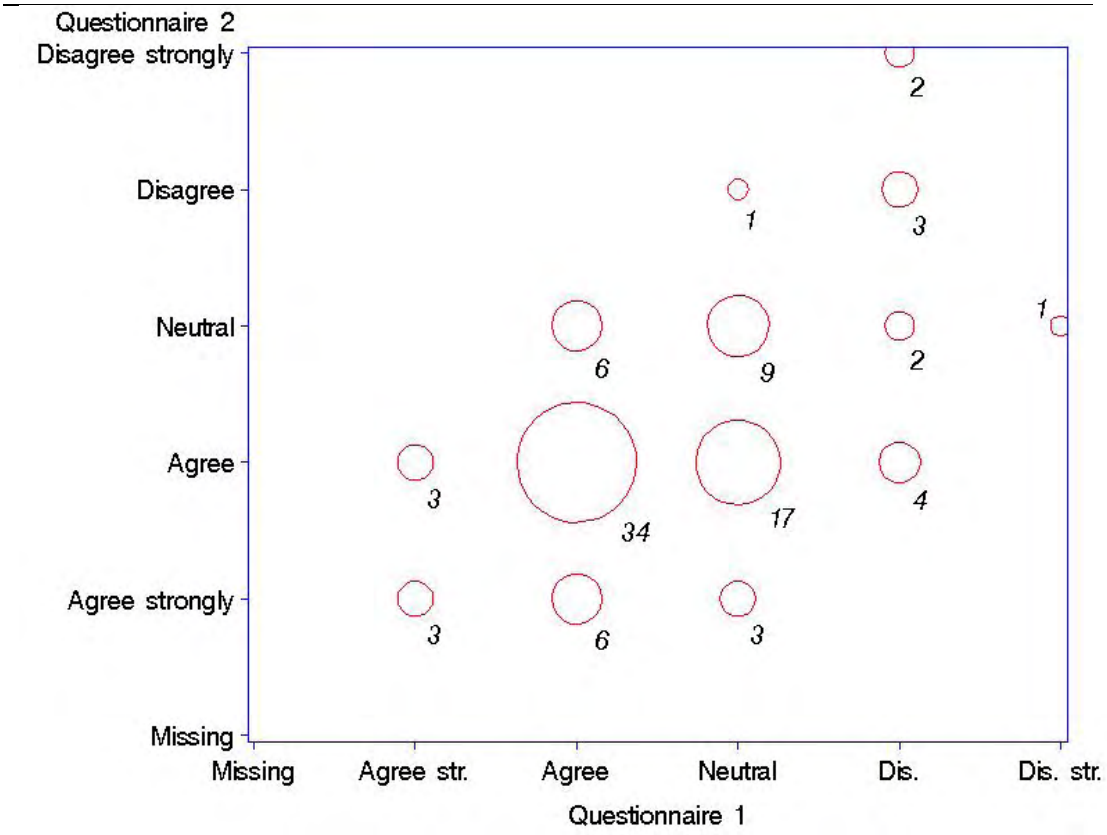
	Questionnaire 2	
	N	%
Missing	2	1.2
Agree Strongly	54	32.0
Agree	86	50.9
Neutral	21	12.4
Disagree	3	1.8
Disagree Strongly	3	1.8
Total	169	100.0

14. Respect for the past should be included in engineering decisions

Paired

	Questionnaire 2					
	Agree	Agree	Neutral	Disagree	Disagree	Total

	strongly				strongly	
Agree Strongly	3	3	.	.	.	6
Agree	6	34	6	.	.	46
Neutral	3	17	9	1	.	30
Disagree	.	4	2	3	2	11
Disagree Strongly	.	.	1	.	.	1
Total	12	58	18	4	2	94



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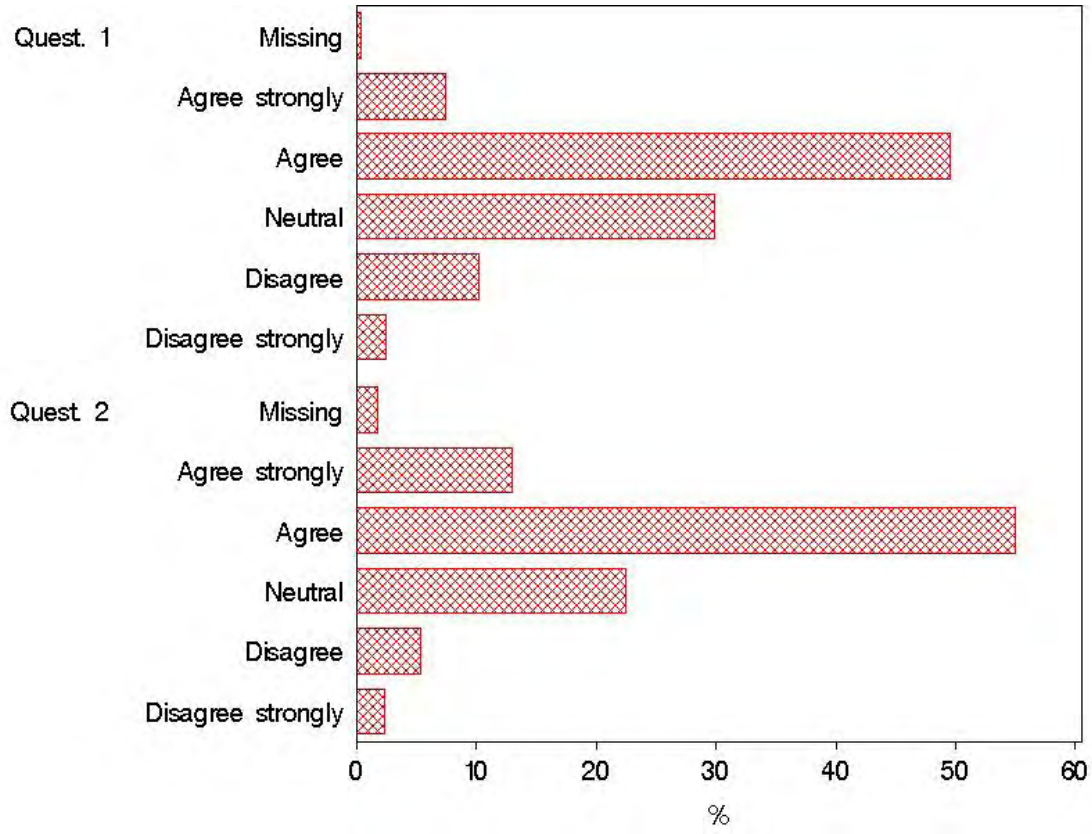
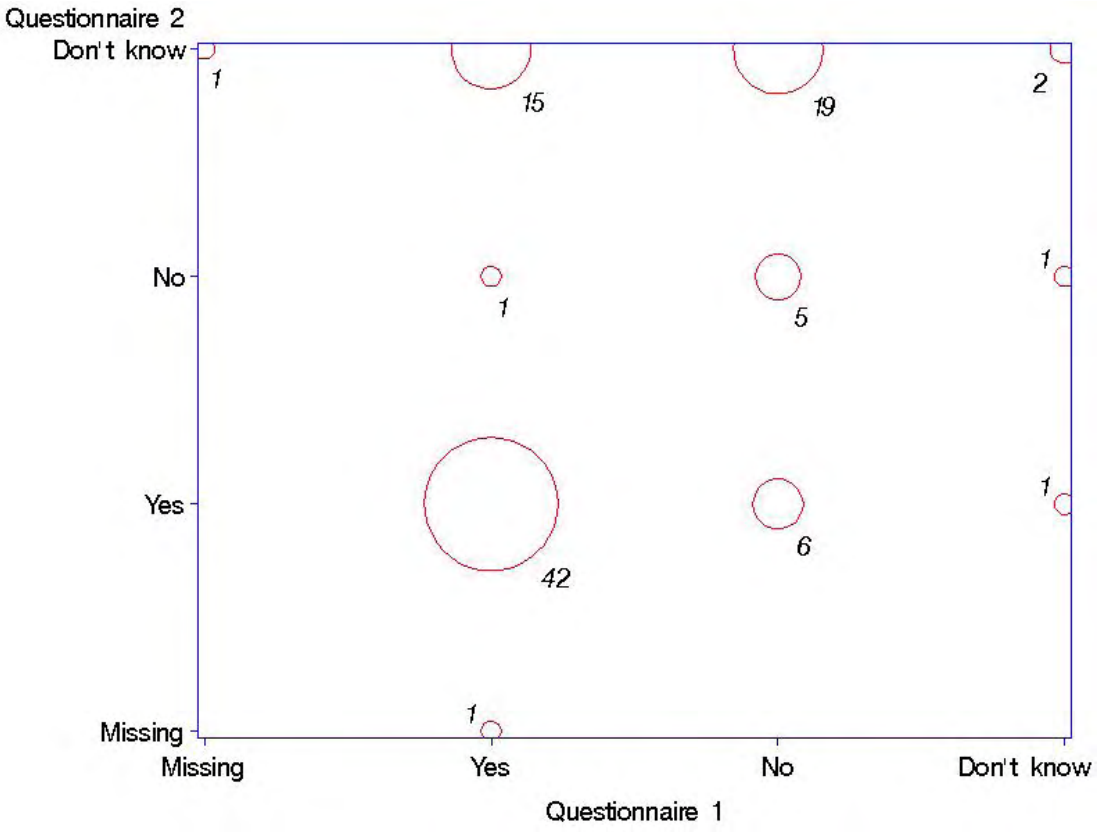


	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	1	0.4	3	1.8
Agree Strongly	18	7.4	22	13.0
Agree	121	49.6	93	55.0
Neutral	73	29.9	38	22.5
Disagree	25	10.2	9	5.3
Disagree Strongly	6	2.5	4	2.4
Total	244	100.0	169	100.0

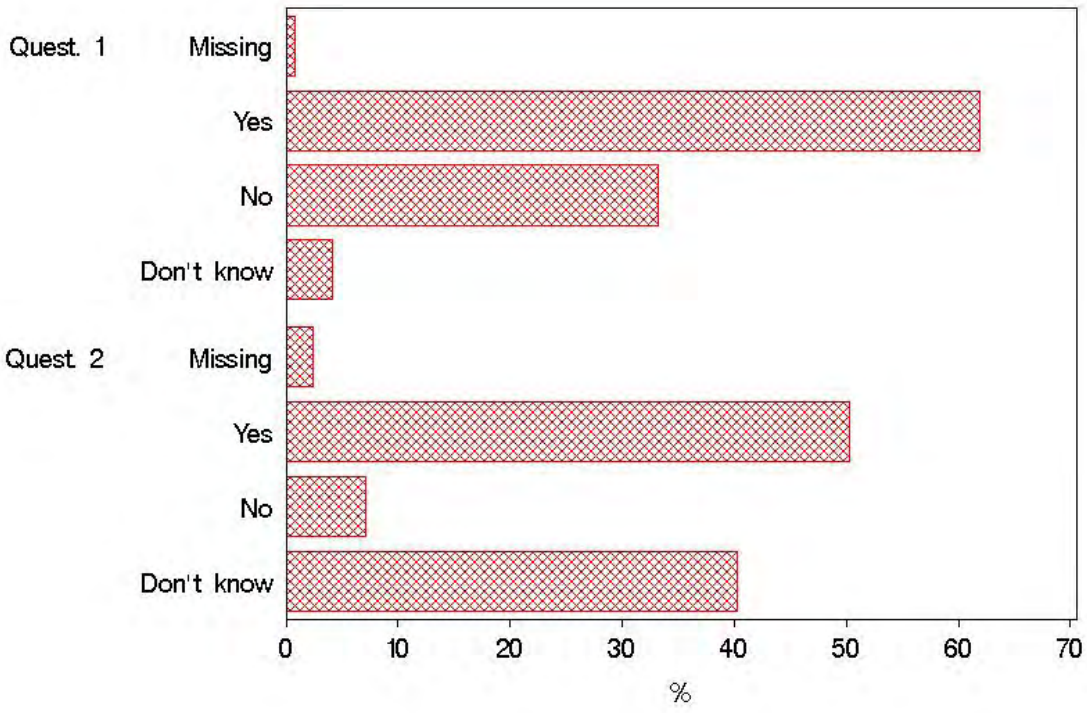
15. I expect to work overseas when I graduate

Paired

	Questionnaire 2				
	Missing	Yes	No	Don't know	Total
Missing	.	.	.	1	1
Yes	1	42	1	15	59
No	.	6	5	19	30
Don't know	.	1	1	2	4
Total	1	49	7	37	94



Unpaired



	Questionnaire 1		Questionnaire 2	
	N	%	N	%

Missing	2	0.8	4	2.4
Yes	151	61.9	85	50.3
No	81	33.2	12	7.1
Don't know	10	4.1	68	40.2
Total	244	100.0	169	100.0

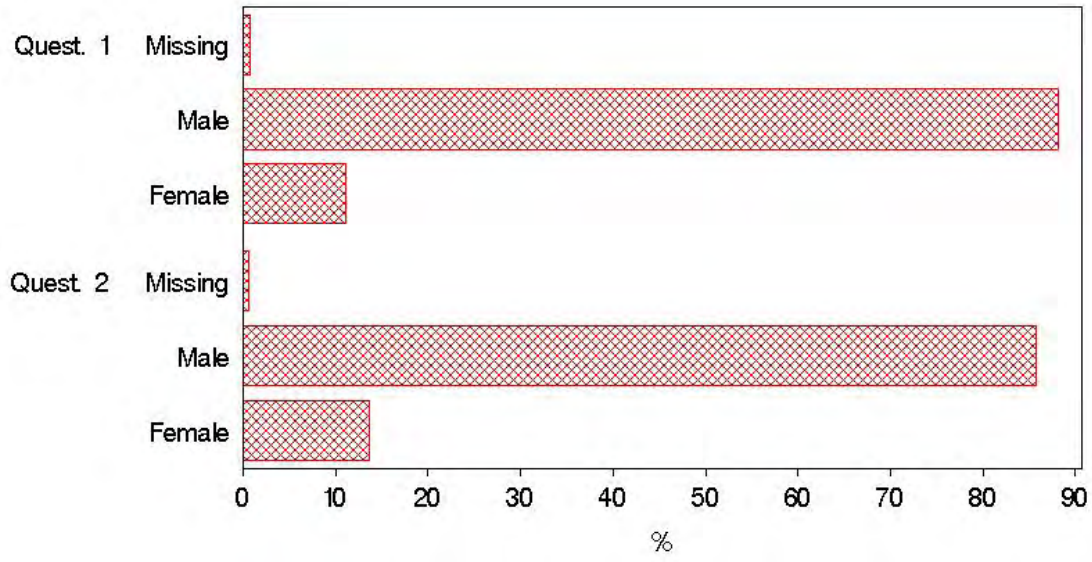
Gender

Paired

The paired analysis in the remaining questions serves to let us know the characteristics of those who completed both questionnaires. For example the table below tells us that of the 94 who completed both questionnaires only 12 were female. No bubble graphs are needed.

	Questionnaire 2		
	Male	Female	Total
Male	82	.	82
Female	.	12	12
Total	82	12	94

Unpaired



	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	2	0.8	1	0.6
Male	215	88.1	145	85.8
Female	27	11.1	23	13.6

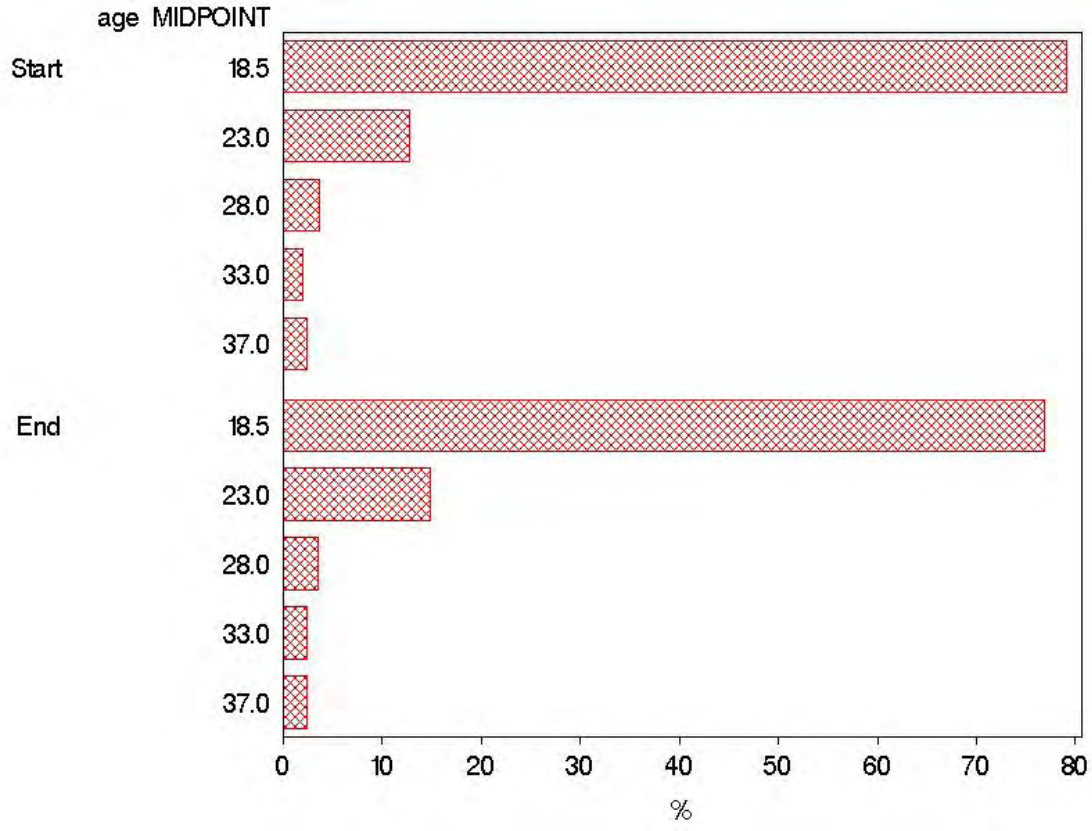
Total	244	100.0	169	100.0

Age

Paired

	Questionnaire 2					
	17-20	21-25	26-30	31-35	36+	Total
17-20	79	1	.	.	.	80
21-25	.	6	.	.	.	6
26-30	.	.	6	.	.	6
31-35	.	.	.	1	.	1
36+	.	.	.	.	1	1
Total	79	7	6	1	1	94

Unpaired



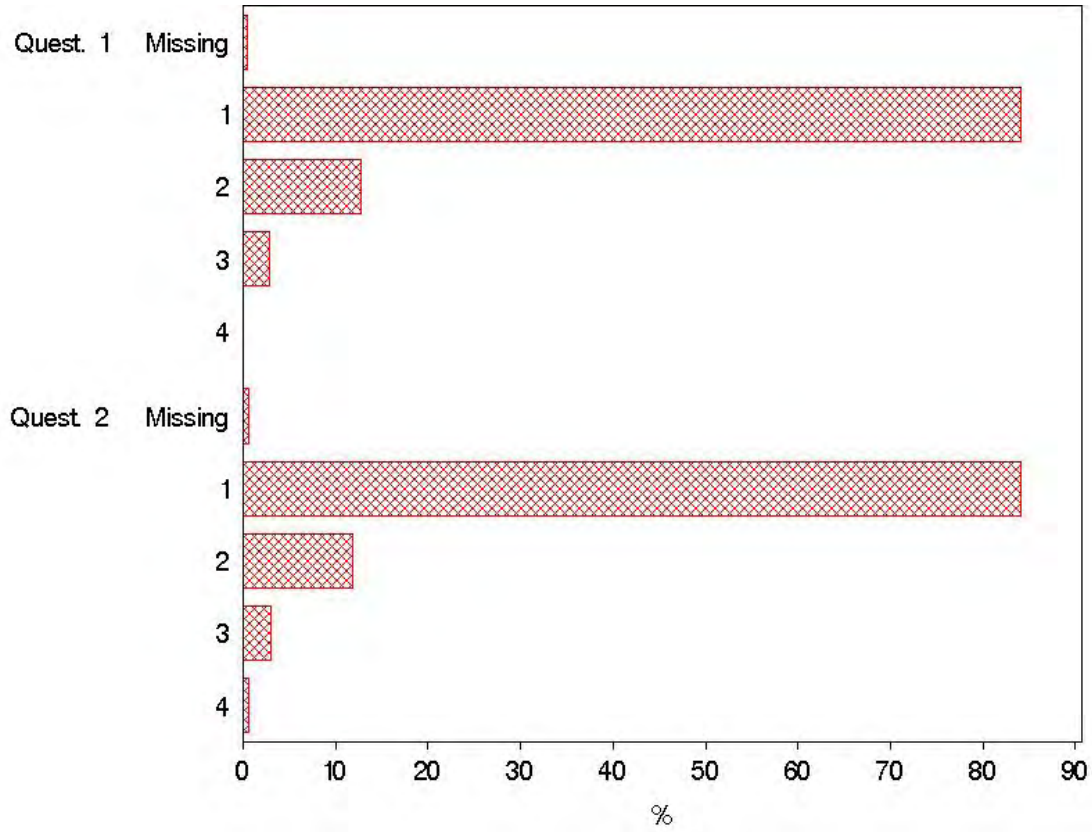
	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	1	0.4	1	0.6
17-20	192	78.7	129	76.3
21-25	31	12.7	25	14.8
26-30	9	3.7	6	3.6
31-35	5	2.0	5	3.0
36+	6	2.5	3	1.8
Total	244	100.0	169	100.0

Year of study

Paired

	Questionnaire 2			
	1	2	3	Total
1	83	.	.	83
2	.	8	.	8
3	.	1	2	3
Total	83	9	2	94

Unpaired



	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	1	0.4	1	0.6
1	205	84.0	142	84.0
2	31	12.7	20	11.8
3	7	2.9	5	3.0
4	.	.	1	0.6
Total	244	100.0	169	100.0

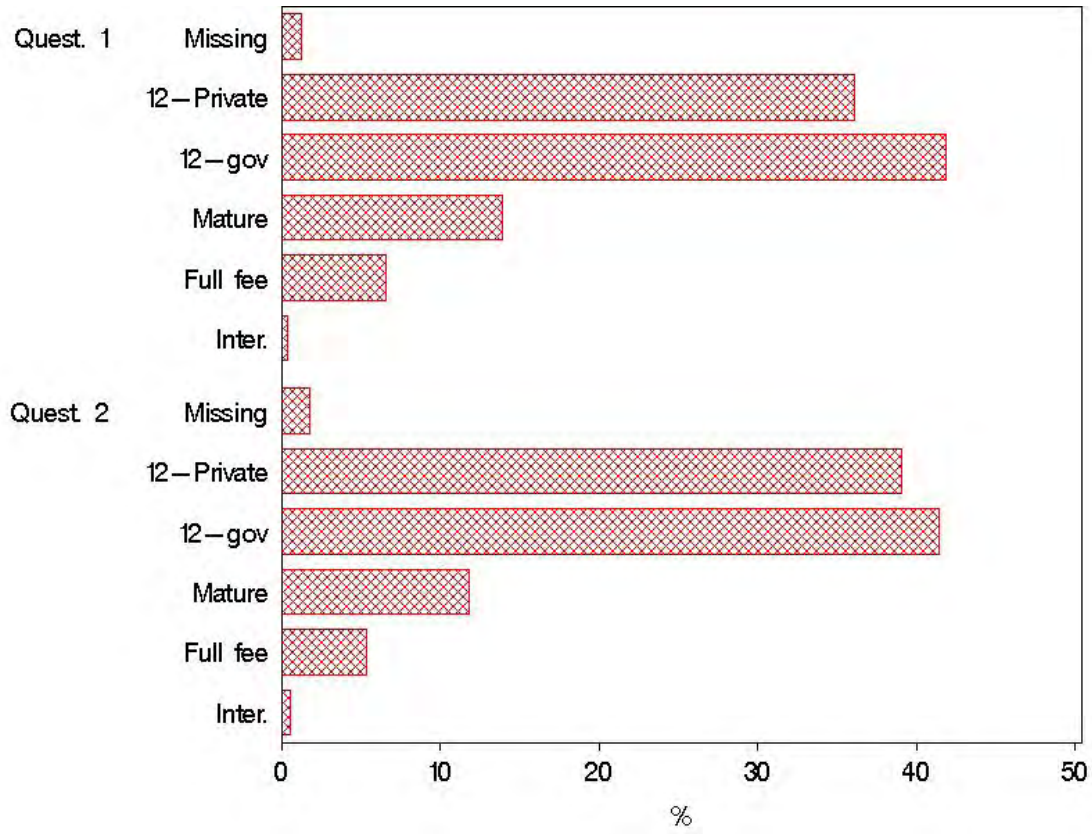
Before you came to QUT

Paired

	Questionnaire 2				
	Private	Government	Mature	Full fee	Total

				paying	
Private	41	.	1	.	42
Government	.	38	.	.	38
Mature	.	1	9	.	10
Full fee paying	.	.	.	3	3
Scholarship holder	.	1	.	.	1
Total	41	40	10	3	94

Unpaired



	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	3	1.2	3	1.8
Private	88	36.1	66	39.1
Government	102	41.8	70	41.4
Mature	34	13.9	20	11.8
Full fee paying	16	6.6	9	5.3
Scholarship holder	1	0.4	1	0.6
Total	244	100.0	169	100.0

