INTRODUCTION
At the beginning of 2009, the newly appointed Vice Chancellor of UCT, Dr Price, launched a process to develop a new strategic plan and mission for the university. These documents, approved in December 2009, committed the university to developing the following graduate attributes:

- Capacity for critical comparative thinking
- Effective cross-cultural communication skills
- Critical knowledge and understanding of the country’s history
- Skills for active local and global citizenship
- Ability to bring a contemporary African focus to future professional work
- Capacity for critical thinking and handling constant change
- Commitment to social justice
- Ability to use a range of information sources and evaluate the reliability of those sources
- Capacity to reflect on the implications of living and working in different social contexts.

INITIATING DEBATE ABOUT THE IMPLICATIONS OF THE REVISED MISSION AND THE STRATEGIC GOALS FOR THINKING ABOUT THE CURRICULUM
Given the strong emphasis on developing distinctive attributes in UCT graduates, the Senate Academic Planning Committee decided to use the annual Teaching and Learning Symposium and Report to initiate a debate about graduate attributes, structured around the experiences of academics on the ground.

The Deans were requested to nominate academics to write reflective pieces on how they used graduate outcomes to inform the design of their curricula and pedagogy. Six pieces were
selected for incorporation into the Teaching and Learning Report and three for the symposium. The six pieces are reproduced here (UCT, 2010).

ENGAGING WITH GRADUATE ATTRIBUTES: REFLECTIVE THINK-PIECES

Don Ross: Wheeling, dealing and learning: the Applied International Trade Bargaining course

Since 2000, Applied International Trade Bargaining, ECO3025S, has served as the capstone course for the Philosophy, Politics and Economics (PPE) Bachelor’s degrees in the Faculties of Commerce and Humanities. It is also taken as an elective by about 50 students each year from outside the PPE streams, which brings its total annual enrolment to about 175. The majority of students in each cohort that has taken it have reported afterwards that it was both the course they most enjoyed during the degree, and also the one in which they think that they learned the most. The course is especially popular with foreign exchange students.

At a superficial level of description, ECO325 is easy to characterise: it’s a simulation of a World Trade Organization (WTO) bargaining round. Students are randomly drawn to represent countries as trade representatives. After performing self-directed research to establish their countries’ interests and goals, and to master the structures and issues of the WTO, they then bargain with each other, both co-operatively and competitively, to try to secure the best outcomes that they can for their respective countries. About 40 per cent of the bargaining occurs in face-to-face settings, where it is governed by rules and monitored by lecturers or tutors. The other 60 per cent occurs online in a structured VULA web village we created, and in coffee shops and pubs on and off campus. At the conclusion of the course, students must each write a 40-page detailed report to their Minister of Trade, explaining why and how they accomplished whatever they did, justifying the concessions they were required to make, and indicating why some goals were not achieved. Sixty per cent of each student’s final grade is based on evaluation of this report. Reports are assessed on the basis of four equally weighted criteria: (1) content and organisation (how closely would the report pass muster as an actual official submission from a chief of delegation to a trade minister?); (2) language, grammar, style and tone; (3) research (does the report incorporate and appropriately cite all relevant, and some novel, discovered facts about the student’s country’s trade goals and policy, and about the areas of WTO jurisdiction over which the student bargained?); and (4) strategies and achievement for the country (what did the student actually
accomplish through bargaining, were these accomplishments important, and are good explanations provided for areas in which strategies failed?).

Given only this surface account, someone may question the relevance of the course in 2010. The then-new WTO seemed, back in 2000, as if it would radically transform the domain of international trade. It has not. Although it continues to perform the very useful role – especially for poorer countries – of maintaining a rule-based system for trade in manufactured goods, since its creation in 1995, all efforts to extend its scope beyond this limited aspect of trade have failed. The bargaining processes our students simulate each and every year have therefore never had any impact on the global economy. WTO policy is not remotely as important as domestic policy-making within the major countries and the European Union.

The explanation for the course’s continuing existence and high popularity is that in its deeper pedagogical aims, it isn’t mainly about the WTO; that is just a vehicle, an economic bargaining setting that happens to be on the right scale of participant numbers and scope for 175 students and a duration of one semester. The true point of the course is to confront students with the need to integrate and apply the skills and knowledge they have learned, and to create an environment in which they must be highly active as creators of their own learning. A secondary goal is that they experience, as opposed to just read and hear lectures about, the political constraints under which developing and poor countries labour.