International origin

Unpaired

	Questionnaire	
	1	2
	N	N
Australian	.	1

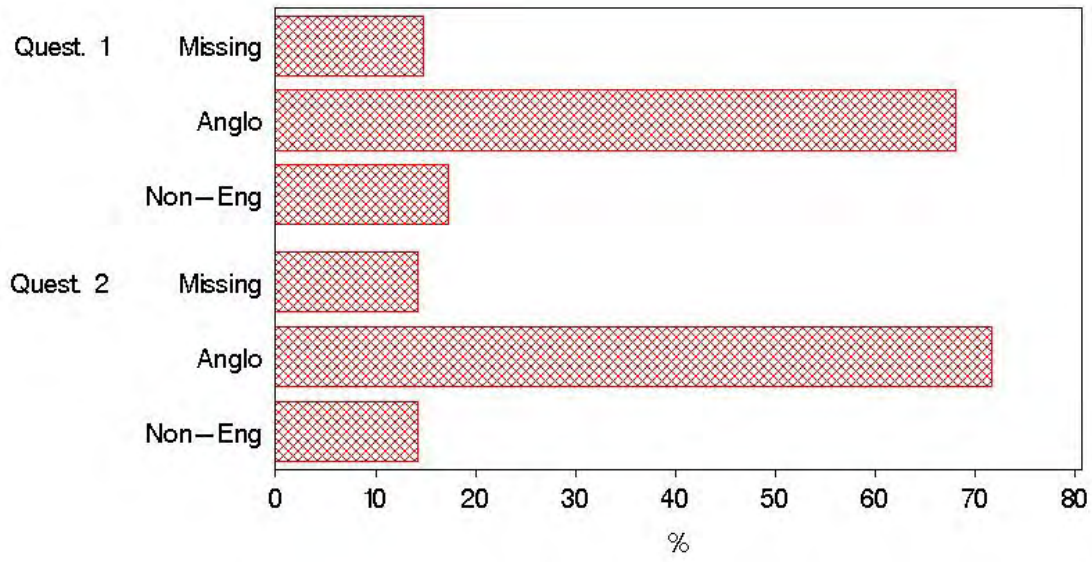
Chinese	2	2
Fiji	3	.
Hong Kong	7	6
Indian	2	1
Norwegian	.	1
South Africa	.	1
Singapore	2	1
Malaysian	1	1
Sweden	1	1
Botswana	1	1
Total	19	16

Cultural background

Paired

	Questionnaire 2			
	Missing	Anglo	Non-English	Total
Missing	5	3	.	8
Anglo	.	72	1	73
Non-English	2	.	11	13
Total	7	75	12	94

Unpaired



	Questionnaire 1		Questionnaire 2	
	N	%	N	%

Missing	36	14.8	24	14.2
Anglo	166	68.0	121	71.6
non-English	42	17.2	24	14.2
Total	244	100.0	169	100.0

Identify

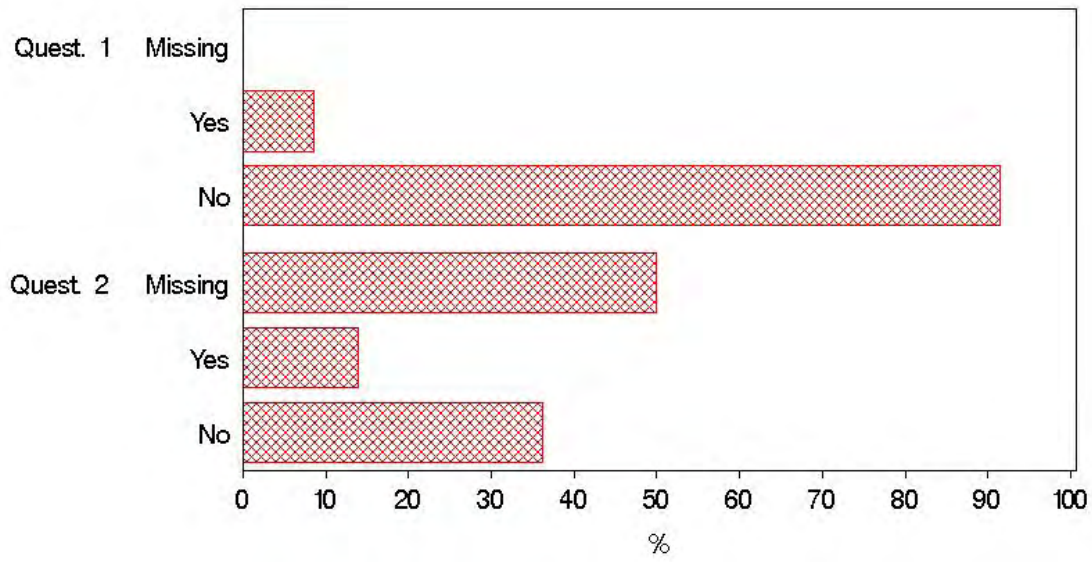
This question was changed from just a tick box in the first survey to a yes/no in the second, hence it is very hard to compare the responses properly. The best I could do was to change all the 'not ticked' answers from the first survey into 'no' responses.

Paired

	Questionnaire 2			
	Missing	Yes	No	Total
Yes	3	4	1	8
No	44	9	33	86
Total	47	13	34	94

Unpaired

	Questionnaire 1		Questionnaire 2	
	N	%	N	%
Missing	.	.	47	50.0
Yes	8	8.5	13	13.8
No	86	91.5	34	36.2
Total	94	100.0	94	100.0



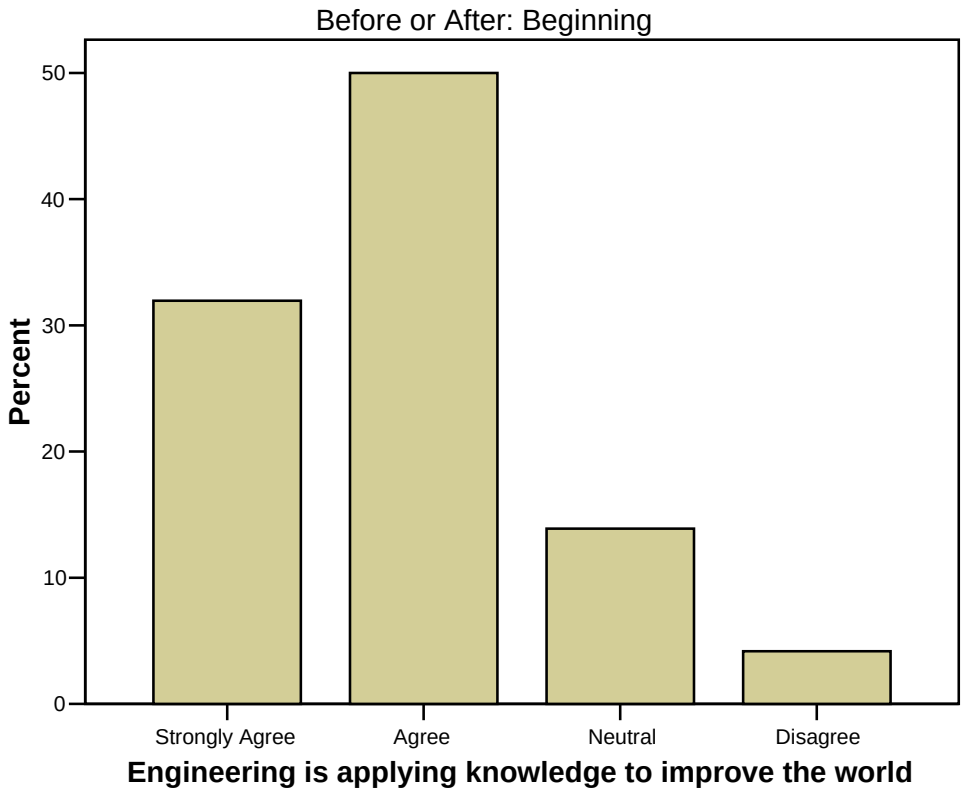
Appendix 5: 2002 Paired data

Sample 72 matched responses

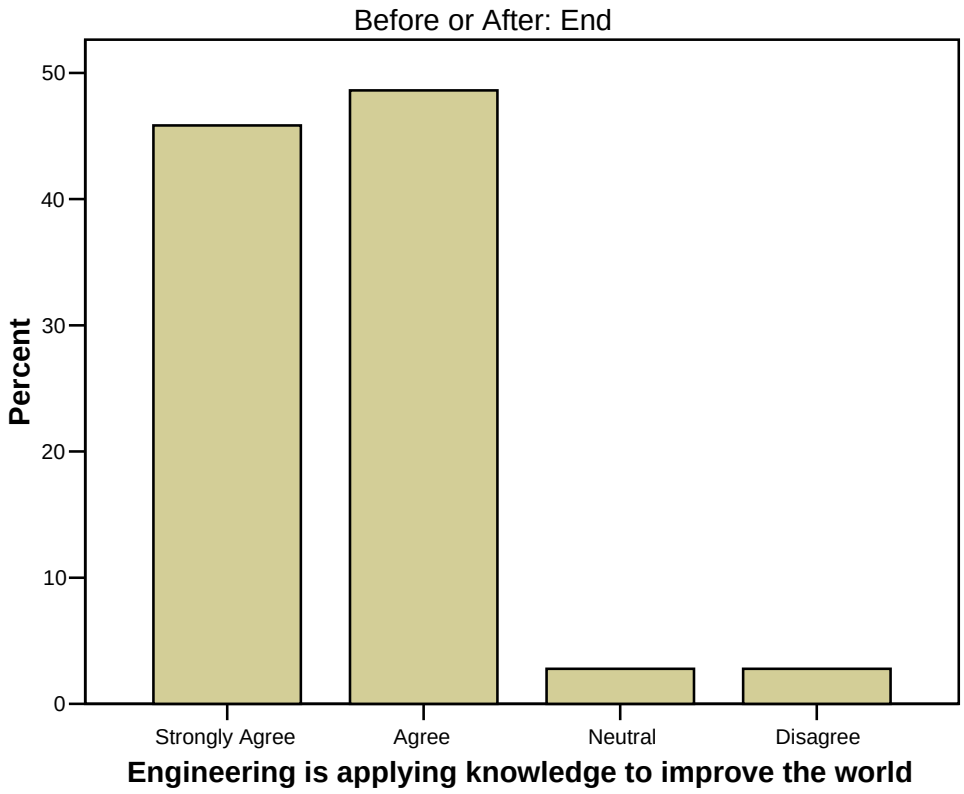
16. Engineering is applying knowledge to improve the world

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	23	31.9	33	45.8
Agree	36	50.0	35	48.6
Neutral	10	13.9	2	2.8
Disagree	3	4.2	2	2.8
Strongly Disagree	0	0.0	0	0.0
Missing	0	0.0	0	0.0
Total	**72**	**100.0**	**72**	**100.0**

Engineering is applying knowledge to improve the world



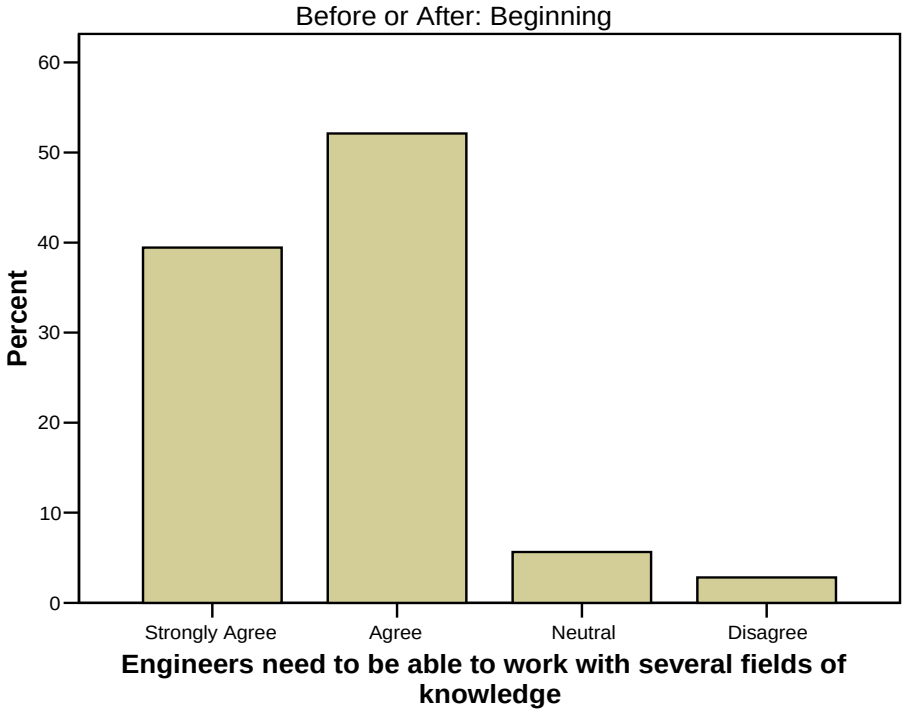
Engineering is applying knowledge to improve the world

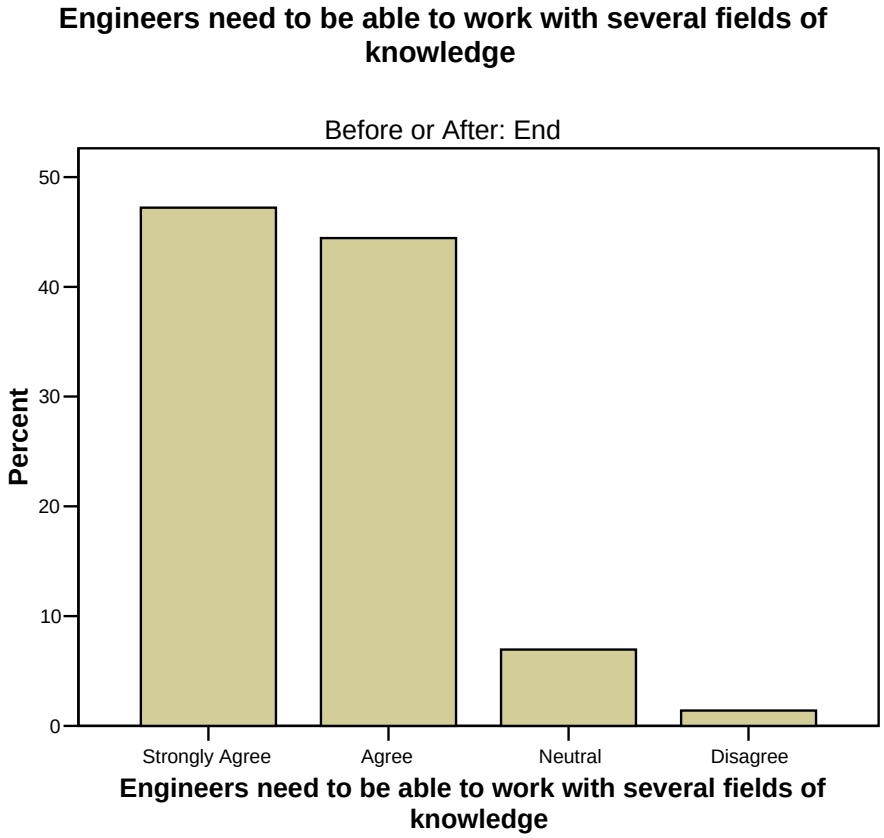


17. Engineers need to be able to work with several fields of knowledge

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	28	38.9	34	47.2
Agree	37	51.4	32	44.4
Neutral	4	5.6	5	6.9
Disagree	2	2.8	1	1.4
Strongly Disagree	0	0.0	0	0.0
Missing	1	1.4	0	0.0
Total	**72**	**100.0**	**72**	**100.0**

Engineers need to be able to work with several fields of knowledge

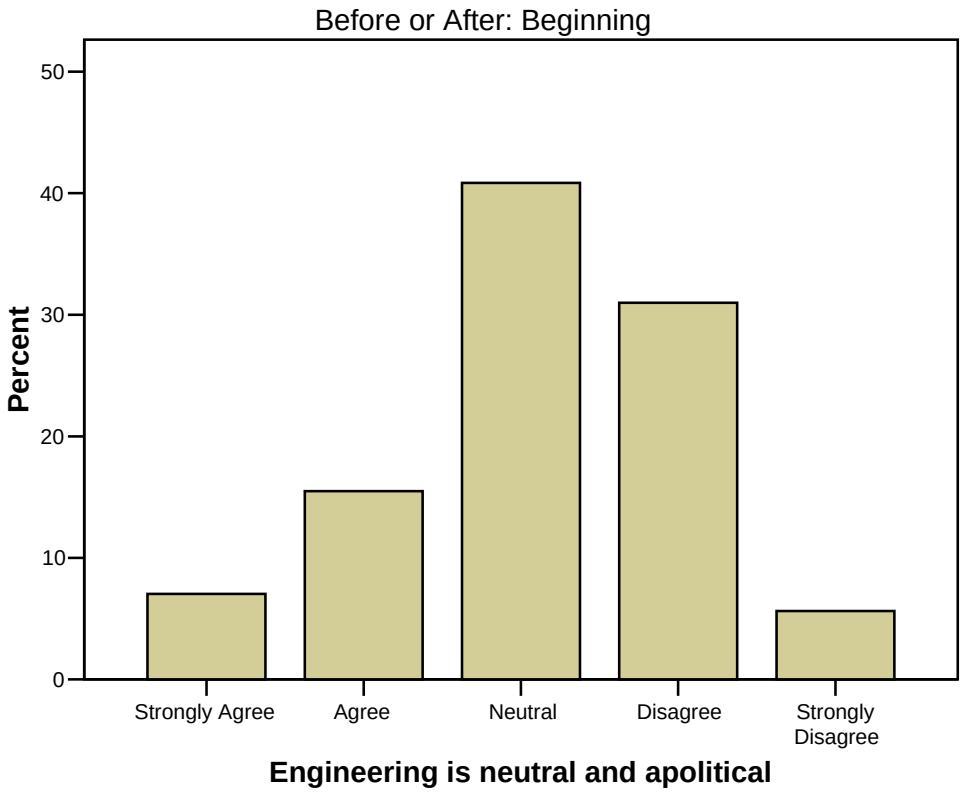


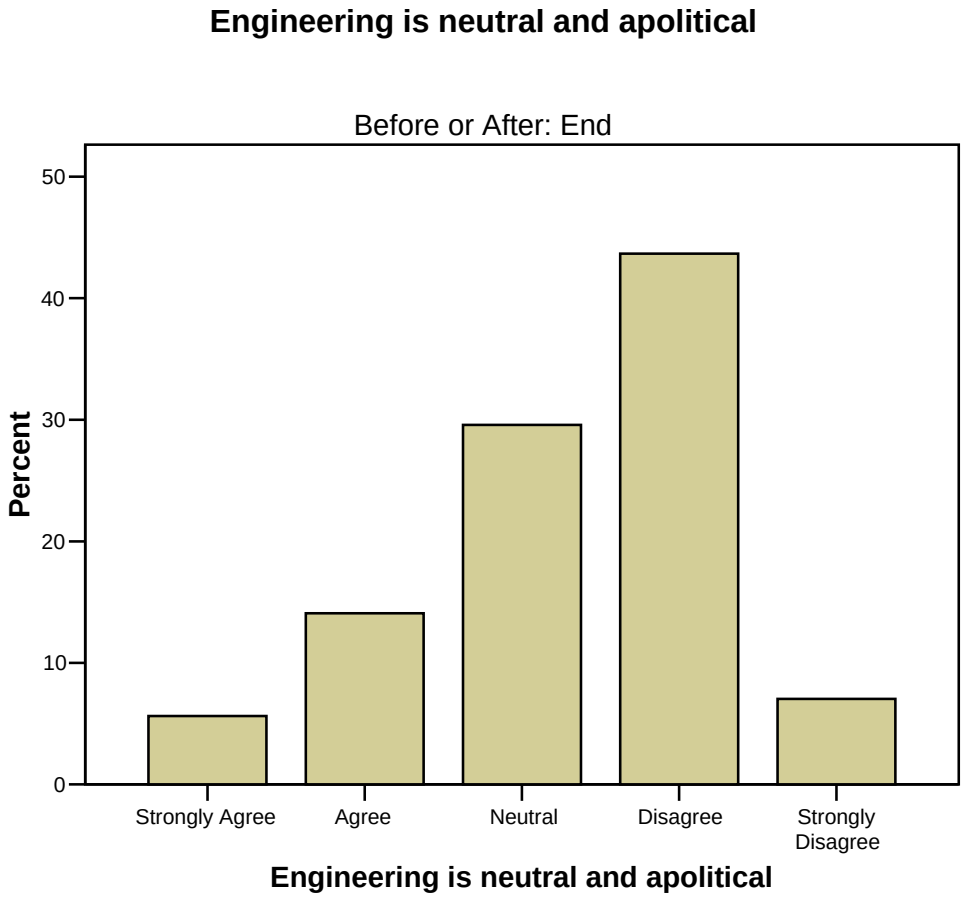


18. Engineering is neutral and apolitical

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	5	6.9	4	5.6
Agree	11	15.3	10	13.9
Neutral	29	40.3	21	29.2
Disagree	22	30.6	31	43.1
Strongly Disagree	4	5.6	5	6.9
Missing	1	1.4	1	1.4
Total	**72**	**100.0**	**72**	**100.0**

Engineering is neutral and apolitical

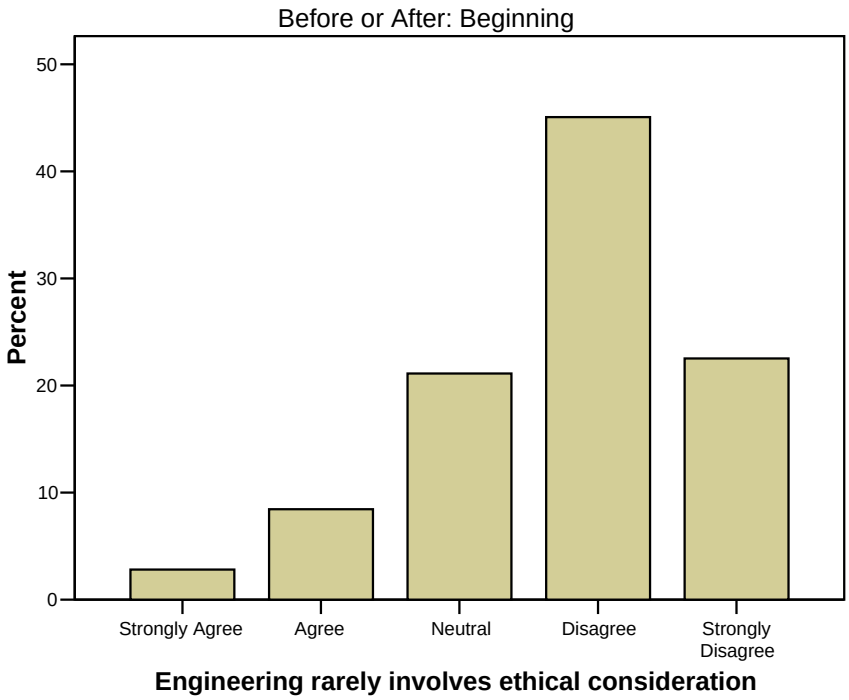


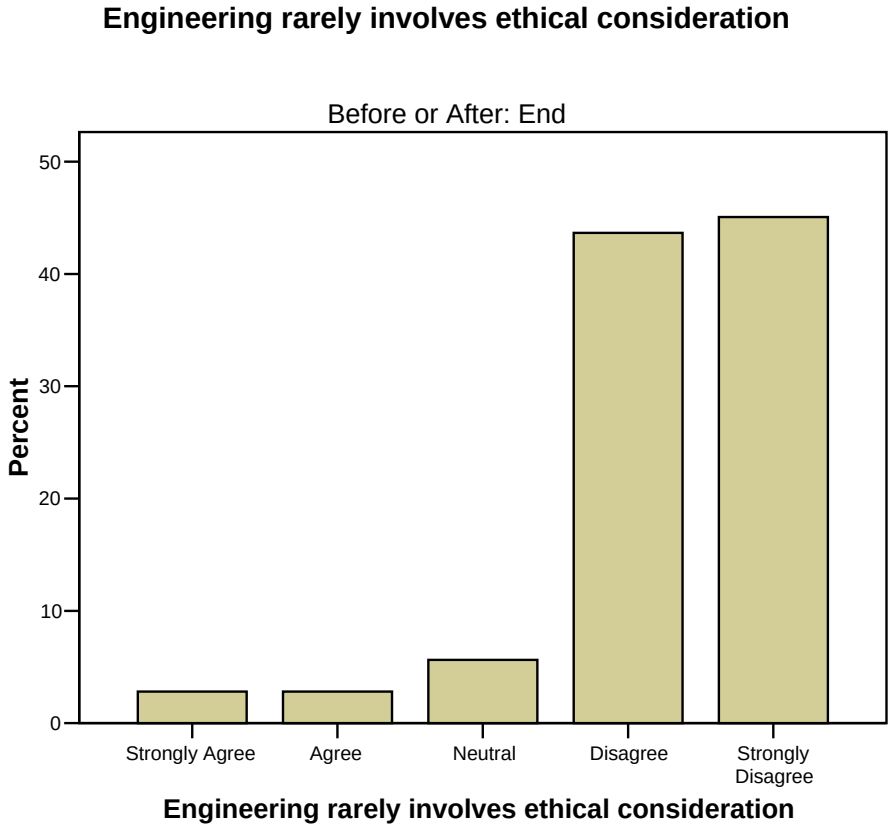


19. Engineering rarely involves ethical consideration

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	2	2.8	2	2.8
Agree	6	8.3	2	2.8
Neutral	15	20.8	4	5.6
Disagree	32	44.4	31	43.1
Strongly Disagree	16	22.2	32	44.4
Missing	1	1.4	1	1.4
Total	**72**	**100.0**	**72**	**100.0**

Engineering rarely involves ethical consideration

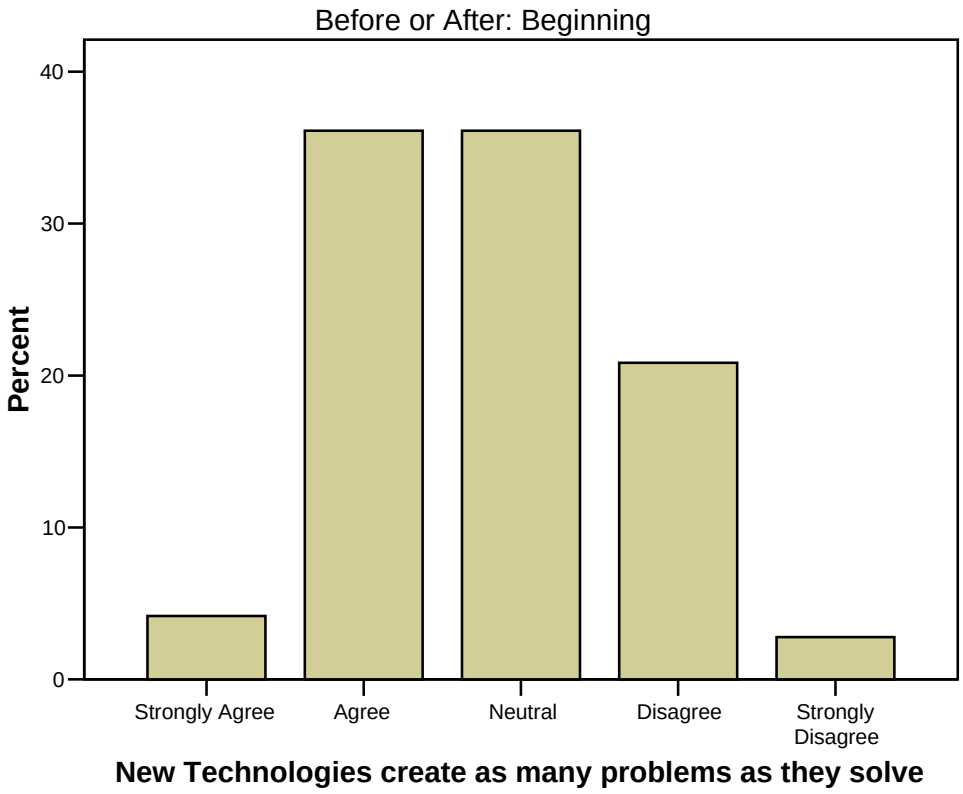




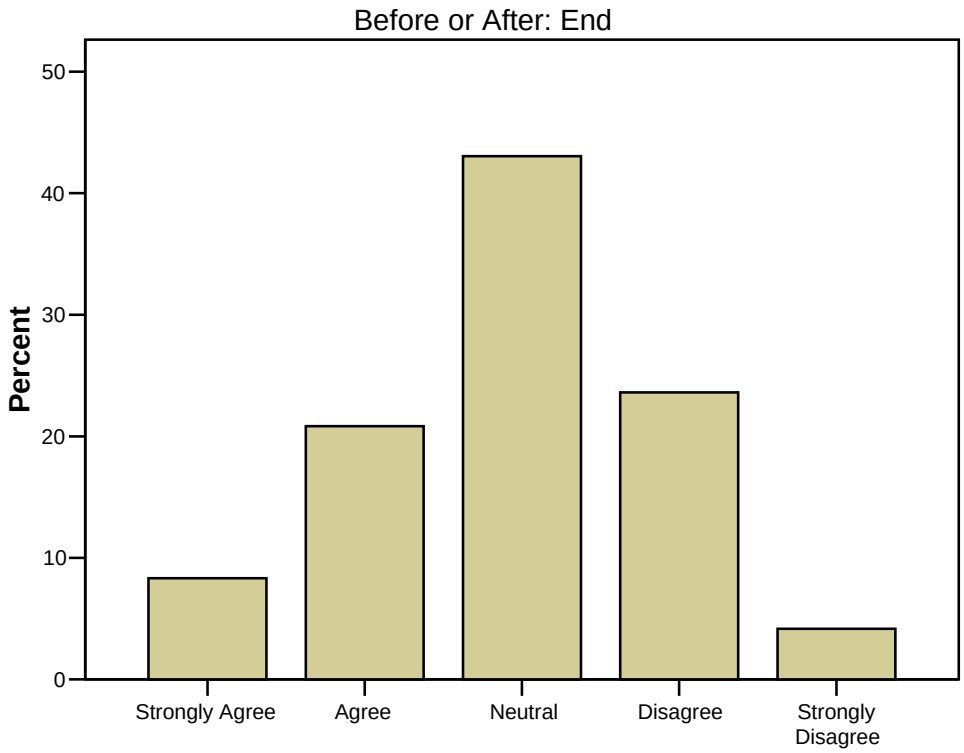
20. New Technologies create as many problems as they solve

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	3	4.2	6	8.3
Agree	26	36.1	15	20.8
Neutral	26	36.1	31	43.1
Disagree	15	20.8	17	23.6
Strongly Disagree	2	2.8	3	4.2
Missing	0	0.0	0	0.0
Total	**72**	**100.0**	**72**	**100.0**

New Technologies create as many problems as they solve



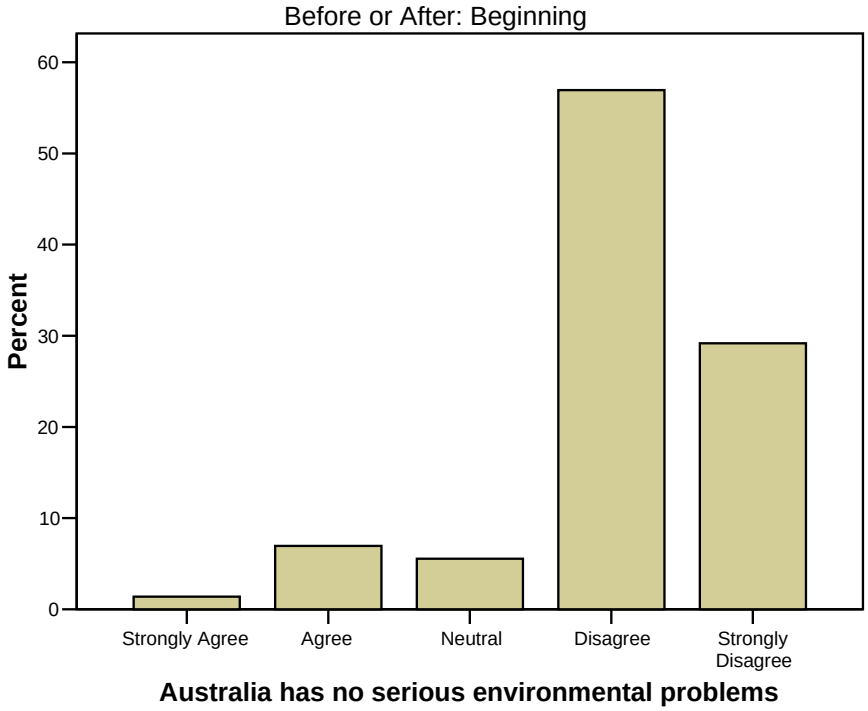
New Technologies create as many problems as they solve



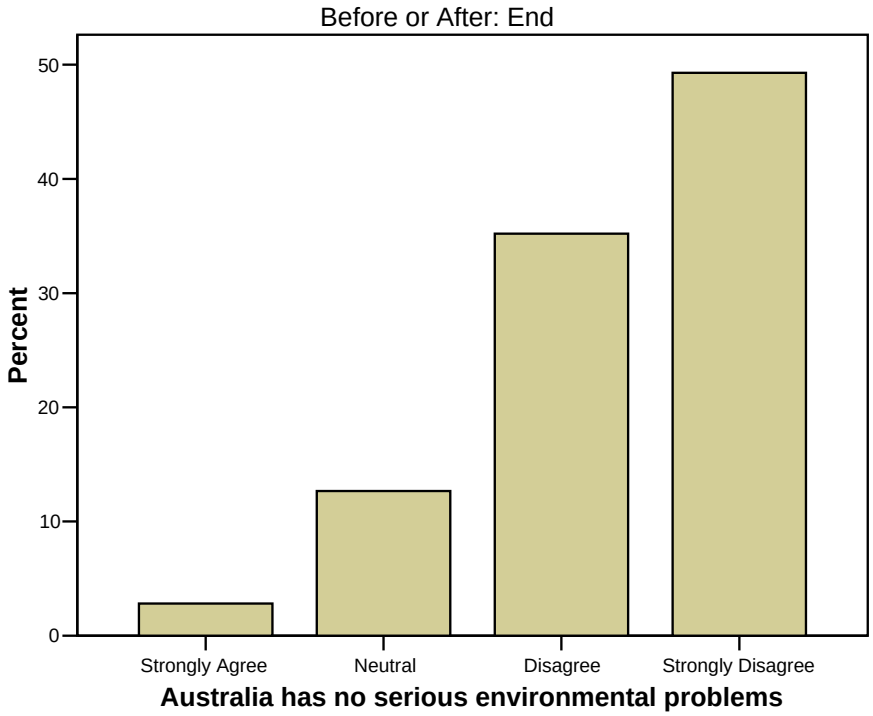
21. Australia has no serious environmental problems

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	1	1.4	2	2.8
Agree	5	6.9	0	0.0
Neutral	4	5.6	9	12.5
Disagree	41	56.9	25	34.7
Strongly Disagree	21	29.2	35	48.6
Missing	0	0.0	1	1.4
Total	**72**	**100.0**	**72**	**100.0**

Australia has no serious environmental problems



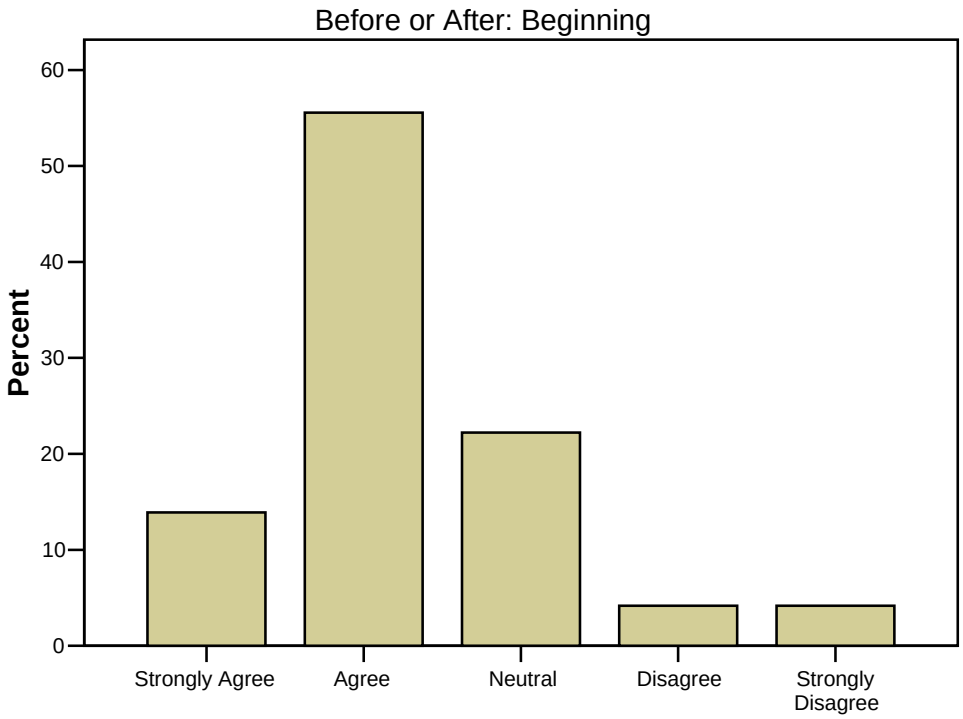
Australia has no serious environmental problems

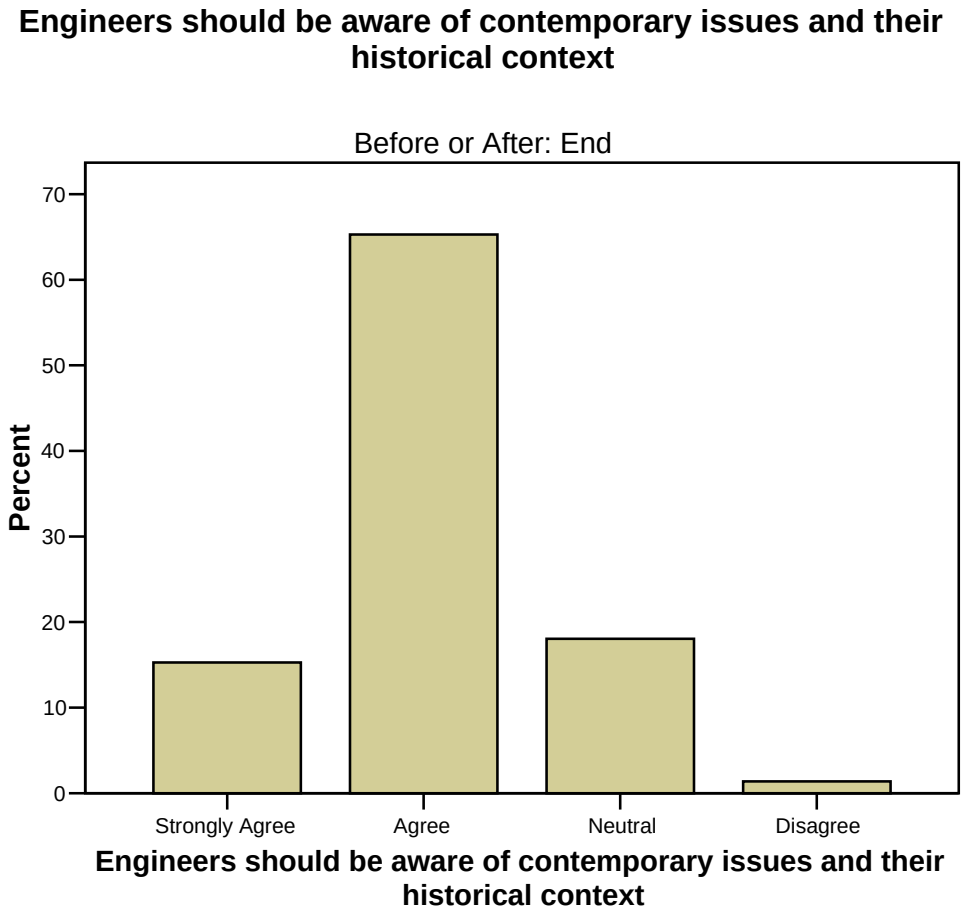


22. Engineers should be aware of contemporary issues and their historical context

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	10	13.9	11	15.3
Agree	40	55.6	47	65.3
Neutral	16	22.2	13	18.1
Disagree	3	4.2	1	1.4
Strongly Disagree	3	4.2	0	0.0
Missing	0	0.0	0	0.0
Total	**72**	**100.0**	**72**	**100.0**

Engineers should be aware of contemporary issues and their historical context

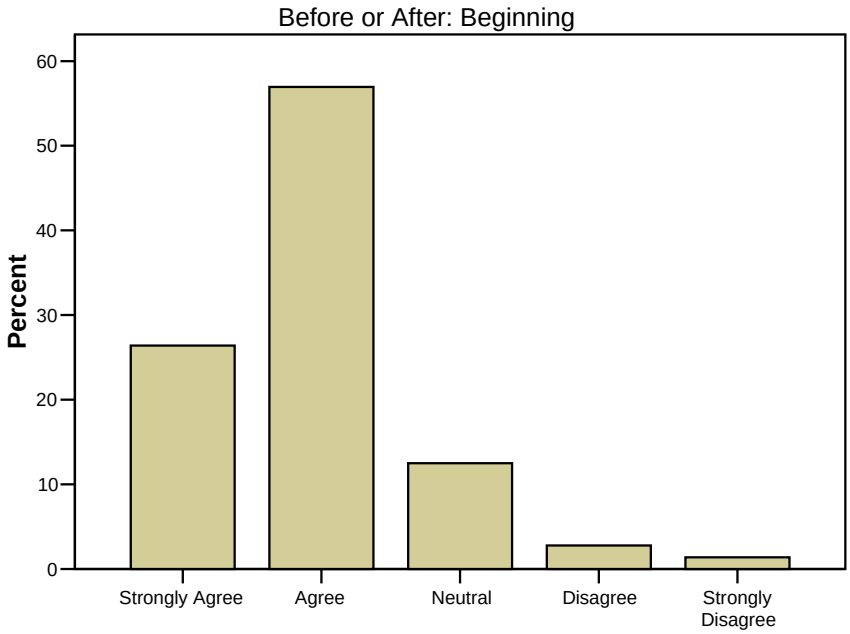


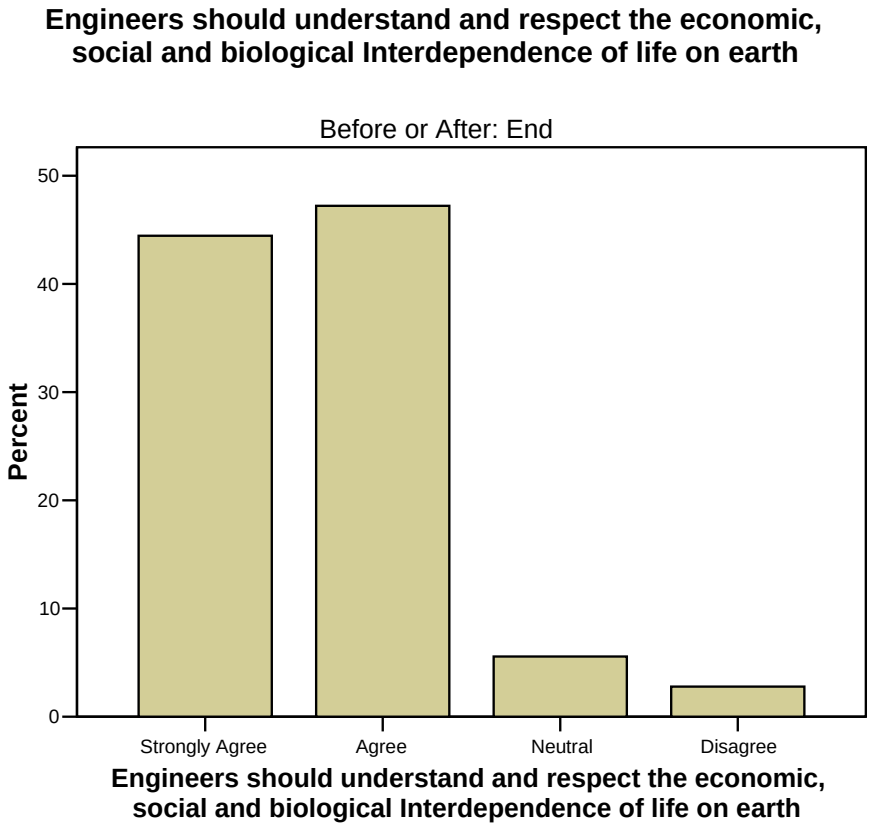


23. Engineers should understand and respect the economic , social and biological interdependence of life on earth

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	19	26.4	32	44.4
Agree	41	56.9	34	47.2
Neutral	9	12.5	4	5.6
Disagree	2	2.8	2	2.8
Strongly Disagree	1	1.4	0	0.0
Missing	0	0.0	0	0.0
Total	**72**	**100.0**	**72**	**100.0**

Engineers should understand and respect the economic, social and biological Interdependence of life on earth

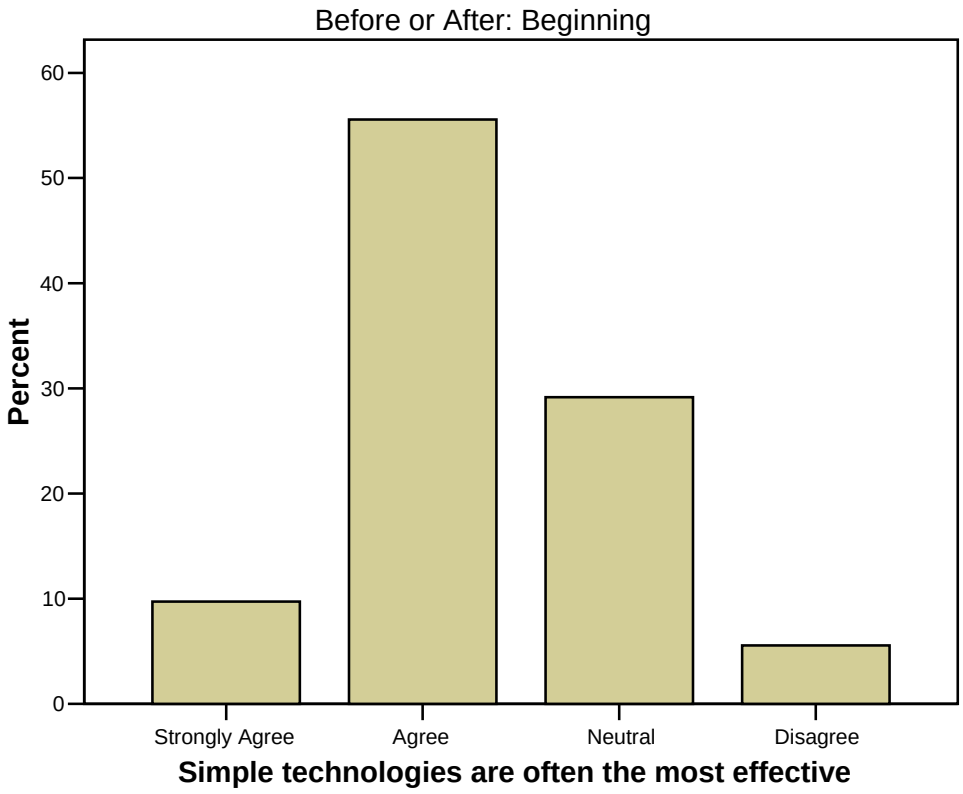




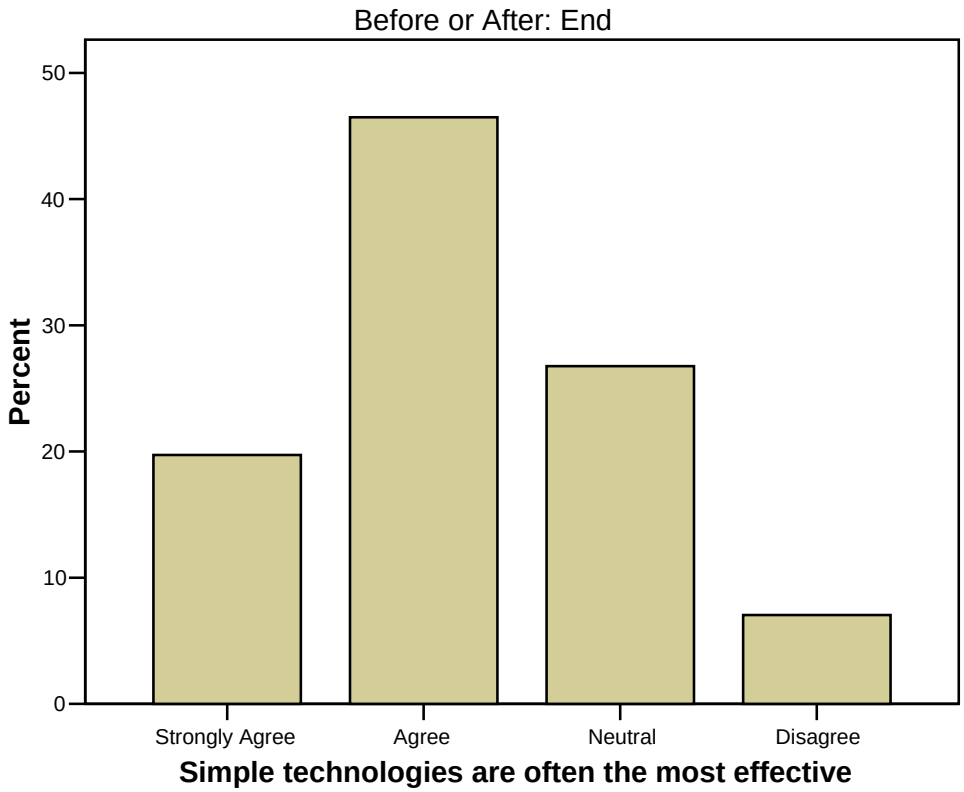
24. Simple technologies are often the most effective

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	7	9.7	14	19.4
Agree	40	55.6	33	45.8
Neutral	21	29.2	19	26.4
Disagree	4	5.6	5	6.9
Strongly Disagree	0	0.0	0	0.0
Missing	0	0.0	1	1.4
Total	**72**	**100.0**	**72**	**100.0**

Simple technologies are often the most effective



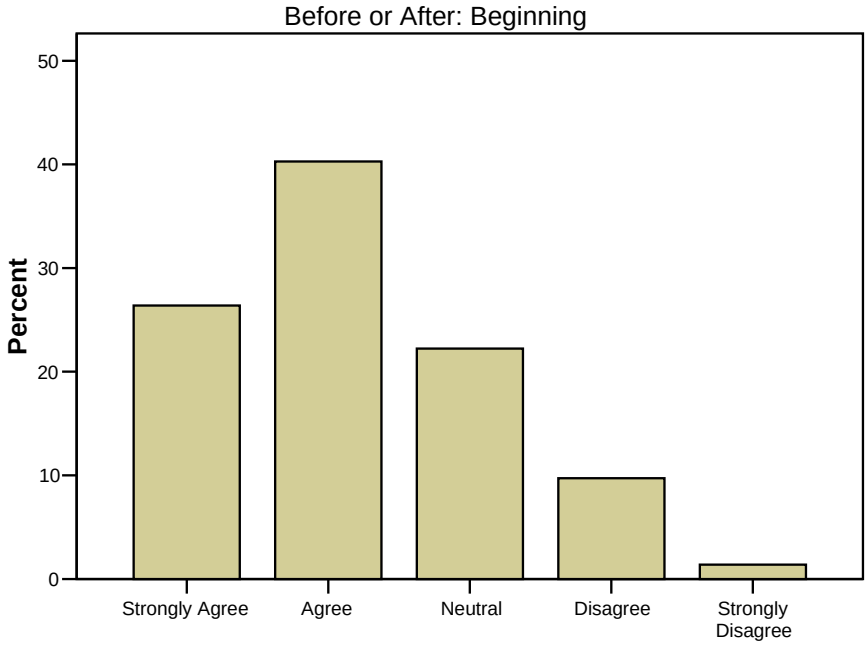
Simple technologies are often the most effective



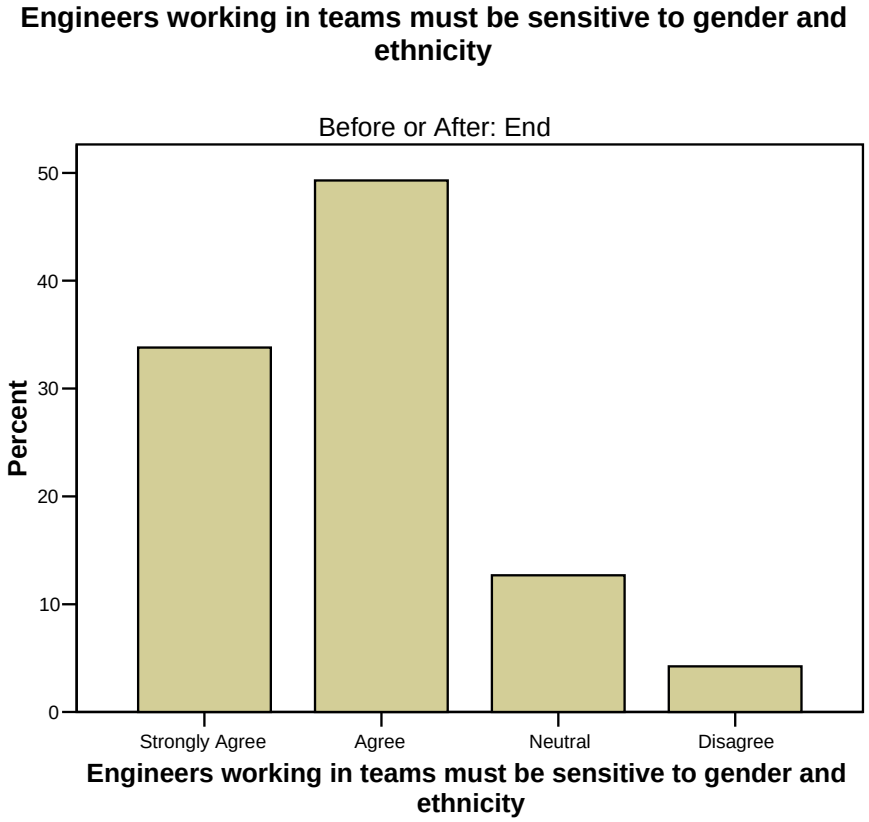
25. Engineers working in teams must be sensitive to gender and ethnicity

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	19	26.4	24	33.3
Agree	29	40.3	35	48.6
Neutral	16	22.2	9	12.5
Disagree	7	9.7	3	4.2
Strongly Disagree	1	1.4	0	0.0
Missing	0	0.0	1	1.4
Total	**72**	**100.0**	**72**	**100.0**

Engineers working in teams must be sensitive to gender and ethnicity



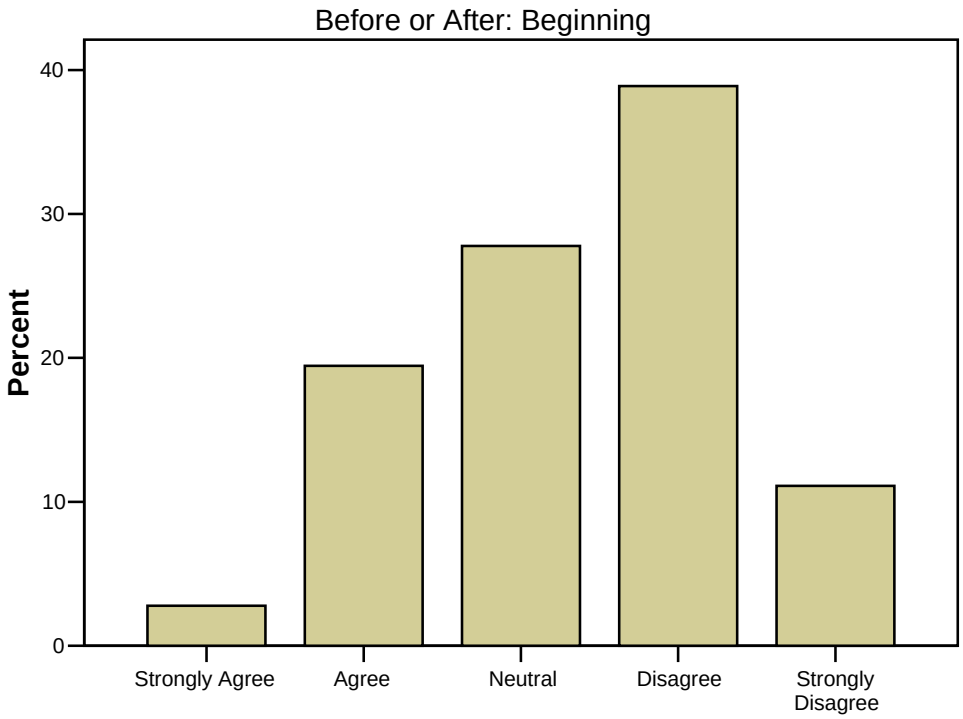
Engineers working in teams must be sensitive to gender and ethnicity

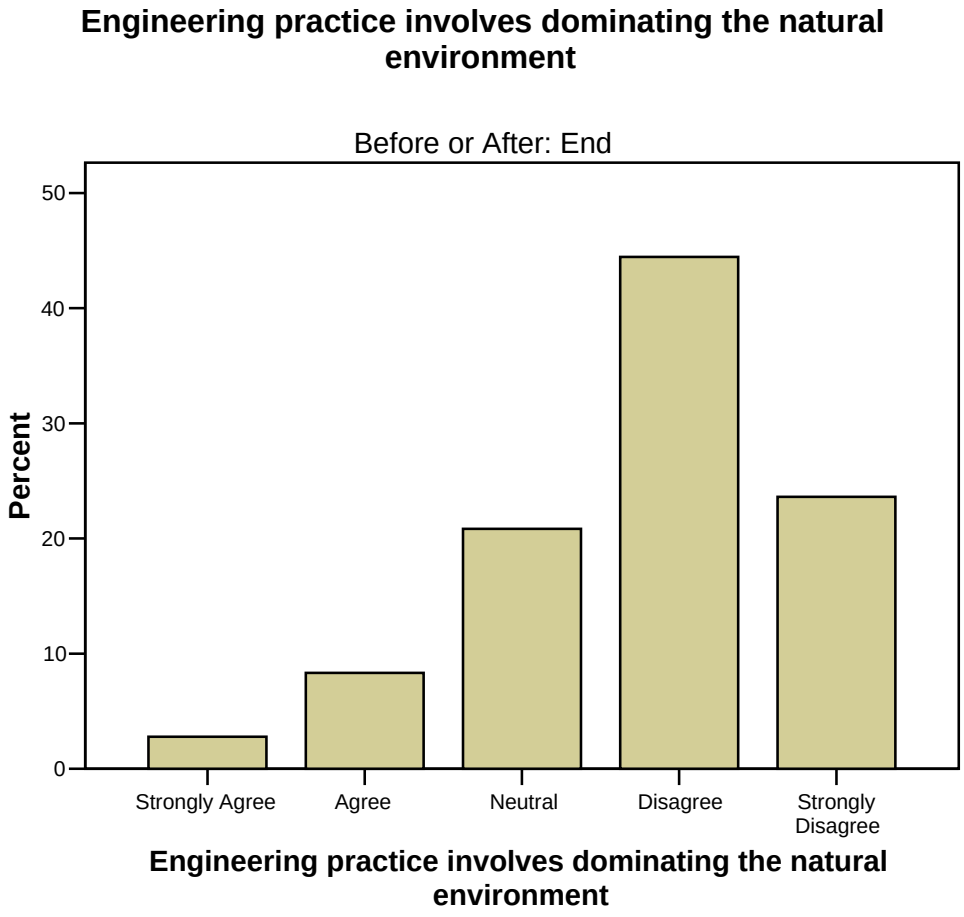


26. Engineering practice involves dominating the natural environment

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	2	2.8	2	2.8
Agree	14	19.4	6	8.3
Neutral	20	27.8	15	20.8
Disagree	28	38.9	32	44.4
Strongly Disagree	28	11.1	17	23.6
Missing	0	0.0	0	0.0
Total	**72**	**100.0**	**72**	**100.0**

Engineering practice involves dominating the natural environment

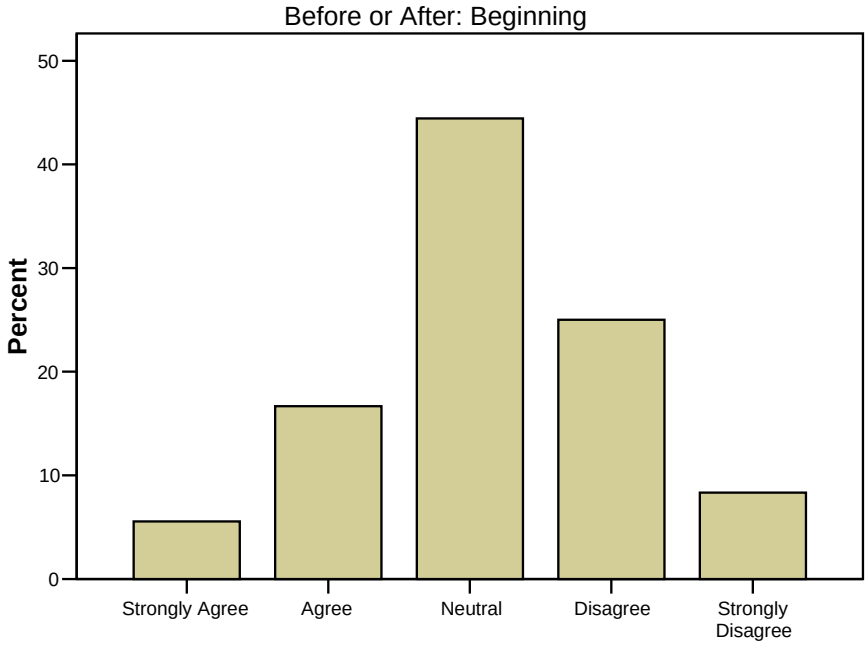




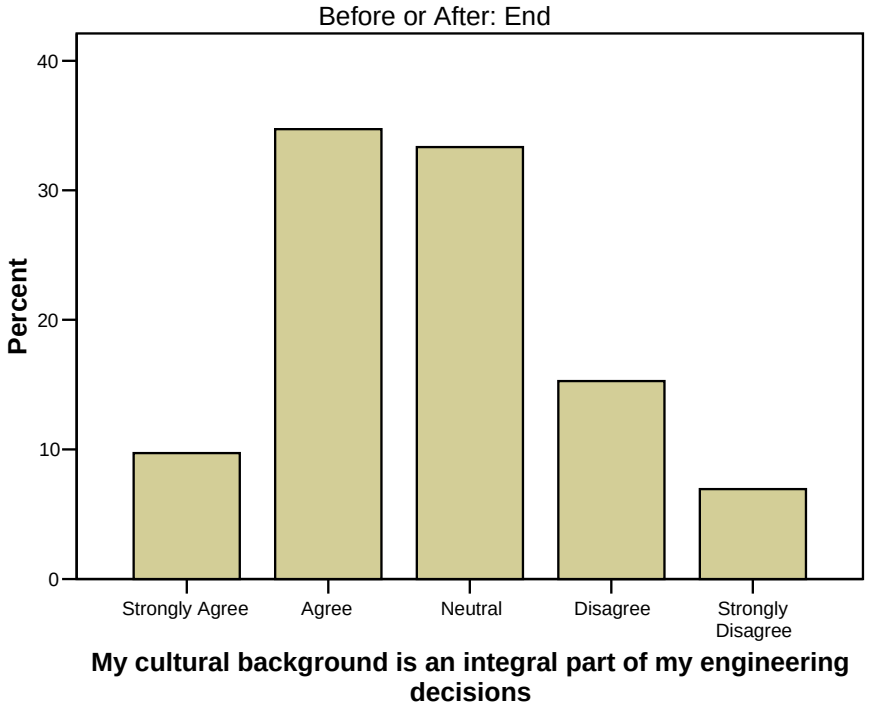
27. My cultural background is an integral part of my engineering decision

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	4	5.6	7	9.7
Agree	12	16.7	25	34.7
Neutral	32	44.4	24	33.3
Disagree	18	25.0	11	15.3
Strongly Disagree	6	8.3	5	6.9
Missing	0	0.0	0	0.0
Total	**72**	**100.0**	**72**	**100.0**

My cultural background is an integral part of my engineering decisions



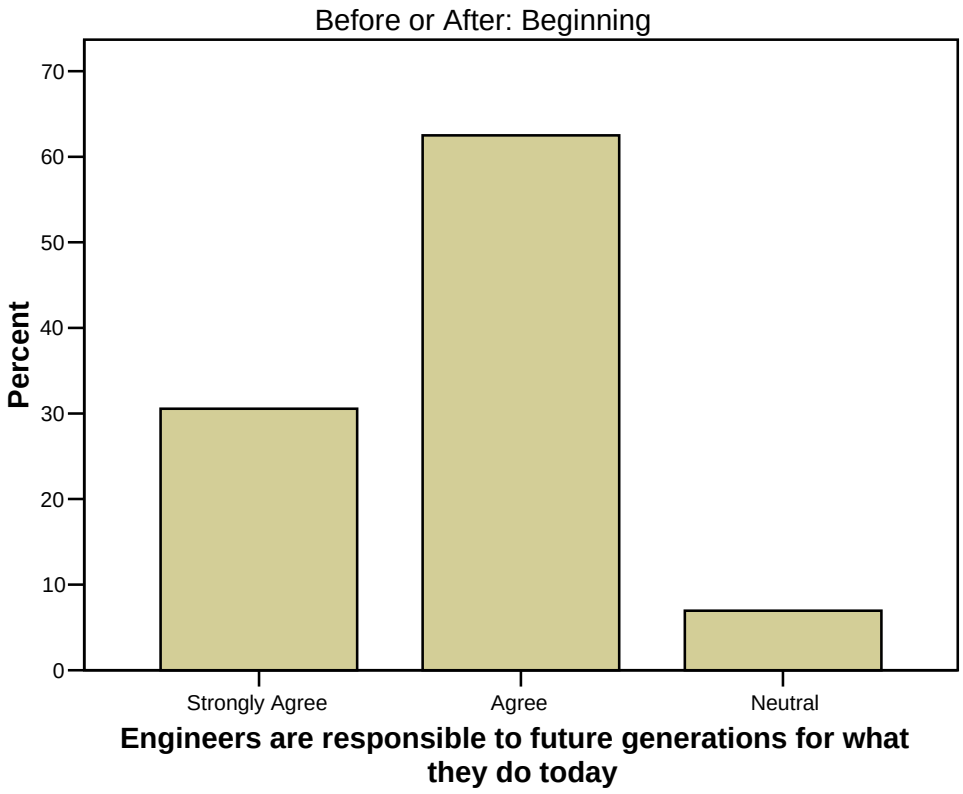
My cultural background is an integral part of my engineering decisions

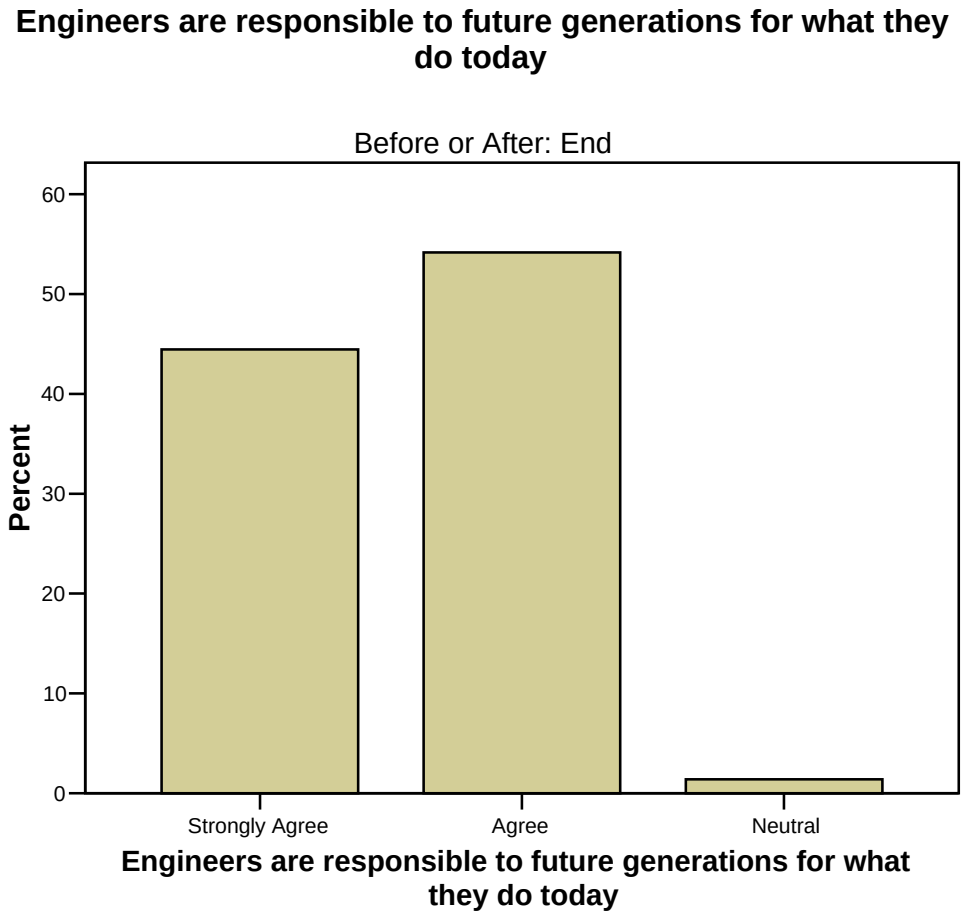


28. Engineers are responsible to future generations for what they do today

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	22	30.6	32	44.4
Agree	45	62.5	39	54.2
Neutral	5	6.9	1	1.4
Disagree	0	0.0	0	0.0
Strongly Disagree	0	0.0	0	0.0
Missing	0	0.0	0	0.0
Total	**72**	**100.0**	**72**	**100.0**

Engineers are responsible to future generations for what they do today

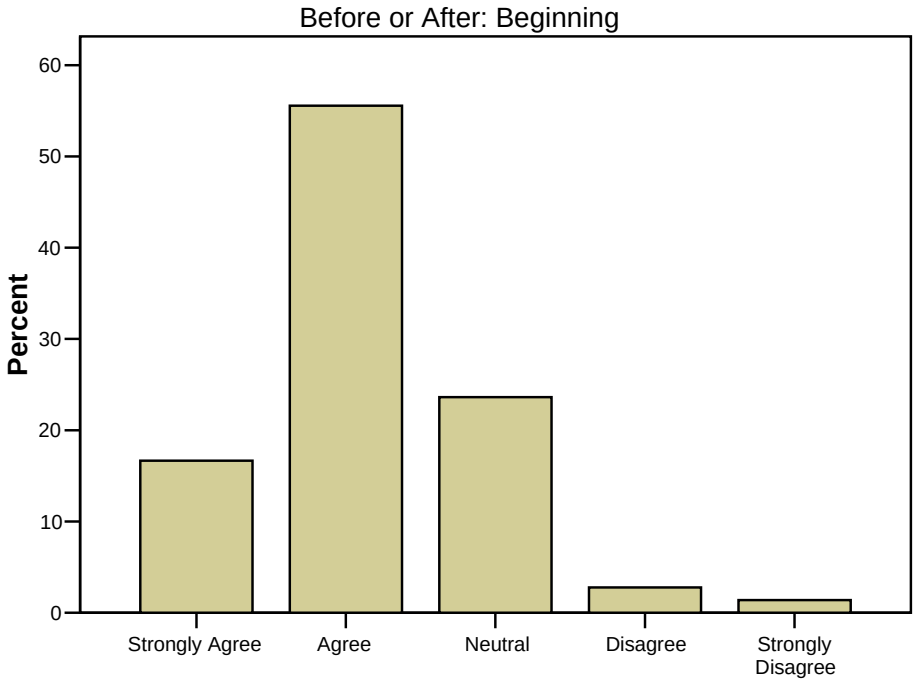


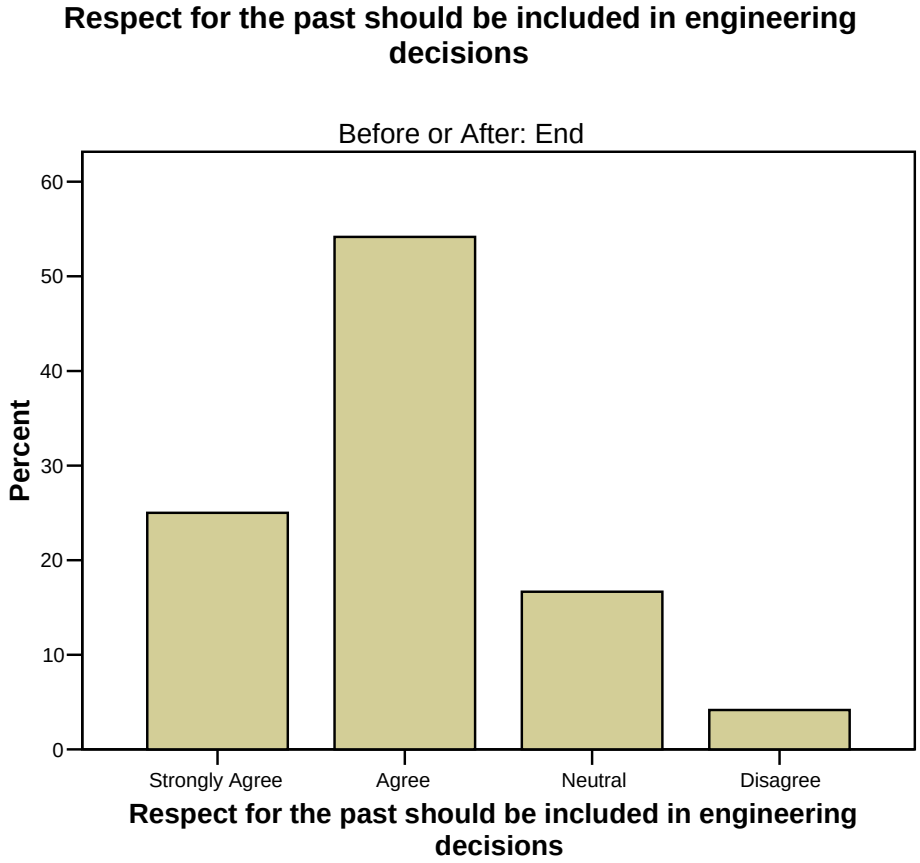


29. Respect for the past should be included in engineering decisions

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	12	16.7	18	25.0
Agree	40	55.6	39	54.2
Neutral	17	23.6	12	16.7
Disagree	2	2.8	3	4.2
Strongly Disagree	1	1.4	0	0.0
Missing	0	0.0	0	0.0
Total	**72**	**100.0**	**72**	**100.0**

Respect for the past should be included in engineering decisions



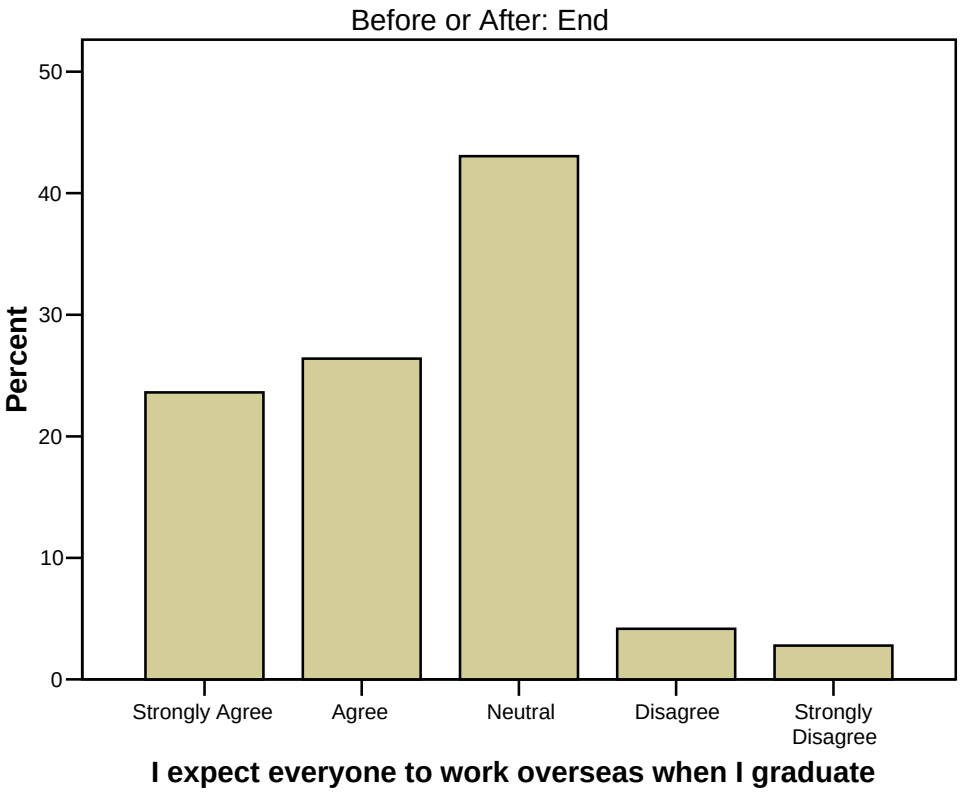


30. I expect to work overseas when I graduate

	Beginning		End	
	N	**Percent**	***N***	**Percent**
Strongly Agree	11	15.3	17	23.6
Agree	16	22.2	19	26.4
Neutral	34	47.2	31	43.1
Disagree	4	5.6	3	4.2
Strongly Disagree	5	6.9	2	2.8
Missing	2	2.8	0	0.0
Total	**72**	**100.0**	**72**	**100.0**

I expect everyone to work overseas when I graduate

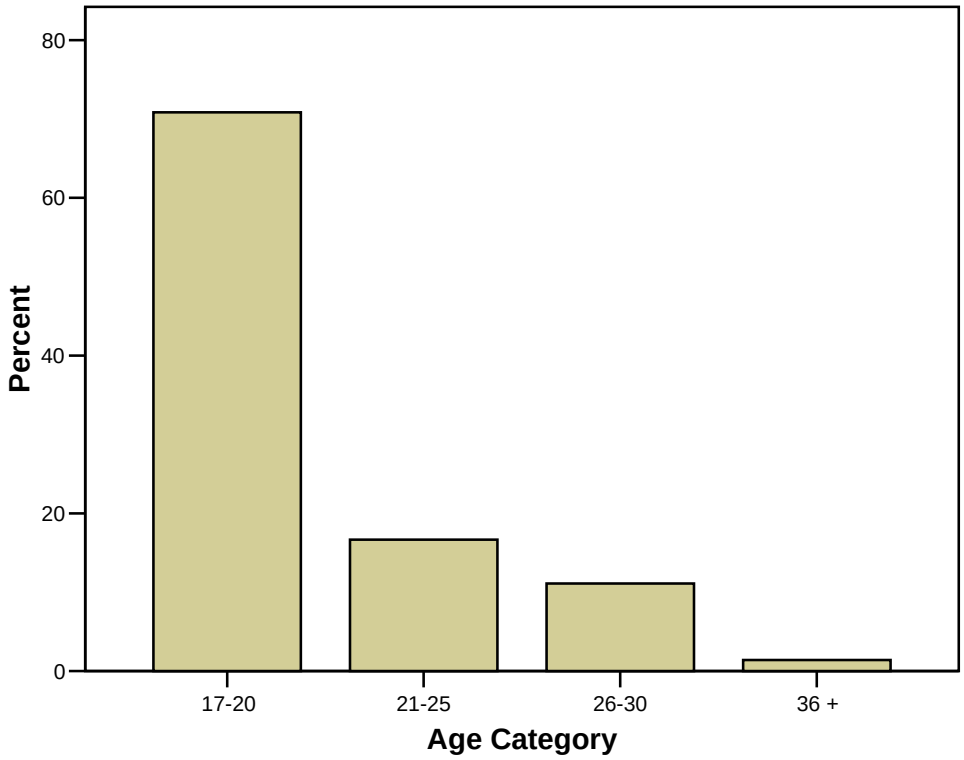
I expect everyone to work overseas when I graduate



Age

Category	*N*	Percent
17-20	51	70.8
21-25	12	16.7
26-30	8	11.1
31-35	0	0.0
36+	1	1.4
Missing	0	0.0
Total	**72**	**100.0**

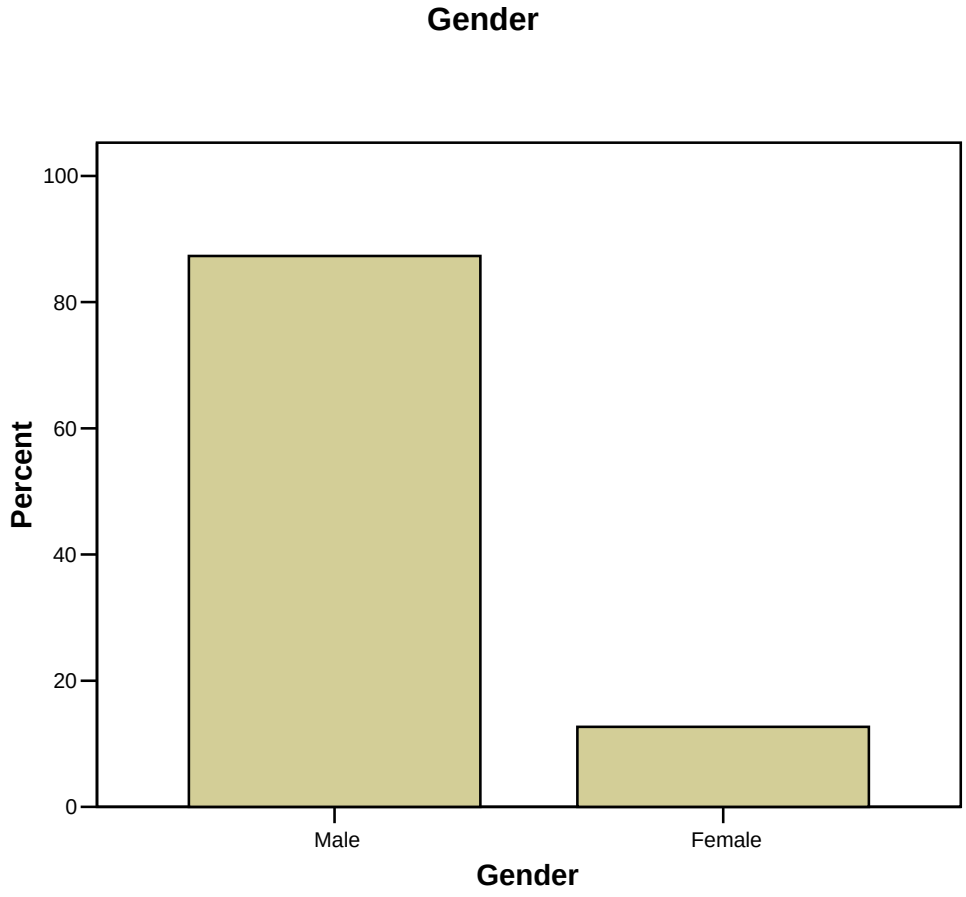
Age Category



Gender

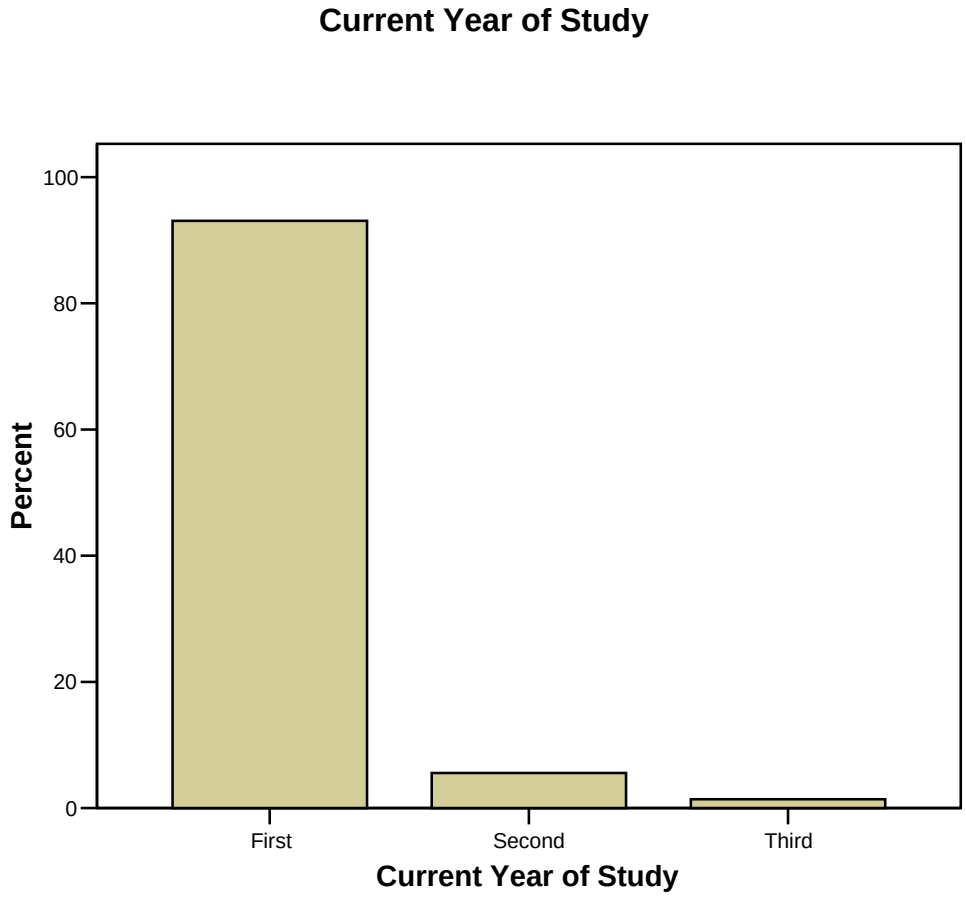
Gender	*N*	Percent
Male	62	86.1
Female	9	12.5
Missing	**1**	1.4
Total	**72**	**100.0**

Gender(a)



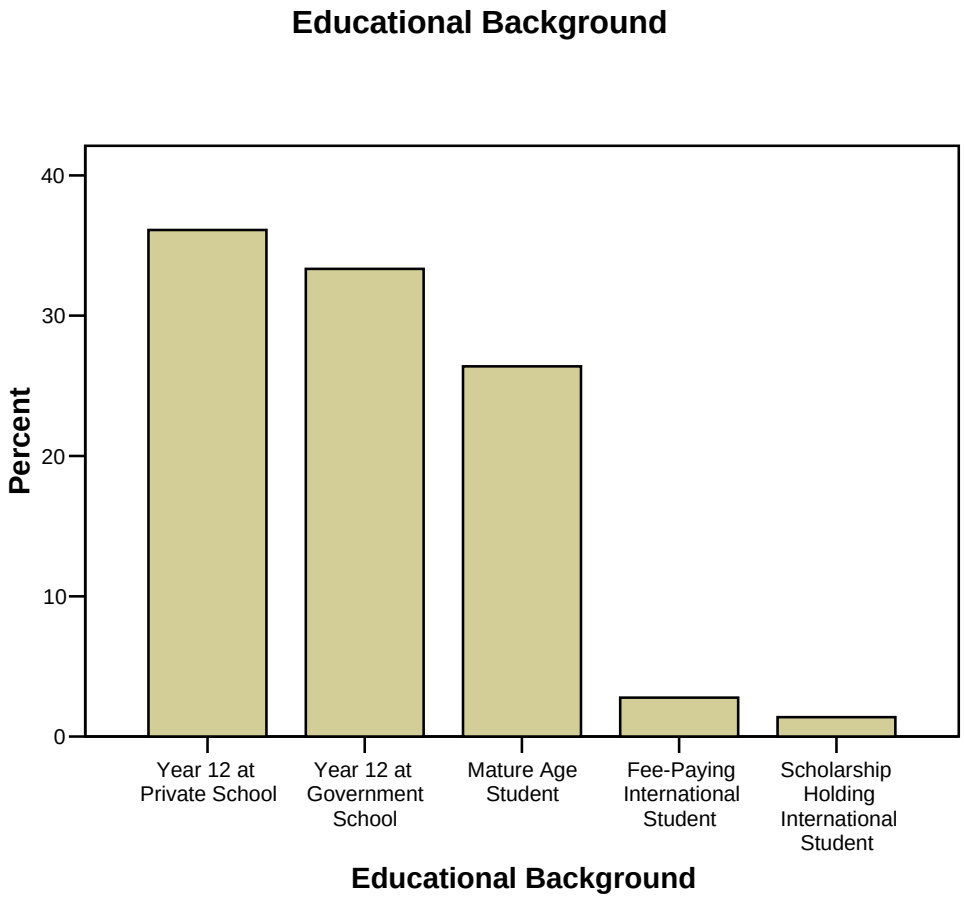
Current year of study

	N	Percent
First	67	93.1
Second	4	5.6
Third	1	1.4
Fourth	0	0.0
Missing	0	0.0
Total	**72**	**100.0**



Before you came to QUT, did you:

	N	Percent
Year 12 at Private School	26	36.1
Year 12 at Government School	24	33.3
Mature Age Student	19	26.4
Fee Paying International Student	2	2.8
Scholarship Holding International Student	1	1.4
Missing	0	0.0
Total	**72**	**100.0**

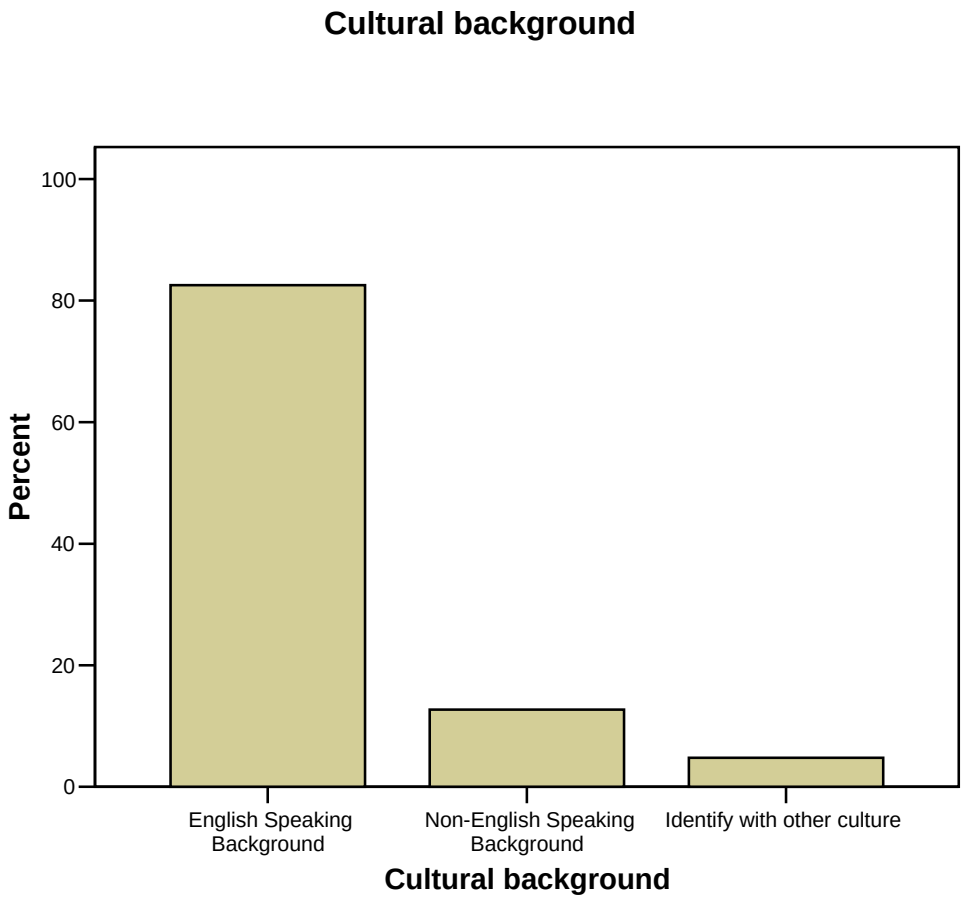


Country of origin

Of the three international students, one was from Germany (scholarship holder), one was from India and the other was from Malaysia (both fee paying).

Cultural Background

	N	Percent
English Speaking Background	52	72.2
Non-English Speaking Background	8	11.1
Identify with another culture	3	4.2
Missing	9	12.5
Total	**72**	**100.0**



Do you identify with any particular cultural or language groups?

Three people answered yes.

If Yes please write them here

Of these three, one person said Chinese, another said German and the other was recorded as a missing value.

Other people did put a value in here even though they didn't answer that they identified with another culture.

These responses were

Identify with other culture(a)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		63	87.5	87.5	87.5
	2nd gen (ital)	1	1.4	1.4	88.9
	cantonese	1	1.4	1.4	90.3
	chinese	2	2.8	2.8	93.1
	jedi	1	1.4	1.4	94.4
	polish/japan	1	1.4	1.4	95.8
	singaporean	1	1.4	1.4	97.2
	taiwan	1	1.4	1.4	98.6
	yugoslavian	1	1.4	1.4	100.0
	Total	72	100.0	100.0	

a Before or After = End

Appendix 6: Requests to use Reflective Journals and for an interview

2000–2002 & 2004

Communication Centre
School of Communication, QUT
Researcher: Ms Patricia Kelly (BA, DipEd, B Ed, Grad Dip Media, MA, FSEDA)
E-mail: p2.kelly@student.qut.edu.au

DATE

Dear student of BNBOO7

REQUEST: Permission to use Reflective Journals and for an Interview

I request your permission to read your Reflective Journals and refer to them in my analysis of the teaching and learning in BNB007. This is part of my PhD research. I have already given informal feedback to some of you on your journals via email.
Box 1 asks your permission for this. [I already have data from many of the last two years' students who kindly allowed me to read their journals][83].

Box 2 asks if you are willing to do an interview with me to discuss the Reflective Journals. This would be of one hour maximum in the post-exam period this year. I hope you might find it interesting as well. You can withdraw your permission at any time.

You can find an article I have written about the journals at this site Kelly, P. (2002) "First year engineers - Given half a chance…" (revised) The Pantaneto Forum, Issue 5, January. **http://www.pantaneto.co.uk/issue5/front5.htm**

I do appreciate your assistance.

Yours sincerely

Patricia Kelly

Reflective Journals

I give permission for the researcher to read my Reflective Journals and to use this data in her research. I understand that this data will be anonymous and I will not be identified.

NAME _____

[83] Added to 2001-2002 letters.

Interview

I am willing to take part in an interview.

My email is _____.

Researcher: Ms Patricia Kelly (BA, DipEd, B Ed, Grad Dip Media, MA, FSEDA)

E-mail: p.kelly@qut.edu.au OR p2.kelly@student.qut.edu.au

Request to use Reflective Journals 2004

December 1, 2004

Dear Student of BNBOO7,

REQUEST: Permission to use Reflective Journals

As I mentioned in a previous notice and email, I now request your permission to read your Reflective Journals and refer to them in my analysis of the teaching and learning in BNB007. This is part of my PhD research into improving teaching and learning. I only use journals for which I have received permission. I am sorry this is a global email, but writing 350 individual emails is a pretty arduous task as you can imagine. I will write and thank those of you who give permission. [This was done]

I did not ask during the semester as I did not want any of you to feel that your permission was in any way connected to the marking. All your marks have now been recorded and I play no further part in your assessment. I hope you feel that I did my best to support your journals.

I already have data from many of the last three years' students who kindly allowed me to read their journals. I may quote from your journals in my thesis but this will be anonymous and **your name will not be used at any point.**

You can find an article I have written about the journals at this site Kelly, P. (2002) "First year engineers - Given half a chance…" (revised) The Pantaneto Forum, Issue 5, January. **http://www.pantaneto.co.uk/issue5/front5.htm**

By returning this email, I give permission for the researcher to read my Reflective Journals and to use this data in her research. **I understand that this data will be anonymous.**

If you have any queries, please contact me on the above emails. Best wishes for a safe and happy holiday season.

I do appreciate your assistance.

Yours sincerely

Patricia Kelly

Appendix 7: Letter to interviewees

The Centre for Innovation
Faculty of Business
QUT

July 1, 2000

Dear ,

Thank you so much for agreeing to be part of the interview process for my research into learning in BNB007 in 2001. I asked permission to interview you about your experience of BNB007, particularly the Reflective Journals, as the final part of my research data. I am as interested in those of you who **didn't** find it useful as those who did

I was originally going to select a sample, but I have been advised instead to keep interviewing until I have what is called *Theoretical Saturation*, or no new information. So at this stage, I am not sure how many of the sixty of you who gave permission I will need to interview. This is an initial letter to each of you. I will follow up with individual letters as I identify those of you whom I think will add extra or different perspectives. For example, a mature age student may have a very different point of view than some-one coming straight from Year 12.

What will the interview involve?

I am interviewing using a process called **Sense-Making**, which is a bit different from ordinary interviews. It will take up to an hour but the research says that it is more interesting for both the interviewer and the interviewee. The process involves identifying important issues or incidents in your learning experience in BNB007 as you recorded it in your Reflective Journals and then following a set of mandated questions designed to help you tell your own story, using your own feelings, words and perceptions about things that, for example, helped or hindered your learning. I will explain the process to you as part of the interview.

I will ask you to choose a pen-name to be used to identify any of your comments in the research. This will guard your anonymity. The interviews will be tape-recorded and you will have the opportunity to read the transcript of your interview when this is done, so you can make any further comments or correct anything. You are free to withdraw your consent at any time in the process.

Where and when?
I can book a room for these interviews at Gardens Point. I will fit in with your timetable to interview you any time that suits you from September 1 until the end of the year, except between November 4-10, when I will be at a conference.

Otherwise, I am sure we can find a time and place to suit you, off-campus if you prefer.

Please email me at p2.kelly@student.qut.edu.au to let me know your willingness at this stage.

[I agreed to offer you $10 for lunch, thinking of Degrees or a city café. I will give this to you at the interview. It is not payment as such, but recognition of your time and effort in contributing to this research. I know that many of you work, so I will fit around your timetable. I am sorry there has been some delay in getting back to you. I could not undertake the interviews until I had successfully passed the Confirmation stage of my PhD, which took place in May, 2002. This in turn was delayed because of a family bereavement][84].

If you would like to read an article I have already written about the Reflective Journals aspect of the unit, you can access it via the Web. Please see Kelly, P. (2002) "First year engineers - Given half a chance…" (Revised) in *The Pantaneto Forum*, Issue 5, January. http://www.pantaneto.co.uk/issue5/front5.htm **(e:journal)**

I welcome your comments on the paper.

I look forward to meeting you at the interview, which will be a learning experience for me and I hope for you too.

Yours sincerely,

Patricia Kelly

[84] This paragraph was in the 2002 letter to 2001 interviewees only.

Appendix 8: Template for Reflective Journal 1

User View | Admin View

OLT Trail: Professional Studies 1 > Reflective Journals > 1. Reflective Journal Topics >

Reflective Journal One

Personal perspective on learning/ Personal Learning Agreement

Introduction	• My name is... • I am... • I am doing Engineering because... • My strengths are... • Tutorial 1,"Thinking about Learning" helped me to realise.... • I now think that a "reflection" means.....
Code of Conduct and Suggested Learning Agreement	• I have read and thought about the Code of Conduct and the suggested learning agreement for BNB007.[There is a link to these opposite.] • It means... • I thought that.... • The positive things about the learning agreement are...
My Personal Learning Agreement: Here is typical student comment. *I think that the learning agreement is a positive thing because it makes you set goals to achieve during the semester.* *In conclusion, I think that learning agreements are good at motivating a student to give 100% by setting himself/herself achievable goals?* 2001).	Here are the five things I want in my own Learning Agreement for BNB 007.. (List them) 1. 2. 3. 4. 5.
Summary/Conclusion:	• A question or confusion I have

	is... • Something that might help now is .... • My aims for this semester are....

Why is a Learning Agreement important?

- **As practising engineers, you will be responsible for advancing and changing the companies, communities and nations in which you work.**

Employers and/or clients will require you to sign a contract to work. In order to ´register´ as a practising engineer you will be required to conduct your engineering practice in an ethical and professional manner (according to The IEAust Code of Ethics). This unit offers you the opportunity to begin this process.

- **As students you have a special responsibility to yourself, staff and fellow students to start developing your professionalism as a future engineer**.

Your actions affect the ability of other students and staff to work effectively. This may affect the quality of your learning and education. To help you to develop your conduct [professionalism] as future engineers we would like you to create your personal Learning Agreement based on a Code of Conduct. This is part 3 of Reflective Journal One.

Appendix 9: Learning agreement and Code of Conduct

Here are some ideas for a Learning Agreement using a Code of Conduct for BNB007 students. Use or **adapt** these ideas to create your own **Personal Learning Agreement for Semester 2, 2005**.

I AGREE TO	WHAT MIGHT THIS MEAN IN PRACTICE?
Learn to the best of my ability	Set myself goals to achieve this semester
Respect other people and possessions	Treat other people [in person and on-line] and their possessions with respect and courtesy. **No put-downs**
Respect the environment and living creatures	We are borrowing the earth from our children. What we do makes a difference to their future. What future am I helping to create?
Be punctual	Arrive and leave lectures on time. If this is not possible arrive and leave with minimal disruption to the class.
Conduct myself as a professional at all times	Respect the right of other students to listen and learn in lectures and tutorials. Do not place feet on the seats, use offensive language, talk loudly, consume food or drink.
Seek direction and guidance if unsure	Ask for help when you don't know or if unsure about something
Manage time effectively	Devise a study and recreational plan for each semester and stick to it .
Express ideas to the group or team without fear of rejection	Take risks - express your ideas - most ideas are useful/helpful [if only in part]
Come to tutorials prepared to work	Read about the tutorial in the Study Guide and read at least one suggested reading each week.

Task

Discuss this *suggested* Learning Agreement with other students and then write your own Learning Agreement as part of your first Reflective Journal entry.

Here is an example of a personal Learning Agreement from a previous student who has kindly allowed us to share it.

"Here are five things I would like in my own learning agreement

1. Set myself goals at the beginning of the semester and try to achieve these

2. Being punctual to lectures and trying not to skip too many

3. Manage my time effectively and set priorities i.e. Not going out too much

4. Respecting the people around me and accepting their way of thinking

5. Ask for help whenever and wherever I can.

Generally I think learning agreements are a valuable thing as the help to be in my case a better engineer and to strive towards my goals."

Student Code of Conduct

Please refer to Appendix 43 of the Manual of Policy and Procedures, MOPP, available through QUT Virtual, for the full charter

STUDENT RESPONSIBILITIES

- to acquaint themselves with University policies and procedures relevant to their enrolment and course of study and obey the statutes and rules of the University
- to treat other students and University staff with respect and courtesy and to behave in a manner which does not adversely affect the freedom of other persons to pursue their studies or duties
- to refrain from harassing or discriminating against other students and staff on the basis of gender, race, ethnicity, sexuality, religion, age, disability or background
- to respect University facilities and to comply with the rules of the University or any lawful order of University staff
- to work to the best of their abilities and to make genuine attempts to progress successfully through courses by meeting course requirements, deadlines for assignments and punctual attendance at lectures/tutorials
- to provide, through the QUT evaluation processes, constructive feedback to academic staff on their teaching and the quality of units of study
- to refrain from cheating, plagiarism, fabrication or falsification of data and unauthorised use of facilities and equipment
- to meet their financial commitments to the University
- to comply with the instructions for health and safety given by the University

What are the consequences of not following a Code of Conduct?

In professional life, engineers who do not practise according to the Code of Ethics can be deregistered.

If a student does not treat others with respect and courtesy action may be taken. This may range from a caution, to refusal to allow participation in the class, to refusal to mark assessment.

[Note: A student will only be refused assessment marks **after consultation** has occurred between the student, the staff member and the Dean.]

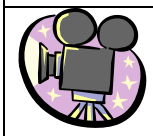
BNB007 - Professional Studies 1 - Home Page

Appendix 10: Find a person who …

FIND A PERSON WHO….. VERSION ONE: THE STAIRWAY TO SUCCESS
TUTORIAL – THINKING ABOUT LEARNING

Objective
To meet and interact with other learning Engineers.
To appraise your learning, writing, speaking and negotiating skills.

Exercise 1 Networking – Find a person who …..

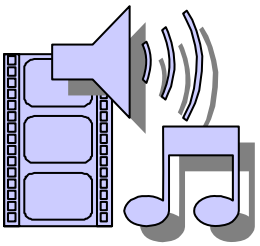
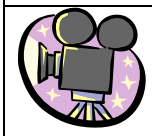
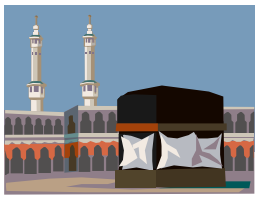
Write only one person's name in each square. 	…… Knows that 2003 is International Year of …… 	…… is a member of IEAust Student Chapter 	…… is working this semester 
 …… has not watched any sport on television in the last week	…… has English as a Second Language 	 …… is in a different Engineering course	…… has an unusual interest, talent or hobby 
 …… speaks and understand an additional language	 …… lives in the same suburb	 …… can explain that Ramadan means ……..	 Now find members of your project team and record their contact details. (Do this last)

FIND A PERSON WHO….. Revised Version

Objective

To meet and interact with other learning Engineers.
To appraise your learning, writing, speaking and negotiating skills.

Exercise 1 Networking – Find a person who …..

Write only **one** person's name in each square. 	…… knows that 2004 is International Year of …… 	…… likes the same movies or music as you 	Wears the same size shoes as you… ……
 …… has not watched any sport on television in the last week	…… has travelled overseas 	 …… is studying in a different area from you	…… has an unusual interest, talent or hobby 
 …… speaks and understands an additional language	 …… comes from a different town or suburb	 …… can explain what *Ramadan* means ……	 Now find members of your project team and record their contact details. (Do this last)

Appendix 11: Exemplar journal – Accepter

Journal 1 Personal Perspective on Learning/Personal Learning Agreement

I am [ ] and I am currently undertaking my first year of Engineering [deleted]. I am doing the course because I appreciate the practicality of engineering and I could not see myself doing anything else. My strengths are the ability to do logical problems and I am quite confident when I need to do public speaking. The first tutorial entitled "Thinking about Learning" helped me realize the importance of knowing your strengths and weaknesses and also how to go about improving my learning techniques. It also made me consider how other people judge my writing which previously, had never been considered. In light of the first tutorial, I believe reflection means thoughtfully evaluating what has been learnt and expressing carefully considered ideas.

After reading the Code of Conduct and the suggested learning agreement, I believe it means working as hard as I can, along with having respect for the university and confidence in myself and others. I think that the learning agreement has some valid points. Although, according to my past behaviour, even when study plans are written, I have poor time management. I think the Code of Conduct is effective and achievable and these points are easily followed. Some positive things about the learning agreement are the respect it shows towards the environment, other students and staff. Also it emphasizes the need for hard work and dedication to the course and professionalism is a key concept.

Five things that I would put in my learning agreement would be
1. Keep on top of my workload sacrifice social time if necessary.
2. Listen to peers, staff etc.
3. Ask for help if I don't understand
4. Set goals and stick to them
5. Participate in group discussions, tutorials etc.

Overall, the Code of Conduct and Learning Agreement are an effective way of having a written contract in order to stay focused to this subject. They will help increase my professionalism and will allow me to become a more productive, proactive and enthusiastic engineer in my future career.

Journal 2 Problem Formulation and Critical Thinking

Critical thinking to me is evaluating and thoroughly examining a particular issue or problem and visualizing different options in order to arrive at an acceptable conclusion. Problem formulation is when you investigate a problem and identify its components. It also involves attempting to devise a solution to match the goals of the people involved and yourself. Rice is Life (Kuyek, 2002) and Trouble at the Temple (Kintisch, 2003) raise issues that will help my engineering career. The lecture helped me realize that many different people are involved in the project process and it is important to understand cultural differences and the consequences of political unrest. All possible scenarios should be considered and the best solution for all parties should be selected. If this is not upheld, there may be difficulties in terms of protests, disagreements and arguments.

Trouble at the Temple helped me understand more about the cultures and beliefs surrounding the Wailing Wall in Jerusalem. This article made me realize how naïve I was, particularly when it comes to religion and the sacredness of the Western Wall. I also learnt that there is more to engineering than what I first thought. Timing of construction and deadlines are critical to this project because of the annual holy festivals. A crucial balance must also be found between the ideal solutions of all parties involved. I realized the need to research the background and weather conditions of the area because those factors may influence the effectiveness of the solution.

Rice is Life helped me to understand the monopoly of seed producers in developing countries and I realize how unethical it is. The article provided effective examples of the overall situation in

developing countries. Some areas are fighting back with protests and anti-patenting rallies. However, I believe that in the end, technology will win over traditionally sustainable farming and food security, even though tradition would be better for the communities and the environment.

Overall, I have learnt about numerous different factors that need to be taken into account when considering a project, such as background, timing, cultures, communities and ethics which I believe will be of great importance in the workforce.

JOURNAL 3 Intercultural Skills: Cultural Sensitivities & International responsibilities

"In order to become what others describe as 'successful in this world,' you often end up destroying that within you that is most precious." (Greaves, 2001)

I feel that this quote reflects the need to keep true to yourself and your beliefs, while trying to understand other people and respect their differences, which is important when it comes to cultural sensitivities and international responsibilities. The lecture helped me understand that cultural sensitivities involve being aware of other traditions, religions and cultures and making sure that through actions, I do not violate their beliefs. Our international responsibilities are to discourage ethnocentrism and allow for individualism while improving our lives through learning about the lives of others.

It is important to incorporate awareness of other cultures and respect for individualism into my life as an engineer and as a person because it is infinitely better to be thoroughly educated and able to adapt and improve my situation than to be ignorant. I felt that the article Of Promise and Protection Preserving Bhutan (Greaves, 2001) was very respectful of Bhutan and it helped me learn more about Bhutanese culture and the fact that you can learn something from everyone. It also emphasized the fact that the Western lifestyle is threatening the culture of the area. However, I felt that it was a little overdramatic and made the Western world sound like a catastrophic virus. While it does have definite problems, I do not believe it is in dire straights just yet.

My cultural strengths are that I try to learn as much as I can about other cultures because I find it quite interesting. I think that no matter how much we learn, other people will always have stereotypes and politically incorrect views, if that is the attitude they were raised with, it is easier to be blissfully ignorant than to change your beliefs from unconscious to conscious.

If I had a "magic wand" I think that it would be most helpful to visit lots of different areas where the cultures are vastly different and experience first hand the differing opinions, values and experiences. I believe that only then can you be truly aware of the situations surrounding you.

JOURNAL 4- Peer Interview

A passion for travel and the signature warmth and friendly nature of someone from C- are just two of the things that characterize who is currently studying first year Engineering (Aerospace Avionics). I chose to interview because of these qualities and she seemed really approachable and fun. Something that I found interesting about was that she only moved to Brisbane from x eight months ago and since then she has settled into Brisbane life really well. I admire the fact that she was able to leave her friends (and warm weather) "back home" and come down here to study at University with such ease and cheerfulness.

main difficulty with writing the reflective journals was getting started; she found it hard to introduce her topic, particularly for the first journal. She has many goals for this semester such as obtaining at least two 7's in her studies. Last semester her goal was to pass and although she achieved it, she was not as satisfied as she would have liked. She also would like to stay stress-free and not fall behind this semester while saving for a trip home to x at the end of the year. She also hopes to mature and be more professional in terms of study and dealing with her workload.

So far, BNB 007 has introduced her to graphics, which she is thoroughly enjoying and that has been a big help for her. The article she found most interesting was The Heroic Rule of Relationships by Margot Cairnes because she found it "conceptually interesting" and a different point of view which is reflected in her journal writing. We both agreed that the best aspect about reading the journals of each other was the way it showed our personalities. We both thought that you can tell so much about another person by seeing how they express themselves through their writing.

I thought that the interview was a worthwhile experience as it taught me a lot more about and it was an insight into her beliefs and thoughts when I read her journals which I think was very beneficial. It surprised me how much I could learn from someone else just by reading their thoughts about different issues. Overall, it was an excellent experience that I wouldn't hesitate to do again.

JOURNAL 5- Environmental Principle/ Sustainable Engineering

Sustainability is important in everyday life because it means considering the consequences of our actions which is an important step for human beings because it means taking responsibility for what happens in the future.

Environmental principles are a code of conduct pertaining to nature and our surrounding area. It involves analyzing ways we can reduce our impact on the Earth's natural resources and making our presence as less intrusive as possible. Sustainable engineering is about making sure that new designs are environment-friendly and utilize the appropriate techniques so we do not jeopardize the ability for future generations to cater for their needs by using unnecessary resources.

The article Little Feats (New Internationalist, 2000) helped me to understand more about my "ecological footprint" and how I can reduce that impact. I understand that as a professional, I have a responsibility not only to my employer, but also to the Earth. B's lectures on sustainability helped me to understand that if I utilize sustainable engineering practices, my future effects may be positive, on the other hand, if my practices were unsustainable, it may have an inverse effect. I also discovered that sustainability is not just about the environment, it is about society and the economy. I also found it informative to learn about natural capitalism and whether this is the answer to a sustainable future.

I believe that Jim Merkel and Erica Sherwood made valid points in the article. The 'wise acre' analogy was very insightful and made me think. I also found the facts about the amount of bio-capacity per person very frightening, if we keep consuming resources at the rate we are today, the next generations are likely to suffer immensely. I agree that the achievement of reducing our footprint on the Earth can be liberating because it means getting in touch with the Earth and we can "fall in love with the Earth again" (Merkel, 2000).

In general, I think that very few people think about their effect on the environment and how others will be affected. Hopefully in the near future, people will become more aware of themselves.

JOURNAL 6 Socially Responsible Technology

After reading the article "Chopstick Controversy" by Yang Zheng (1999) and the paper entitled Towards an Environmentally Conscious Engineering Graduate by Professor Sharon Beder, I am beginning to understand the importance of society in terms of engineering and how it is vital that I consider all possible solutions when developing new technologies or changing old ones. I believe that socially responsible technology means understanding the needs of the people who will be affected or changed by the new technology and doing the "right" thing for the community in terms of the environment, long-term financial benefit and future generations.

These articles helped me to understand more about the different types of environmental protection, for example "end-of-pipe" technologies and how they are used as a scapegoat for weak laws that

seek "quick remedies to severe environmental problems" (Beder, 1996). The benefits of appropriate technology is now clearer to me and I am now more encouraged to pursue sustainable technologies in my professional career, as an alternative to following the standard solution of simply adding methods to control waste. The lecture by Professor L helped me to identify sustainability problems and the growing increase in resource usage over the past few years. I particularly liked how he demonstrated this by showing the comparisons with Mt Kilimanjaro. As an engineer, I will strive to develop new technology that does not deplete resources or contribute to problems such as those described in the article, by respecting the Earth and developing sustainable solutions.

My personal vision for the future would be one where the extent of deforestation in China is reversed by conservation efforts and new developments that do not jeopardize the resources of the future, like those described in the lecture. I also hope that I continue to have a vested interest in the most sustainable way of achieving a certain goal, rather than the easiest or the quickest.

This article along with the lecture has made me more aware of the fragility of the Earth and its resources. I hope that we have not exhausted these to the extent of irreversible damage.

JOURNAL 7 Professional Engineering Ethics

Professional ethics mean a great deal to me because my values and upbringing have meant that loyalty and integrity are very highly regarded. I have also experienced ethical challenges within the workforce previously which has helped mould my values and ideals in the present.

The lecture on ethics in engineering helped me to understand the importance of having a strong set of values and helped to evaluate potential dilemmas in my engineering career. Professional ethics in the 21st century means using values and morals to evaluate problems that arise in the workplace. New technology and current developments in research have meant that ethics are sometimes lost in the "hype" of progress but I believe that they are a major part of sustaining our planet and reassuring our future. Environmental ethics are also vital in recent times because the damage we are inflicting is now becoming apparent, as seen in the excerpt of text by The Committee on Engineering and Environment. This text reveals the accepted code of Environmental Ethics, which includes making sure there are enough resources left for the future. This also involves discussing and thinking about the consequences of a proposal which is vital in terms of protecting the earth.

One ethical dilemma I have faced previously was that a staff member was giving friends discounts that I knew were unacceptable. This situation was difficult for me because I felt torn between my colleague (as I did not want to betray his trust) and the company because I knew it was costing money. I wanted to stay loyal to my co-worker and yet I knew that I needed to act responsibly. I realized that my colleague did not understand that the money was being charged to the owners. I quietly spoke to him and explained that I felt uncomfortable and that it was unacceptable. This allowed me to communicate more effectively and I hope I earned his respect.

Professional ethics are vital in running a successful business and as an engineer; I understand that I must possess favourable values and ethics which are beneficial towards my employer and colleagues.

JOURNAL 8 Project Progress and Planning

Throughout our lives teams are absolutely essential and a part of everyday life. It is important to acknowledge our strengths in teamwork because we generally have to work effectively with these people everyday.

While reading the article Achieving Success by Slava Thaler, I learnt numerous techniques that I believe will help me to become a more productive team member and engineer in general. She emphasized the need to always give to others and the notion of karma was discussed which I found really intriguing. The lecture by D also allowed me to improve my skills in teamwork.

Particularly focusing on active listening, shared leadership, flexibility and sharing the workload. This was helpful though I think a lot of it was common knowledge and it depends on the individuals involved as to whether or not this advice will be heeded.

Through previous experiences in teamwork, I found that when I was younger, I liked to be right and take charge and command people. However, recently I am happier letting others share the spotlight. I try to be encouraging and enthusiastic with my team members; I believe that this allows freer discussion and everyone getting their share of "airtime". One aspect that requires improvement for me is motivation, I tend to loosen deadlines which is unproductive although I will take into account the hints discussed in the article to avoid procrastination.

My journals reflect who I am and who I want to be as a professional, which is why I am content with them thus far. One negative aspect would be that I am not as opinionated as I could be; I tend to stick to a safe response rather than thinking laterally. Also my journals are often too long which makes it difficult to reduce.

My hopes for the future are to find a mentor (or a group of mentors as Thaler said in the article) and remain positive. I hope that by doing this, I will be more successful and a happier person. My long term goal is to become a stronger person who is more comfortable with myself and has a lot of faith in my abilities.

JOURNAL 9 Negotiation and Conflict Management

The articles Facing the Dark Night of the Soul and Stages of Personal Development by Margot Cairnes were an insight into the way I solve problems. They helped me determine which level of personal development I was, and which level I wanted to be at. The lecture on conflict management and negotiation by N also helped me to understand the different types of people and language in conflicts and some techniques on how to better manage future conflicts.

I believe that negotiation and conflict management means listening intently to both sides of a disagreement and offering suggestions on how this issue could be solved whilst talking to the discontented parties to see if a feasible solution can be agreed upon by all concerned.

Conflict is faced every week, often everyday because there are always disagreements. In primary school, I was a peer mediator which helped me to improve my conflict management skills and it enabled me to handle potentially disruptive situations more effectively. My strength in negotiations would be that I am very determined so will keep trying until I get a result. Another positive aspect in my conflict management skills would be that I like to please everyone, although often this can be a hindrance. One issue that I need to work on is my ability to stand my ground; I tend to be a "turtle" (as described in the lecture) which may mean good ideas go unnoticed.

Through reading these articles and hearing N speak about these issues, I have discovered that everyone operates on a different level which is why conflicts arise in the first place. To become a more effective negotiator, I need to use innovation and "think outside the square" while listening more effectively and defining each others needs to arrive at a win-win solution. I thought that the animal analogies in terms of dealing with conflicts were a really cute idea and it was effective in explaining the different types ways of dealing with conflict. I also am more aware of the necessity of being assertive.

JOURNAL 10 Globalization and Professionalism

Globalization is a term that is being heard more frequently as time goes on. This term to me, involves the growth of technology and the way that businesses often spread to overseas due to the convenience that improved communications and cross border relations have made. Professionalism involves many different things including honour, integrity, politeness, responsibility and communications.

Through reading the article Irreconcilable Differences or Strange Bedfellows, I managed to understand a little more about globalization and it made me agree that it is not as bad as I originally thought it was. A lot of what Mark James said made sense which was very helpful. I found that the lecture by Dr. G was rather hard to follow and dealt with difficult concepts that were hard to understand. However, I did learn about the different decisions that companies make particularly when considering going overseas. I also discovered how to calculate internal rates of return, net present values and other ways of determining the viability of a proposal. The lecture on professionalism what much easier to take and I found it useful in determining the kind of professional I would like to be.

As an engineer, I feel that these issues will be vital because it is important that we keep updated so that we can use the latest technology in our designs. It is also important that we understand how the world is progressing in terms of the economy and also the cultural and social aspects.

To me, professionalism means understanding all the facts and coming prepared while using all the resources available to enhance your performance as an engineer. It also involves taking responsibility and respecting peers and superiors. More importantly, professionalism is about communication and working with teams effectively and productively.

To me, success means being the best professional that I can be while being well informed about the latest revelations in Australia as well as overseas without jeopardizing my health, relationships or interactions with other people. If I achieve this in my lifetime I will be content.

JOURNAL 11 Self Interview on Learning

The duration of this subject has been a challenge, an adventure and a positive experience. I found that this subject has taught me more about myself and what kind of person I would like to become. It has encouraged me to set goals and become more involved in my learning by managing my time and developing a study plan. Although I still managed to waver from the timeline I set at the beginning of the semester, I found myself less stressed and more prepared at the conclusion of this subject.

The most helpful aspect about BNB007 would probably be the computing module, I felt that this was very effective and I only wish that I had known those techniques sooner. The most interesting topic that I have written about would have to be way back in journal 3 when we discussed international responsibilities and cultural sensitivities. I found the article about Bhutan really inspiring and it gave me an insight into another culture, which I thought was very beneficial. One obstacle that has always been a problem with me is motivation, I found that although I wrote time lines and study plans I have a real problem staying true to deadlines which will definitely need improvement.

As a “learner” engineer, one goal for the future is to find mentors, as they will be able to motivate me and keep me on track while educating me. I also hope to research more about other cultures and keep up to date with current affairs pertaining to Australia and overseas because so much can be learned through knowing the facts and obtaining an opinion about issues that may affect me now and in the future.

Throughout my professional studies experience, including the lectures, tutorials and journals, I have developed a new way of thinking that encompasses the cultural, professional and sustainable beliefs discussed throughout the semester. I hope that I will continue to strive to be the best engineer that I can be while still staying true to my personal beliefs and maintaining a strong relationship with my peers, superiors, family and friends. That would be true success to me and BNB007 helped me to understand that.

Appendix 12: Exemplar journal – Convert

Relative Journal Number 1
Topic Reflection One: Personal perspective on learning/ Thinking about Learning in BNB007

My name is . I am a new international student and my home country is . I am doing Engineering because I do not like Business and Information Engineering and also most of my friends study Engineering, so I chose this subject. My strength is Mathematics and weakness is English. I hope this semester I can improve my writing skills gradually through these journals. Tutorial Activity 1, "Thinking about Learning" helped me to realize what the standard of my English is. I now think that a "reflection" means what you should do to improve this language and also thinking back on other learning.

I have read and thought about the Code of Conduct and the suggested learning agreement for BNB007. It means if you want to become a successful engineer, you need several qualities, such as: Self discipline, Balanced lifestyle, Decisiveness and integrity and so on. Right! This is true. But the main point is there are only a few people who can obtain all these things. It could be too tough to me. The positive things about the learning agreement are that you need to try to find out what type of ability you have and try to set some agreement to improve it even though the target is hard.

Here are five things I want from my own Learning Agreement for BNB 007.

1. Try to concentrate and do not sleep in lecture class
2. Do not spend so much time on computer games, TV and internet everyday
3. Try to speak more English everyday and do not be afraid if they do not understand
4. Hand in assignments and journal on time
5. Start to study as soon as possible
6. Be more active when I work with others

All in all I think this course guide you what you should be. If I do follow them and learning agreement, then I will have a bright future.

Relative Journal Number 2
Topic: Learning in your Professional
Learning in your professional

It just means how to be a professional, how to work effectively and how to enjoy your life. As learning agreement has mentioned, to become a great engineer, you should have a balanced life style, self discipline ability to think and long term plan and etc. If you have these qualities, you can your work, your life and your family very smoothly.

First of all, you need to know what your strength is; weakness and also you need to aware your limitations. After that, you can find some ways to improve your weak point. For me, I have a poor time management and also not reading quickly and effectively. Since I do not know my ability, so I set my timetable really late and crazy. Of course, I cannot follow what I have set in my timetable. So I just point out what kind of thing is the most important and do that first. Although this is not the best method, it should be fine to me.
I should be a working smarter not harder person because I am a quite lazy, so I do not want to spend much time on everything. For example, study, I try to understand all theories before I do any homework and exercise. As I really hate to go back to find answers from the books again and also you can know how good your study is.

Actually, I do not know what to do in my profession, but I will set some targets in this semester. The main one should be to pass all subjects and try to get high as possible. Moreover, try to find out what kind ability I have. But in the future, I definitely want to learn one more language and it may be French or Japanese.

Relative Journal Number 3
Topic: Professionalism

If you ask me what I want to do in the future, then I will say I have no idea. Actually I never think my future, since you do not know what will be happened. It is possible I will die tomorrow or I become a billionaire in ten years later. At that moment, I can only say I want to finish my course as soon as possible. Since I am an international student, so the school fee is extremely expensive and this is a great burden to my family. Also I quite miss my parents and my friends. Maybe, you will ask have I ever thought I will work in Australia after I have graduated. If possible, this may be a great challenge to me, but this should be a valuable experience. Now I really aspire to finish my course with a good result and become a professional engineer. I do not want my parent to feel disappointed about my study.

It should be really simple "Do not care about the failure, Do your best". At that moment, I cannot say I am professionalism. But when opportunities are given, I need to try, even though I will fail at last. The main point is if you fail in this time, then you will know what type of mistakes you will make and think what I need to do if I meet this condition again. Also do not care what other people opinion are, just do what you want if you think that is correct. Last time, when I watched TV, it just talks some handicapped people. The idea is that although they are handicapped, their work, life are as same as normal people. Even though some people may tease them, they do not care what those people say and just do their own work. At the beginning I just think since they are handicapped, they cannot have any contribution to the society. In fact, this is completely wrong. They also can give some incredible work to the society.

Reflective Journal Number 4
Topic: Entrepreneurship, Innovation and Creativity

Actually I have totally no idea about this topic since I am a student and I should focus my study at that moment. But if someone wants to have own a business, this kind of thing should be really important. Why do so many youngsters want to have their company? The main reason should be money. No matter how talented you are, it is quite difficult to be rich if you are only employee and this is completely different to the employer. However, it is not easy to start the business. First of all, you need to consider what kinds of things you want to do. It just matches with creativity. Let's take Big Brother as an example. Why is it so popular in Australia? Maybe the main one is the idea is so creative and this type of programme was never shown on TV. Everything is so fresh and novel.

On the other hand, innovation is a little bit different to creativity. Something have been changed to make more effective. For example, education. In the past, most of people gained knowledge from teacher. But with the invention of computer, everything had be changed greatly. You can learn anything from computer and also more and more secondary school's teacher start to use computers for teaching. Through the computer, you can talk with your classmates or teachers or hand the homework. Everything have been innovated by computer and traditional methods have been eliminated gradually.

Entrepreneurship means how to manage business successful. In fact, this is not an easy task since there are so many factors that should be concerned, in particular, government policies or economy. And these kinds of things are unavoidable. So even though you have entrepreneurship, it does not mean you will success. But to run the business smoothly, good entrepreneurship should be one of element and another should be good opportunities are given.

Reflective Journal Number 5
Topic: Team Work

Let take last project (bridge project) as an example. Every member had participated in the team project. Normally all members had attended the meeting and also we chose what we would do in that week. Also during discussion, no member dominated the meeting all the time; everyone had suggested his ideas and then discussed if this idea is good or not. In short, the meeting was running very smooth. However, there were some problems in my group. First, my members did not help the other if they got the difficulty for handling the work; they just did their own task. Second, even though we had chose which area we response, some of them could not do them on time. Third, my group did not respect each other; some of them complained another. Therefore my team was out of control when the due date was coming soon.

From BNB tutorial class, I have learned how to be a team member. You need to respect each other and also do not want what other member do, but you can change how you react with other people and how you work. Actually I have this experience in my last team project. Sometimes it is quite difficult to work with Australians since I am an international student with different culture and custom to them. Also my English is not really good, so I could not participate the team at all and I can feel my member did not like me. However, the situation had been changed because I can prove I still can contribute to the group to the group even though my Language is not as good as them. As I have mentioned in reflective journal 2, I never set timetable. I only do the most important thing first.

Since I am not creative, so I cannot give lots of good idea. Moreover I cannot organize the meeting very smoothly. But if someone suggests some opinions, I can analyze this and give some suitable comments.

Reflective Journal Number 6
Topic: Review

Has anything changed? Not much. Since this is only a short period, I do not think I will change my mind so fast. If possible, I want to change my learning agreement. I feel so disappointed that I cannot follow what I have set. For example, start to study as soon as possible. Although I have done this in this semester, the result is not really good. In fact I cannot study hard; I always find some excuses to ignore it. So this is the reason why I want to change the learning agreement and the new one should be- NO EXCUSE. If I can do this, everything should be fine.

Suddenly, I feel that experience is very important to profession. Even though you are extremely clever, you still make some careless mistakes without experience. Also when you apply any job, you must be asked if you have any working experience. Therefore during the holidays, I aspire to find a summer job no matter that is full-time or part-time. The main point I want to try different kinds of positions and gain a variety type of experience.

Furthermore, I do understand good time management is really essential. Though I have mentioned it in journal 2, I still need to emphasis this point. Since in this semester, I have not used my time properly, however, most of them was wasted to do other things. It is better to solve this problem as soon as possible. Right! It should be “no excuse”.
In short, I do not satisfied with my performance in this semester. Compared to last semester, I am too lazier in this one. If I behave still like this, I do not think I can be a great engineer in my future.

Reflective Journal Number 7
Topic: Cultural sensitivities and international responsibilities in business

Have you ever imagine you live in other countries? Cultural sensitivities and international responsibilities in business mean that you cannot just notice your own city and country at all. On the other hand, you have to try to know other customs or cultures from other countries.

At the beginning, I just think Engineers only need to do the survey and make some calculations on their projects, but this is definitely wrong. In fact, engineering seem to be more and more popular to work in overseas, in particular, China. As anyone knows, China is a big developing country, and most of countries want to do the business with China. Therefore, if possible, engineers should need to know the basic cultures of some countries. No matter how smart and talented you are, you will not success if you do not concern this factor. Also, being a professional engineer, there should be no problem to work with other people. Moreover, this is a great experience and a great success if you can handle the project with other foreigners.

Actually I have some advantages in this area. Since I am an overseas student, so I have some experiences in this one. Compared to Hong Kong, Australia is totally different, such as living style, working method. At the beginning, it is not easy to adapt the cultures, food, etc, but everything have been settled down after living a long period.

In my opinion, language should be the major gap. Although I can also speak English, there are some different to Australians. They can speak so fast and very clear and also different countries should have different style language. I do not think I can learn this in a short period. However, all people have a common language- body language.

Reflective Journal Number 8
Topic: Appropriate Technyology & Social responsibility – implications

What is the meaning of Appropriate Technology & Social responsibility? It is no doubt that technology can help people in many ways, such as communication, transportation, etc. However some people may say that the higher technology we have, the more wars and pollution we produce. That may be true. Why US can spend so much money on military and Africa countries lack resources for development. This is so unfair in this world. In fact, some wealthy countries should support some poor countries for the development. On the other hand, with the aid of support and technology, China becomes one of major countries in the 21 century. From this case, it is easier to know that if the technology can be used properly, this can bring so many benefits to us. However, if it is used to develop the weapons, it may produce some horrible result in the future. In short, every country should make sure they use the technology correctly.

Have any effect on personal and professional life by the technology? Actually, the living standard has been improved greatly through the technology. It is quite inconvenient to live in a place without the electricity or water. In personal life, there are so many advantages with the high technology. In the past, when I want to research some information, I need to go to library. Now it is another story, I just switch on a computer and I can get any information from Internet. This can save so much time and work.

As the technology is changing all the time, even though you are good at some specific skills, you still need to keep learning. To become a professional, I need to adapt the new technologies and also I have to continue the study in the future.

Reflective number: 9
Topic: Environmental principles and sustainable engineering personal perspective

Being engineers, there are so many factors to be considered and this is the reason why there are so many types of engineering. The environmental principles mean what kind of factors are considered and it only produce the minimum affect on environment. On the other hand, sustainable engineer

means what types of material and resources should be used that the object can maintain as long as possible.

Normally engineers should have the same basic knowledge, but the main difference between the outstanding and the normal is outstanding one will consider the concept of environmental principles and sustainable. To become professional engineer, not only you have the clear concept, but also you need to think how to apply the environmental and sustainable principle in your work.

Even though I study civil engineering, I am quite interested in nuclear power. As far as people concerned, oil will be used up within 20 years and coal can only last for 200 years, therefore we need to use other type power to replace them. It is no doubt that wind and solar power seem to be good ideas- no pollution, unlimited, however, the main disadvantage is they can only generate a small proportion power. So some countries start to use nuclear power, but it is really hard to control it. One serious disaster is one nuclear plant bombed in Russia and this give a great warning to the world. People may think if this power should continue to use, but the answer is no. It is because we still cannot find other material that is as effective as nuclear power. At that moment no one can ensure that this power is absolutely safe and we can only try to prevent the happening of this disaster.

Reflective journal number: 10
Topic: Issue involving engineering ethics

What do professional ethics mean to me? For engineering, the responsibilities of engineers are to make the world better and let people live in a comfortable environment. For doctor, they have to rescue people as possible as they can do. The professional ethics seems to be difference with difference jobs; however, the basic principle should be the same. And the principle is everyone should follow the rules of professionalism.

What values I will bring in my profession? The first one is honest. In fact, I do not like to lie. One of reasons is I hate to find some excuses. The other is you can only know what wrong you have made by telling the truth. For example, when you do the project with some members, it is difficult to accept the criticism from your members. But this is the only way to improve the project. The second one is that please try to respect other people. As one of BNB lecture stated before, this is one of major factors to run a team successfully.

In the recent days, some new public schools had been discovered that there are so many problems in the structure of building. The major reason was building companies used some low quality material instead of original one. Some teachers were strongly disappointed about this. They wondered why the government's professional had not mentioned there were something wrong for these schools. If the professional still have their ethics because it is unbelievable they cannot find this big mistake. So if people do not be honest, some great tragedies may be happened in the future.

Reflective number: 11
Topic: Globalisation what this means to you and the engineering profession

Globalisation means a team and the team members come from all over the world. They will share the business, technology together. With the globalisation, some poor countries may get the benefits. First, they will receive the support from other wealthy countries. Second, since the living standard is not really high in those countries, so some large companies will build the industries there. Third, their products can be imported to other countries. On the other hand, the local industries may be affected by this policy. For example, U.S. people oppose to import the China's products into their market since those products are quite cheap and this will affect the local market. If globalisation apply in the engineering profession, that means engineers trend to work in different

countries. So being a professional engineer, they should be familiar to global market, some specific culture, religious.

Through globalisation, engineers may have more and more opportunities to work in overseas and this can brings lots advantages to me. First, both countries may not have the same mother languages, so I can improve my communication skills. Second, I study in civil engineering so this is quite important to know what type of building structure in other countries. Third I can learn the local culture and custom, sometimes that will be useful on other countries. The main benefit I can build up a long-term relationship with foreigner and learn their forte through this. They should be a valuable experience.

Reflective journal number: 12
Topic: Final and Reflection and Review

In this period, I have learned so many things to become a professional engineer. At the beginning, I just think what this subject is and it seems to be useless. But it is totally wrong. When I looked back what goals I have set in the fist journal, I feel a little guilty because I have not achieved the goals at all and also it is difficult to improve these skills in one semester. However I have learned one thing. To become a professional engineer, you need to equip yourself first and then try to participate into the world.

In these 12 journals, it can be divided into 3 parts. The first part introduce professional engineer. The second part is what performance should be if you are working in a small group. The third part is how to be a professional engineer in the world.

For the first journal, I start to think about your shortcomings. For the Learning in your professional and Professionalism, it gives me basic ideas to become a professional. In week 4 and 5, Entrepreneurship, Innovation and Creativity focus on the thinking skills and Team Work teach me how to work in a small group. For the rest of journals, it recommends what kind of things I need to consider when I become an engineer. For example, how the technology and environmental principle affect when I am doing a great project. Also when I work in overseas, I need to think about the globalisation and culture sensitivities. And Professional ethics help me to classify which behaviour should be correct. Actually, BNB007 guide you to become a professional engineer.

Now the most important factors to me should be Learning in your professional and Professional ethics because they should be the starting point of professional life. In the future, I may face lots of problems I hope use these concepts to handle all of them and become a great engineer.

Appendix 13 Exemplar journal – Resister

Name:
Student No
Reflective Journal No: 1
Topic: Personal Perspective on Learning/ Thinking about Learning.

My name is . I am [deleted]. I am doing Engineering because it is a continuation to my previous profession, [deleted]. By obtaining a degree in Engineering, I will be able to use my previous experience in the building trade as a useful resource throughout my future career. My strengths are directing others, motivation and being a no-bullshit sort of a person.

Tutorial Activity 1,"Thinking about Learning" helped me to realize that there are many useful and experienced peoples other than my-self. Where I was deficient in areas, I found others to be strong. This could be quite a useful tool for up and coming projects. That is, to fish in other minds for my resources. I now think that a "reflection" means to analyze what you have learnt from lectures, readings and tutorials. Then, use what you have learnt in a productive way.

I have read and thought about the Code of Conduct and the suggested learning agreement for BNB007. It means that every student will have the chance to a fair go at completing BNB007. By implementing a set of guide lines for the students, boundaries are formed. These boundaries ensure the safety, respect and best possible learning atmosphere for students. The code also helps get the up and coming engineer into the right frame of mind. Professionalism.

I thought that the code would be just another set of rules and regulations. To my surprise it was not. The Code helps me to direct my focus towards becoming a good Engineer. If I use such things as the Code I will only benefit because it is there for the good of me and every other student. It will also help me organize my daily activities and eventually teach me skills that I will take into the engineering field. Another big attribute I can learn from the code is better respect for others and our environment. By being aware of the code I practice it everyday.

The positive things about the learning agreement are enabling me to break down my goals. By doing this I can keep a better check on my individual goals and in turn have a better chance at achieving my overall goal. Sometimes a goal, if large, might seem too big and cause doubt. Here are the five things I want in my own Learning Agreement for BNB 007.

1. Balance my studies and being a good Dad.
2. No girls for the first semester.
3. Listen to others and their opinion.
4. Enjoy my learning.
5. Bee cool.

My aims for this semester are to enjoy University and stick to my learning agreement.

Reflective Journal No: 2

Topic: **Problem Formulation and Critical Thinking**

Problem formulation brings the idea of “fix it” to my mind. When a problem arises and needs to be fixed there are certain ways to go about it. This depends on the nature of the problem of course. Let’s say that Bob has a problem with Bill’s bad breath. Bob is so disgusted with Bill’s bad breath that he doesn’t go to work because of Bill’s bad breath. In doing so, Bob gets the sack. Obviously the problem was not fixed. What Bob could have done was to formulate a way to fix the problem. He could have broken the problem down into a number of small problems and gone from there. Let us say Bill’s bad breath had three contributing factors to it. They were- he didn’t brush his teeth, he didn’t know he had bad breath and he didn’t know that his bad breath was affecting others. Right away by breaking down the problem into smaller components, a formula can be devised for fixing the problem. Bob could have done three simple things that would have prevented his dismissal. They are- leave heaps of teeth brushing and bad breath pamphlets lying around for Bill to find and if all fails, offer him a chewy. See by Bob not fixing Bill’s problem it

became his. Problems don't go away and that is why we need to formulate a way to fix the problem

Most of these problem solving/formulation techniques are all based around the same themes: identify problem, evolve problem, generate proposals, evaluate proposals, communicate solutions, implement. Saying it like that makes it sound easy and when you read it as set out in the suggested readings, it sounds quite large and troublesome, however if you break it down and follow the steps you will not go wrong.

Being able to think critically will be a major point in decision making. How could you go about achieving something if you do not know where to start? The starting point to any scenario is the first point. Critical thinking is also a major part in trouble shooting, especially if your job depends on it. If you are at work and there is a problem and the boss wants you to fix it, then you have to get to the critical problem. All problems stem from another and to me that is the critical point.

I think that critical thinking will be a major part in my professional practice. Being able to think critically will be my strong point as I am naturally able to think to a critical level. Once I studied a Meat -Ant nest. I thought to my-self, "Why are theses ants putting these same size rocks on top of their nest and why do it"? So, after a lot of critical thinking I finally saw the reason why. Do you want to know? Then ask me.

Reflective Journal No: 3

Topic: **Professionalism - What do I aspire to?**

Professionalism to me means, conduct. As in conducting my-self in a way that is organized and able to be followed by others. I will usually imitate proven ways of professional conduct. Sometimes I find that other less professional people think I am too serious, but I enjoy being that way. I love making things work and one way to get things done, is to have a professional attitude towards what I am trying to achieve. Learning in the profession means to keep an open mind and never be too resilient towards change. After all that is how we learn, watching or reading what other people do and utilize their workable ideas. I have learnt that a good and balanced life will aid my success along with such things as having a mentor, keeping fit, goal setting and knowing exactly what my worth is. Selling my-self short will only slow my progression towards becoming an excellent Engineer. People respond better towards confident and motivated people. I can also learn from other people's ideas, you know, don't try and invent the wheel. Someone once said, "All thoughts have been thought before". To me that makes sense but on the other hand maybe someone has thought of an idea but never brought it to fruition. So I say, "What is the point of having an idea if it is impossible to achieve".

Success to me is to be happy in what I do. Being happy will allow me to become successful. If I am not happy, then what is the point of obtaining success? I find that when I am happy, I am able to use the tools of professionalism much more easily. By doing this everything has a positive slant on what I do. An example would be my goal setting. Setting my goals with a positive frame of mind helps me to set realistic goals and immediately find ways to achieve these goals. Being positive not only helps my-self but also it reflects onto others making their day easier.

I think that learning in the Engineering profession will be easy. When other people see that you are willing to learn they will help you learn.. What I don't know how to do I will learn from others and their resources. I will never know how to do everything and besides what fun would it be if I did know everything? I wouldn't need other people and my life would become very lonely. I think that learning in my profession will come with time and utilizing everyday resources.

Reflective Journal No: 4

Topic: **Entrepreneurship, Innovation & Creativity**

The topics entrepreneurship, innovation and creativity bring one thing to my mind- "Excitement". I remember one time when I invented self-lighting cigarettes. The feeling of success from this was enormous. Although somebody else had taken out a patent seven years before me, I wasn't really bothered because I still had the vision myself and brought it to fruition. The whole idea needed creativity, innovation and entrepreneurship otherwise I would have never made it to the patient office in the first place. I have had many ideas that could be developed but I feel that my knowledge is minimal at his point in time. That is why I am at University. Hopefully I will graduate and end up in a good job where I will learn how to develop ideas.

I would love to be an entrepreneur. To be a person that comes up with an idea and bring it to life is me all over. I hope that once I am in the engineering field I will come up with an excellent idea and bring it to life through investors, other innovative thinkers and creative people. One thing I have noticed throughout my project group meeting's, is just how colorful my idea has become. I used to go fishing but got very disappointed because my hard work and patience was never rewarding enough. So, I started to think how I could fix my problem. I soon discovered that my problem was a lot of other people's problem as well. So, the best thing I could do was invent some way that people could catch fish easily. This is just what a guest speaker suggested- "find a problem and fix it".

I found that the readings reinforced what I was already practicing. They gave me confidence in what I was doing and also hinted to me that I will be a successful person by nature. It is very encouraging when you read a report written by an established professional and it describes yourself. My Dad's favorite T.V show was the 'Professionals'. I know now why it was. The show was showing him what he does best- being a professional. I have also used the idea of "Chiasmus" in our group project. It is very catchy and makes people manage the idea that our group is trying to establish. Give and receive.

The only confusion that I received from the readings was, "why would you go about a task in any other way besides being creative, innovative and entrepreneurie"?

Reflective Journal No: 5

Topic: **REVIEW**

My chosen subject is . I have chosen him for my review because I can rely on the fact that is a very focused student. His work will be of a good standard and it is also convenient to do so. is a good bloke and I am learning valuable lessons from his nature. seems to have a down to earth attitude and is successfully completing five subjects as apposed to my three.

I have asked some questions. They are as follow;

Qu. what has been the most helpful aspect of your learning so far in BNB007? Well (I have found BNB good and bad. The good things I suppose are, learning tactics that will enable me to tackle situations in the real work-force. The Graphics tutes are well planned as along with the computer lessons but the actual lectures are a waste of time. They would be better off giving us reading materials and questions to follow.

Qu. have you had any questions, confusions or muddles? Yep, what are we supposed to get out of the lectures? I can't believe that I am paying for those lectures.

Qu. which article did you find the most interesting/challenging? I found the article on trouble rooting beneficial because it is an area that I have to work on and it provided ways for me to use in the future trouble shooting.

Qu. what was the best aspect of my journals? You seem to have an extensive amount of practical experience and experience on your side. It would seem that BNB will come easy for you and coming up with an idea won't be hard but the best thing I could say is that you are honest in what you are saying and it seems that you have read the suggested readings. I can tell this by the way you have reflected on them.

Qu. what is your best suggestion for improving my journals? Sentence structure and writing a little more could help.

Any comments on the interview as a learning experience? Yes. It was nice to be able to compare journals. My partner for this task had some good points and a seemingly easy way of expressing what he was thinking. It is great to be able to meet someone then have the pleasure of getting to know a little about the way they tick. I suppose doing this type of thing will be valuable in my future as a professional Engineer. It is a lot easier to get along with people in general if you know a little about the way they work on the inside. After all we are only human.

Reflective Journal No: 6
Topic: Environmental principles and sustainable engineering - personal perspective

After reading "A Rainforest Experience", I realized that environmental principles and sustainable engineering has a lot more depth and regulations than I thought. I was surprised to read that the tribe leader carried the torch through the forest leg. Reading that told me the Engineers did a good job installing the project and also addressed the ecological aspects in a respectful way. I suppose that if they had not, they wouldn't have gained favor from the associated tribes and in turn not of been able to proceed with the idea. All in all I think now that the actual project idea comes second to the planning and considerations of the idea.

All this "Eco" stuff makes me want to change over to Environmental Engineering. Gone are the days when common practice such as 'do now and find out what happens later'. Imagine if we had of had the pollution statistics before we mass produced cars? We would not be driving air polluters around now would we? Well I would like to think so. I suppose that's where I will be able to do my bit. Engineer for Eco-Tourism.

[deleted]

The team project that I am working on at the moment nilly died in the ass. We were confronted with a major problem. Fish shit. For a moment all of our ideas seemed to be bogged down with a really crappy situation. But in the stench of it all we came through with a clean and practical solution. Once upon a time the fish-do wouldn't have been a problemo but with today's current environmental problems, fish poo is a problem and rightfully so.

The best thing about engineering for sustainability is it has positive repercussions. Not like that of cars. Being aware of our surroundings will influence my profession as an engineer but in a positive way. What would be the point of building something that in the long run comes back on our children?

Reflective Journal No: 7

Topic: Team Work

I found that I was taking control too much in our group project. I found that the more I talked the more others clammed up. So after watching a tutorial video, I restrained myself and watched what happened in our next meeting. The outcome was extraordinary. I found that others in the group began to open up and soon gained more confidence in what they were saying. I nilly mucked it up!

Working as a team is heaps better than working with your own thoughts. Ten minds are more powerful than one, that's if they can work in synchronization with each other. In my case, our team can. We use the force always.

At the start of our group meetings I found on student a little hesitant towards me. I thought I was being normal but he seemed to think I wasn't. So, what I did was make an effort in getting to know him and find out things that he liked to talk about. During the next meeting I was then able to relate with this person a lot easier. I found this approach to work quiet well and will use it in future team projects.

Being positive is a major benefit. During one tutorial session, a student from another team told us that our idea was "shit". Hearing that was one of the hardest things to take. After all it was my idea that he was referring to and the last thing you need to hear when starting a project, is that. The best thing that arose out of that situation was listening to my team as a whole on the defense. Gooooooooooooooo-Tteeeeaaaaaaaaammmmmmmm! They proceeded to totally disassemble the other student's idea and show him through passive ways that his idea was in actual, a big pile of crap. Not ours. Team, team, team.

I have also found that a little story during team meetings makes things more fun and that our tasks are just that, tasks and not stumbling blocks. Jokes also liven up our team meetings. We have included a "joke a week" scheme into our minutes. Each week a different team member has to come up with a joke. This keeps a fun atmosphere in the room and allows team members to express themselves openly.

The biggest thing that made us feel like a team was finding a solution for the poo problem. Everyone including me thought that our project was over. As we sat and talked about this problem many lame jokes were formed. It was then that the answer presented itself. I think that smiling a little about this problem allowed us to overcome it.

Reflective Journal No: 8

Topic: **Socially Responsible Technology**

Socially responsible technology is what the world needs today, before it is too late. People need to be aware of the damaging effects that technologies can have. One main concern is the 'Equilibrium of it. Most technologies up until today have little effect on the survival of the Human race. When technology starts messing with cloning, genetically modified food and the geno-code, we are stuffed. Once the balance of life is tampered with, people will be loosing their lives all over the place simply because of the equilibrium effect.

Sometimes I get really pissed off with all this talk about 'socially responsible technology' because the main concerns with this issue are not being addressed. Issues such as car pollution and bad television never seem to be confronted. I mean socially, car pollution is killing us all but do you think that the oil-giants give a shit. I don't but I do recognize that the sooner we start training

people in good engineering practices the sooner we will reap a better social atmosphere. All in all socially responsible technology means attitude to me.

Green Peace seems to be the only active group actually doing something about this issue. They are the real worriers in our world today. They need our support and our wimpish government needs to insist that any new product be screened for any harmful effects. For fucks sake what are we thinking, everything has an opposite and equal reaction and everything reaches equilibrium at one stage. So all these people not giving a hoot about what effects technology has on our social lives seem selfish.

In my life technologies are mastered not the other way around. I am not consumed by every new technology that hits the retail shelves, eg; television. I went with out one for a year and it was excellent. Television rots your brain and it is as simple as that. To hell with the money hungry, socially affecting and eye ruining box. Oh, and the Simpsons sux.

Besides all that, I think being aware of the side effects that certain technologies have on the mortal mind is all you need. After all it is your decision to turn them on. So, I would have to say that technologies will have only a positive affect on me because I want it that way. As for the other people that are to ignorant to see the harmful effects of certain technologies, well, they will be the guinea pigs.

This is what I am saying, we as a world today should ignore the dollar and start enforcing rules that protect people from harmful technologies and at the same time let us grow as individuals.

Reflective Journal No:9

Topic: **Issues involving engineering ethics**

Professional ethics to me means doing your job right, that is do what ever you do with regards to the better of others. One main concern of mine now is to do the right thing by others. My life will be better if I can concentrate on doing this. This is a good professional ethic to be practiced because it has positive rewards on you. One thing I like seeing is men treating other women with a professional attitude when needed, such as in the work place. Once women never had a say but today things are different. Science has proven that they do have brains and are very capable of doing something that involves their brain. Only I think that they should steer away from aggressive behavior because that is a primal urge of the man. I would also suggest that that is why there are so many restraints against aggressive behavior today simply because women have no power against aggression.

I will bring good reinforcement to the profession of ethics. I will be one of those that practice rather than preach. By doing this I will lead by my example and hopefully others will follow. When I arrive at work I will greet people with a hello and when I leave I will say good-bye. I also won't eat any body else' lunch. If I want to be treated in a professional manner then I will have to treat others in the same way.

Story time. Once, I was working as a [trade] and I noticed a certain young lass walk across the shop floor everyday. I think that every other bloke did too only I had a chance. I thought wow what an absolute hunney! Time passed and I new what time she would be coming through so of course I would be in the area of her pathways waiting for and with a big smile. Now ethics told me that I shouldn't involve myself with some one from work but something in my pants told me otherwise. So, what should I do? Talk too her and risk my job or just plain forget about her? Sticky situation hey!

Sure enough I talked too her and we began to date, have lots of sex and no body knew. It was amusing hearing other blokes comment on what they would like to do with her as she walked

through the shop. Anyway, we broke up after six months and things turned ugly. We hated each other and work became hell because we would always see the other.

Time passed and I left and she started screwing another worker from the shop floor. Now if I had had better work ethics, I would have recognized that it was only lust and saved myself a lot of pain. Stick to professional ethics and things will be easier, as in this case the ethic of 'don't get involved with anyone from work' would have been applicable.

Reflective Journal No:10

Topic:**: Globalisation, what this means to you and the engineering profession.**

Globalisation means the end. When I finish my degree I will be just another engineering guinea pig. I tell you, if this was my planet we would all be pure hearted, butt naked and sharing. That is all I have to say on this subject. Ok it has been a couple of weeks and I don't want a bad mark. So, once upon a time when the world became one and God frowned. The people of the world thought that they could run this world without him. This was not pleasing to God because he created the world and the people in it. He also created the people in this world for his glory and that he might have people to praise and worship him by love of his good works forever. When the people forgot about God and thought that they could run the order of this world, God confused language and therefore divided the peoples on this earth.

If we look at the world today we are heading to a self-sufficient race of people that have no need for God. Our language is becoming one, travel is easy and fast and the internet is allowing everyone to live next door. We will soon have no need for God. But as history has been written so is our future. The day that globalization happens as a whole, will also be the day that God has his say.

As for the engineering side of things, well we have already seen a huge advance in technology towards better engineering practices. We will be able to combine all engineering disciplines from all over the world. This will bring forth a new and exciting age of modern Engineering.

Reflective Journal No:11

Topic: **Cultural sensitivities and international responsibilities in business.**

Cultural sensitivities and international responsibilities in business mean that the world is about to work as one. If these issues are not addressed the chances of Globalization will be small. How could we as a world act as one if these issues are exactly that, an issue?

I think the big issue here, is bringing everyone together. Let's get together, come on, come on, let's get together. The fact that cultures are becoming sensitive means that people in general are speaking out, speaking out for equality and rightfully so. We are all humans whether we have different eyes, different colored skin or funny custom but on the other hand will different cultures exist in the future or will we form a single 'bitsa' culture?

Business today does take responsibility for their cultural sensitivities or they will minimize their clientele. How could an international business possibly sell to a foreign country if they were not sensitive to their culture? Imagine that, an over seas country selling Aboriginals coon cheese. They wouldn't sell one block would they!

I used to not give a crap about other cultures but now I know that Australia is becoming very multi-cultural and if I do not change the way I think my [child] could marry a Wog. I think that in my professional career I will be working with other cultures so, it would be beneficial to me of I

can be sensitive in the right areas or I could loose my job. Further I will not be able to work over seas if I do not consider their culture.

Usually I am culturally sensitive but at times I can test the boundaries of racism. Mainly because I can't understand why people need to have a problem with other cultures. If we do something and it offends the other we need to find out why it does and fix it. If everybody takes the time to understand other cultures I think that people will become more aware of sensitive issues. Maybe in primary school we could have a culture subject that will give understanding to our children and break the viscous cycle.

I find reading information that gives me another point a-view helps me to understand other cultures better and be more sensitive towards other cultures.

Reflective Journal No:12

Topic:**: Self Interview.**

The best aspect of my journals was learning how to type. It was also nice to see the work that I have put in over the last twelve journals and receive feedback from S, even though she gave the same comments too each reflective writer. I really think that I have learnt absolutely nothing from the reflective journals except learning how to type. The journals should have been formatted by the lectures using questions that relate to the given readings. That way, the student must research the reading and provide an answer and in doing so learn about the subject. Whereas, as it is now, the student ponders on things to write so that he-she can gain a pass in the subject. I found the lectures useless because they were boring and lacked direction as was the tutorials. Also I cannot believe that "**An Excellent Reflection"** was right at the end of the web page.

The reflective journals part of BNB007 is a waste of my time and money. There should have been more focus on the project. Why would the lectures organize the green book like they did. The green book was hard to follow, its font was messy and making us start a sentence with "This lecture presented……" was just plain. The whole tutorial was crammed.

The most helpful things that I learnt in BNB007 was the generic computing, Auto-Cad and the project. The green book and its associated lectures are hopeless.

The best topic that I learnt was on Chiasmus. This gave us our project title and a good marketing idea.

I really do not have much to say any more because I am quiet angry about the way the REAL WORLD UNIVERSITY has organized this section in BNB007. The pilot thing, was an absolute joke. The lady out the front was thinking that pilot was the next best thing to sliced bread, well, if watching her instruct us on how to use the pilot wasn't a waste of time I don't know what is. This area of learning makes me think that the university is just a scam, providing students with costly subjects that they will in no way benefit them. I say thank you reflective journals for wasting my time and showing me that I have been ripped off. Put that in the "What previous students say" section.

Appendix 14: List of interviewees 2002-2004

Interviewees	Accepter Convert Resister	Age group	Gender	Cohort	ESB/NESB/ Bi-cultural Australian	Interviewed in study year unless otherwise stated
1. Alex	A	28	M	2002	ESB	
2. Andrew	A	18	M	2002	BI-CULTURAL	
3. Bo	C	MA	F	2002	ESB	
4. Bruce	A	28	M	2002	ESB	
5. Clarke	C	19	M	2001	ESB	2002
6. Dave	C	MA	M	2002	ESB	
7. Fiza	C	18	F	2003	NESB	2004
8. Geoffrey	R	18	M	2002	ESB	
9. Gir Bob*	C	18	M	2001	NESB	2002
10. Hamish	A	MA	M	2002	ESB	
11. Harry	A	18-20	M	2002	NESB	
12. Ignatias	A	MA	M	2001	ESB	2002
13. Jack Africa	A	35+	M	2001	BI-CULTURAL	
14. James Bond	C	MA	M	2003	ESB	
15. Jimmy	A	18-20	M	2002	NESB	
16. Kelly	A	18	F	2002	ESB	
17. Lady Arwen	A	18	F	2002	NESB	
18. Lenny	C	18	M	2002	NESB	
19. Muffin	A	28+	F	2002	ESB	
20. Odysseus	R	MA	M	2002	ESB	
21. Peter Parker	C	MA	M	2001	ESB	2002
22. Sirocco	A	MA	M	2002	BI-	

					CULTURAL	
23. Spontaneous Combustion	A	MA	M		ESB	
24. T	R	18	M	2002	ESB	
25. Yamaha	C	MA	M	2002	ESB	
26. Zaeris	C	19	M	2002	ESB	
Staff				**Year conducted**		
1. Fluffy	Tutor		F	2003	NESB	
2. Georgia	Coordinator		F	2003	ESB	
3. Kym	Tutor		F	2003	ESB	
4. Paris	Marker		F	2004	ESB	
5. Self-Interview	Marker Online admin.		F	2002-2004	ESB	
N=26						
A = 13 [50%] **C** = 10 [38%] **R** = 3 [11%] *Gir Bob was a Resister in terms of the journals, but a convert when interviewed a year later.	**Male** 80.7% **Female** 19.2%	**18-20** 46% **MA** 54%	**ESB** 65% **NESB** 23% **BiCultural** 11%			

Appendix 15: Sense-Making questions

GAPS from 26 student interviews – using 5W focus. Other content analysis templates in brackets [ ].

WHAT Questions 70 / 208 =34%

Condensed summary in bold

Creativity

1. What is creativity?
2. What you could do and what you're harbouring inside?

What is creativity? [process focus] present

What is my creative potential? [self focus]

Ethics

3. Ethics, what was involved?
4. Ethics: whether you stuff everyone else or question yourself?
5. Is it ethical to do that?

What is ethics? [process focus]

What is ethical behaviour? [process focus]

What are my personal ethics? [self focus]

Expectations

6. What they wanted you to talk about?
7. What to expect of BNB?
8. What to expect?
9. What was expected?
10. What was the level I had to be at?
11. What do they want from me?

Their expectations: The unit, The journals, The level of work, me? [process and self focus]

Our expectations: of them, the journal content, their level of work, personally [process]

Environment

12. Questions about environment and engineers' responsibility?

What is my responsibility to the environment? [self focus]

The Future

13. What am I going to do when I graduate?
14. What am I going to specialise in later years?
15. What am I going to do in the workforce?
16. What I might be doing when I graduated?
17. What am I going to be doing later down the track?

Work after graduation [self focus] future [where one will be]

Group work

18. What do we do in our groups? [process focus]

Peer Interview

19. How do I come up with the questions that were going to be of value?
20. How long does the PI have to be?
21. How are we going to make 500 words out of that?
22. How do I adjust to different accent different version of English?
23. How would people react to me wearing a Shalwar Chemise?
24. Is she different?
25. Would they look at me differently?
26. Is this helpful to me or is it just a normal interview between friends or does this can bring us like more close like a friend that we didn't know each other?

Practical aspects [process]

Working with a different culture [personal and other focus]

Culture

27. What to expect with another culture?

Uncertainty about "other" cultures [future focus] another

Writing

Getting started

28. What to do?
29. What you had to do?
30. What I need to do?
31. What it entailed?
32. What am I going to type?
33. What do I choose to write about?
34. What was required for this task?

What was the task? [process]

What do you need to do it? [self]

Physically beginning the task [fear][process]

Writing process

35. What's this expression…what's this writing down on paper?
36. Did they want us to write personally?
37. Is this supposed to be personal, or professional? [what]
38. What we were meant to write, report or opinions?
39. What do I think about this, what do I think about that?
40. What information to put in? [journal 2]
41. Could I see a past journal?
42. Oh geez, are we sposed to know this stuff already?"
43. Just what do I think about this?

44. What is my opinion?
45. Learning about learning: what were the things that I wanted to achieve from it? What sort of impact's that having?
46. Are the journals going to be so formal?
47. What step do I take next?
48. What did the terms mean in an engineering sense?
49. Are there too many words?
50. Are they irrelevant?

What style of writing, personal or professional? [process]

What content? [process]

What is my opinion? [self]

Should I already know this?[self]

What is the Big Picture? [process]

What do the key terms in an engineering context

Assessment

51. What mark I was at, whether doing what I had done so far would allow me to pass the journal section?
52. Which level I am in and how I need to do extra works to improve myself?
53. What is the area that you know needs to be answered?
54. What went in each topic?

What level am I at [self] [where one is]

How do I do better [self] [how to get to future]

What do other people's journals look like? [process]

Appropriate Technology

55. Is technology itself responsible, is it how we use it?
56. What technology will hold for us?
57. How this could be used against, against people, how it could be used against our ways of living, how it could alter the world for good or bad?

The future of technology [process] how one got to the present

The ethics of technology [whether road will be good or bad] future focus

Environment

58. Oh wow, do I have to worry about the environment?
59. Ecotourism when you place it in another place, apart from Australia is it working or not?

The transferability of environmental principles? Present focus, process

My responsibility for the environment [self] where one is

Professionalism

60. What is classed as professional? [process] present focus

61. What you can do to become professional? [how to get to future]

Relevance to engineering

62. What the heck's what's going on with this subject; it's not maths or physics?"

63. What benefit is there in an engineering environment?

64. What difference is that going to do to make you realise anything different to what you already realised?

65. What are we doing here, we're wasting our time?

66. What use they could possibly be?

67. What is the relevance [of articles] to what we were doing or trying to achieve with our Reflective Journals?

68. What I could gain from it?

69. What were the students who didn't like BNB missing?

Curiosity about the Resisters [another focus]

Self-interest [self focus]

What will I learn [self] will the road be a good one?

The difference of the unit from current [present] process

Readings

70. Whether they wanted me to read all of the readings? [process]

HOW 78 / 208 = 37%

Future

71. How would things work out?

72. How we will be able to sustainably continue on in the world for as long as possible without jeopardising having food to eat?

73. If not, how can we...change what we're doing now so we can live forever, survive forever?

74. If I was to do that, how would I do that better?

75. Would the articles get any easier to comprehend?

How do we create sustainable futures? [future] [How can one get there?]

What are the threats and promises of Technology? [future] how to get there

Can I make a difference? [self] future focus.

Process, understanding the articles

Culture

76. How do you see things from another culture's point of view? [another focus]

77. How do you write something for yourself to cover everything?

ESB concern [another]

NESB concern [self]

How do you write about culture? [process]

Ethics

78. How do I approach it [ethics]?
79. Ethics: how would I like to be?

What is ethics? [process]

What are my ethics? [self]

Writing

Writing process

80. How am I gunna do this?
81. How am I gonna write my journals?
82. How do I write it?
83. Is this how I do it?
84. How do you do it exactly?
85. How can you expand it to make it 300 words or to make it sound a little bit better and more coherent?
86. How to express everything you feel in 300 words
87. Are there too many words?
88. Will someone correct me?
89. How *doesn't* it help?
90. How to say that I didn't like doing the journals without being offensive to anyone or using any cursive language
91. Would you prefer us to do it properly or cut stuff out?
92. Whether or not when I was sending it, it was being received?

How am I going to write journals? [self]

How exactly do you write them? [process]

The word limit - too much or too little [process]

Will I get feedback? [self] will road be a good one

How to give critical feedback [process]

Writing content

93. How specific I could be in certain sections of it?
94. How do I write about topics when I don't have an opinion on them?
95. How can you write a whole article on like being environmentally responsible you know or ethically responsible?
96. How do they work as like engineering words? Terminology
97. Did they want us to write personally?
98. How do I make it sound professional?
99. Am I doing this right? Is this too personal?

How do you write about things you don't have opinions about? [process]

Personal or professional? [process]

Writing style [self]

Getting started

100. How to write, that sort of thing?
101. How to start to write a Reflective Journal? How do you start writing?
102. How much you had to write for each one?
103. How to approach the first one?
104. How do we approach all that?
105. Sitting in front of the computer blankly thinking, how can I make this better…?
106. How Grade 12 leavers would find it particularly easy either.
107. How do you use that program if you've never used it before? Computing

Practical issues about word limit [process]

Writer's block [self] how to get to future

The first journal [process]

Relevance

108. How can a bunch of electrical engineering students contribute to a project on ecotourism?
109. How's an idea going to help other people?
110. How's this ever going to help me?
111. How is this going to be applicable to me / my life?
112. How does professional studies fit in with my subject?
113. How topics related to each other.
114. Globalisation: how I could relate that to engineering?
115. How was that relevant to professionalism in any way?

My engineering area and the topic [process]

How will it help me? [self]

How is it relevant to my life? [self]

How is it relevant to engineering? [process] good or bad road

What is the big picture? [process]

Assessment

116. How could someone could read them and assess my own thoughts and feelings?
117. How they were going to assess it?
118. How it was going to be put into a number?
119. How deep do you go?
120. How much do you write?
121. How they were intending to mark our journals?
122. How was I going to do good in this subject?
123. How was I gonna get the marks?

124. Where are all these marks gonna come from?

How do you assess journals? [process]

How deep do my answers have to be? [process]

How do you write good journals? [process]

Peer Interview

125. How do I come up with the questions that were going to be of value?
126. How long does the PI have to be?
127. How are we going to make 500 words out of that ?
128. How do I adjust to different accents or different versions of English?
129. How would people react to me wearing a Shalwar Chemise?
130. Is she different?
131. Would they look at me differently?
132. Is this helpful to me or is it just a normal interview between friends or does this can bring us like more close like a friend that we didn't know each other?

Practical aspects [process]

Working with a different culture [another]

Group project/team work

133. How is the group project going to go?
134. How our group would work together?
135. How can you make others work?

Time

136. How do I find the time?

Time management [self]

Metacognitive thinking

137. How do you help yourself learn, find people to help you learn?
138. Do you actually learn every time you look at something?
139. Do you learn every time something happens to you?

Creativity

140. How do you get your ideas off the ground?
141. How do you plug in to your creativity?
142. How I could come up and start thinking of those same ideas?
143. How come I didn't come up with that?
144. How any of that would work?

How can I develop my creativity? [self] future focus how do I get there]

Readings

145. How does the reading relate to the personal learning agreement?
146. How many of the articles were applicable to what we were studying?

How are the readings relevant to the journals? [process]

Why 36/208 = 17%

Relevance

147. Why was it important?
148. Why were we doing it?
149. Why had they chosen us to do that sort of thing?
150. Why are we here doing reflection?
151. Why do we have to write this?
152. Why do I have go out and make a friend?
153. Why am I wasting my time with all this stuff?
154. Why do we have to do it?
155. Why are you on the job?
156. Why did we have to do it?
157. Why do we have to do it?
158. Why do I have to do journals ,
159. Why they had any application to an engineer?.
160. Why would an engineer have to write a RJ?
161. Why this specific topic for each one, not just about why are we doing this but why this specific topic?
162. Why do we have to write journals about something we don't know anything about?
163. Why we should be doing 'em?
164. Why we were writing them?
165. Is she doesn't care about it, why should we go to all the trouble of writing down how we feel about professionalism in the Reflective Journals?
166. Should I be doing this?
167. Do I wanna do this?
168. There's no way I'm gonna pass, so why bother?
169. Why was it important that engineers also develop the ability to reflect and to write in that sort of context?

Why do engineers have to do journals? [good or bad road]

What skills do journals develop? [self]

Why do we do these topics? [process]

Why do we write about things we don't know anything about? [process]

Technology

170. Why make the world smaller by destroying lives, why basically hinder technology by pushing backwards, by destroying things rather than creating?
171. Should we really do genetic engineering? Is it really right and responsible of us to do these sorts of things?

172. Should we produce nuclear energy when we have all of these dangerous waste products?

173. Is it right that Margaret Thatcher did it for political purposes?

[The ethics of various technologies and how we have used or might use them. [past and future]

Sustainability

174. Why always we have to maintain the sustainability when we maybe built a resort in a rainforest, for the tourism purposes?

175. How come I always think about man they have to like they have to chop all the wood from the forest in order to have a development?

The tension between sustainability and development [present] good or bad road

Peer interview

176. Why do I have go out and make a friend?

177. We're doing our own journals, why do we have to do someone else's?

Why do I have to leave my comfort zone? [self]

Why should I collaborate? [self]

Time management

178. Why on earth didn't I start straightaway?

Readings

179. Why do we have to read this?

Culture

180. Why are Palestinians and Israelis still fighting Middle East Conflict?

181. Why couldn't we all get along and have fun together?

182. Why sometimes is freedom and sometimes not, in their country this is freedom.

183. Why some in their country they can do everything they want and in this country you want to do everything's is illegal?

Why aren't people friendly? [another] [past focus]

The differences between political systems [present] [process]

Trying to understand major political issues [present – process]

Who questions 17/208=8%

Lecturers

184. Am I wasting my time here or not? [self]

Group work

185. Is the group too big? [who] [another] present

186. Am I taking too much on my shoulders? Group work? [self] present

Peer interview/culture

187. Is this helpful to me or is it just a normal interview between friends or does this can bring us like more close like a friend that we didn't know each other?

188. Would they look at me differently?

189. If they are very good, if they will accept me or not? [pi]

190. Who was it going to be was the problem?

How do you choose a partner? Present focus, process

Will the other person accept me? [self? another?]

Readings

191. Who were these people that we were reading about?

Who wrote the readings? [another] present

Relevance

192. This isn't familiar, what am I doing as an engineer? [self] present

193. Does this really apply to me? [self] present

Personal direction

194. Was I going to continually say I can relate this back to the nursing environment? [self] where I was

195. Where am I now? [self] present

196. Am I the only person in this whole unit that's coming forward [self] where one is

197. Am I doing the right course? [self, present]

198. Is it the right choice? [self - present]

Technology

199. Who came up with the idea of drains and aqueducts? [another] past

200. Who really knows how well pesticides biodegrade? [present] process

When 3/208= 1% focus

Timing

201. Why wasn't the lecture earlier?

Future

202. If these better ways were adopted will that solve a part of this big picture problem? [when] [process] future focus

Assessment

203. When is the final thing due?

Practical issues [present] [process]

Where 5/ 208=2%

Future

204. Where is it heading?

205. Where are they going with this?

The big picture [future focus] will road be good or bad

Getting started

206. Where do I start? [self]

207. Where to find the readings?

208. Where do you really start? [self]

Appendix 16: Excerpts from two interviews, 1. *Fiza* [Convert] and 2. *Geoffrey* [Resister]

Excerpt 1: *Fiza* begins:

P: okay, so in relation to that step what questions confusions or muddles did you have related to that step apart from the one you've just mentioned?

F: The readings. I remember like the readings were just like. you know, do we have to read this? When you said journal I thought you know you're gonna have to keep a diary of like your thoughts, you know what you think of the stuff and I was like is this sposed to be personal, or is this like supposed to be professional. I'm sposed to read something and put my thoughts about it or I'm supposed to be writing about what I'm thinking or feeling or going through right now as a kind of stress reliever but that was sort of like a personal diary so when I came to see you it was like, so you just read it , like I agree no I don't agree you know, you just write your thoughts, it's not like you have to please the marker or you have to figure out what they want , or you have to write a stereotypical sort of a result , you know. Whether you agree or not, you say it's rubbish, I didn't like the reading, you know that was really good and that made it easy knowing I didn't have any...There wasn't anything expected of me, there was no set requirement or level except for reading it and then just writing down what you want you know. So that was good, once I figured …

P: okay

F: …that out, yeah

P: Any other questions or confusions you had at that point in relation to never having kept a journal?

F: mm why did we have to do it? The topics were just like you know, socially responsible, like they're all listed in the blue book and I was like how do you write a journal on these topics, they're just... they were so strange, so foreign and I thought, I'm supposed to be an engineer , these are s'posed to be terms that I'm s'posedly gonna work with, or I should recognise or know and I just thought you know I don't see anything there that looks familiar, what am I doing as an engineer you know? I thought I picked civil eng and it was the right choice but... is it the right choice, cause I thought professional studies, what's this about, JOURNALS!!! This is not part of being an engineer you know, like writing down your feelings and stuff.

P: So what conclusions or ideas did you come to at this point that you haven't already mentioned?

F : I think I've already mentioned like how was I going to do good in this subject you know? How was I gonna get the marks? Like the project was worth 40% and I thought, 40% that's nearly half... you know it's not as much as a final exam, 60-65% but it's still the most and I thought, oh God, this is gonna be bad, like where are all these marks gonna come from you know, like auto cad and drafting and I wasn't good at graphics and I was just like oh I'm gonna fail this subject (laugh) or I'm just gonna get a four. I'm gonna be one of those people who don't get the distinctions or the high distinctions in this subject so that's why I

sort of ignored the journals at first. I thought there's no point wasting so much time on it if I'm not gonna get the results in the end so I might as well concentrate on my maths and stuff but in the end I did get a 6, I got my D and I'm surprised and very pleased and I realise that it wasn't such a big deal you know?

End of excerpt 1

Excerpt 2: Geoffrey, begins

G I didn't really find any of it useful. It was more a thing that I had to do and I found it more of a chore than something helpful.

P What leads you to say that.

G Because I've never enjoyed writing things especially writing things about my feelings, because I've never really had to acknowledge that they exist until now.

P [laughter] How does that relate to your situation?

G When you're a male, you grow up, you've always got to be macho , you can't really cry in front of people or really express your feelings which means that writing a reflective journal about your feelings is extremely difficult because you haven't actually decided whether they exist or not.

P Does that hinder you?

G Oh yes it does,

P How does it?

G Well, it won't hinder me as an engineer because you have to be more analytical and not really worry about it, but it hinders me, as being a person as such.

P How does it hinder you as a person?

G Oh, I don't actually think about other people's feelings when I talk to them or worry about things because I just assume that a lot of people are more like me and don't really worry about it.

P Does having come to that conclusion help you in any way?

G It helps me with most of my subjects because if I decide I don't like someone I still do all the necessary things, even if I feel that I don't like the subject, it's just helped me to keep passing everything and getting decent grades.

P Did you get any answer or resolution to that difficulty with feelings?

G Not really, it's still the same. There's a few subjects which are mainly humanities based which ask to express them which pretty much means you have to decide what THEY want and make them up.

P If you could wave a Magic Wand what would help?

G A magic wand would pretty much have to get rid of all the feeling section of it. All of my things have bullets on it because that's just what I've learnt how to do.

P And yet you said earlier that you made the Reflective Journals as constructive as possible because you were concerned about the person marking them.

G I was concerned about the person marking them more because if they don't like it they're obviously going to mark it down. I thought about them , their feelings, but I don't think about many other people, like when I do my other tests I do now I don't write comments to say why I've done this or how it's made it better and think about their feelings because I assume that they're not going to be all that worried about it. But in this one because it's humanities based I assume that quite a bit of it is going to be based on their feelings because most of the English type and humanities things don't have much of a set criteria like you have, if you have 300 words you get this mark, if you get like in maths, you get this one. It's a lot more shaded so I had to actually consider someone's feelings and actually try to make it better.

P How do you think that will help?

G It means I CAN actually do it and I can now try when I'm writing other things up or when I'm having an interview with different people I can now actually consider their feelings and work out what they think of it.

P What leads you to say that?

G It's just something I haven't had to worry about before but I could see how it could be a problem in the future, like when I'm talking to an employer I want to make a good impression on them I don't just want to keep blunt and to the point.

P How do you think that will help?

G I think that will help getting a decent job and making people like me as a person and not just with the work I can do.

P How does having that conclusion hinder you?

G It means I actually have to put effort into it but doesn't really hinder me that much

P So what you've said is that actually some of that, now being able to write and to actually…

G Consider other people's feelings will help me in the long run

P As an engineer and as a person?

G Yes, it will.

Excerpt 2 ends

Appendix 17: One analysis of a summarised Time-line interview – "Bo"

This begins with the summarised Time-Line Steps, which are then followed through from Situation Movement State to Uses. Similar tables were done for all interviewees.

BO: TIME LINE STEPS [summarised by PK]

(female, ESB, Mature-age, 2002)

STEP 1	You weren't worried about the Reflective Journals, what fazed you was the need to hand them in and have them assessed, You couldn't see how that would help,
STEP 2	The feedback, the content wasn't deep enough and I realised I hadn't reflected as deeply
STEP 3	You realised no-one was assessing YOU and you relaxed
STEP 4	It made you think about the issues
STEP 5	And the readings weren't available
STEP 6	It related back to your previous work
STEP 7	It was good at the end although you were dubious at the beginning.
STEP 8	The guys found it more difficult and thought that they were a drag
STEP 9	You like to write anyway.

STEPS	SITUATION MOVEMENT STATE	GAPS	BRIDGES	FEELINGS	HELPED	HINDERED	USES
Step 1 We found out we had to do them	Barrier	How could someone read them and assess my thoughts and feelings? Why hand them in?	I had done them before in nursing. I keep a journal. No-one's assessing me It's just the way I'm Writing.	Fazed	Prompting questions helped	Someone was going to be reading it. I had to write well. Workload heavy	
I held back.	Tuned out	How was it going to be put into a number? What does content mean?	Reflections always been an airy-fairy sort of subject. My personal thoughts and feelings were my own and how anyone was going to judge them was beyond me. Adjusted writing	Stress	Spoke to other students. Nothing to stress about	Didn't seem relevant. Made it difficult to write. Feedback took too long. It made it difficult for me to write it. I procrastinated a lot. I just didn't feel I wanted to do it because I knew someone was going to read it.	
You realised no-one was							

assessing YOU and you relaxed							
Week 4/5	Moving		Just write and be done	Relief			Got easier
Step 6 The feedback from week 5 was I hadn't reflected deeply enough in content .					Feedback – I didn't reflect deeply. Ok to write in the first person. Got feedback. The assessment wasn't as formal as I was anticipating… that helped me to relax . ' Wrote more down – more personal writing.		Relaxed. Able to move
Step 7 It made you think about the issues							
Step 8 And the readings weren't available			I concluded the readings are there to make you think about it really.		Readings there to make you think	The readings not being available, sometimes the readings didn't seem relevant	Relaxed Got easier

(laughs)							
Step 7 It related back to my previous work .	Decision	Would I relate it back to nursing? What am I doing here? What's going on with this subject? (males)	Went back to being a student again. The two professions are similar. I have a lot of thought processes already, Not so foreign Nursing not useless	Concern Relief	Experience in teams I'm not as silly as some people think for changing professions. I felt a shift, a change in thought processes	Group project – only female. It wasn't just me.	Got connected Found direction Relaxed Got reassurance Metacognition
Step 10 It was good at the end although you were dubious at the beginning.	Problematic	Where is it heading?	Had to sit in a room and reflect.	Dubious	We are reflecting on specific topics here. Some direction Took the Hoodoo on the word reflection away. Faced journals without thinking it was a drag	Bad experiences from nursing. Thought I'd left it behind Not beneficial	Found way to move
Step 8 The guys found it more difficult		They thought it was a drag – a lot of their time out of their	I didn't see it as a drag. Their problem not mine.		I like to write. Previous practice made it easier for me		Found a way to move

		week was spent doing it					
Step 9 I like to write anyway.					Qualities article opened my mind		Got insight