These aims are reflected in the explicit intended learning outcomes. Students are assessed on the basis of their demonstrated ability to integrate trade theory, microeconomic and macroeconomic analysis, political analysis, and game theory – in sum, the main core content taught in the core of the PPE programme – in all of their course work, including both the extensive continuously assessed participation in bargaining, and their final reports. They are additionally assessed on their demonstrated ability to deploy this knowledge practically in making judgments about the relative value of the material, some of it objective and scholarly, much of it politically biased, that they find on the Internet. The course structure, and the interpersonal dynamics to which it naturally gives rise, reward students for their ability to perform this integration in real time, under the pressure of public gaze, and in application to practical tasks rather than in the abstracted form of the traditional examination or pure research paper.

Students are informed at the beginning of the course that they will be graded on the basis of what they accomplish for their countries. They’re told that high achievement will require intensive research into not only their own countries, but also on those with which they
bargain. A few believe us and get cracking on their research right away. Most do not. But then they discover that, although bargaining requires them to behave diplomatically, and to build and maintain effective coalitions, it is also intensely competitive. If others come to know more about the global economy, or more about country contexts than they do, their lack of preparation will be exploited. In consequence, by the mid-point of the course, very few students are not relentlessly hunting down useful information. We see the fruits of this in their final reports: 8 to 10 each year are so professionally done that they could pass for real WTO delegation briefings. The rest fall short of that extreme standard, but nevertheless reflect prodigious levels of work. Most are also, quite evidently, labours of love rather than onerous sweats, because they are accounts of the student’s own, unique record of self-organised research, strategising, wheeling, dealing and PR. Seventy per cent of reports are unabashedly proud documents.

I believe there are several basic reasons why the course works so well. First, it transforms the learning dynamic into one that people find natural and that they enjoy: essentially, that of sport. Second, it gives students wide scope to be active, and to exercise control over their outcomes. Third, it encourages the students to be creative and to develop personalised work deliverables, in the context of a discipline, economics, that isn’t generally known for travelling far from standard textbooks.

What makes all of this so satisfying is that the knowledge and capacities the course develops in the students are exactly the ones it was designed to emphasise. A student who does well in the course has necessarily demonstrated sustained commitment to hard work and significant investment in a task; strong interpersonal, especially bargaining, skills; ability to do self-directed research and extract information for use in real time; skill in strategic analysis and foresight; and the ability to produce a well-organised and well-written report. Most importantly in the context of specific knowledge relevant to their programme, they have had to negotiate the subtle interrelationships between economic analyses and real-time political processes, in which trade-offs among ideal outcomes are essential.

We don’t make it easy for them. Reports are graded stringently and externally examined. Many students report that, because of its competitive dynamic, it demands as much time as all their other courses put together, even if all they aim for is a solid second-class pass. Yet after ten years I’ve never heard this expressed in the form of a complaint.
**Stephen Inggs: Vision, imagination and perception – desired attributes of graduates in Fine Art**

As contemporary fine art has changed, so have the needs of students and the demands they place on developing skills in understanding forms of representation and the visual world. The techniques and concepts of artistic practice have evolved alongside teaching methods and theory, and successful art schools reflect those changes while preserving a continuity of practice and values that connects with a long tradition.

Upholding core values is important to sustain distinctiveness, as is curriculum development and innovation, if teaching and learning are to remain relevant, especially when only a few graduates will have lifelong careers as professional artists. Therefore, students need to be educated for multiple careers, with a range of knowledge, skills and attributes which will assist them in handling constant change. If the primary function of an art school is to educate the next generation of creative and cultural professionals, then it is crucial that they are prepared for a visually rich world in which complex information is increasingly conveyed through visual forms.

Through the reassessment of curricula and focusing on significance and distinction, courses can give students access to modes of learning through the engagement with and manipulation of the material world. This process helps students to develop an understanding of empathy that can lead to the development of more responsible citizens, no matter what career path they choose.

Although delivery of content knowledge and disciplinary expertise are central to teaching within our programme, an art school is also a place for thinking and learning that can lead to numerous desired attributes which add important value to an education in Fine Art.

- **Vision, imagination and perception:** Forming images and concepts is central to the practice of making art. By helping students to develop creative ideas and bring them into being through materials also impacts on their perceptions when faced with challenges outside the academy. When evaluating creative work, vision, imagination and perception are evident in the levels of interpretation of ideas and concerns expressed.

- **Observing and problem-solving:** In addition to developing skills and finding solutions to visual representation, this entails making students understand, through the experience of making, the central role of contingency in the production of art. Evidence of creative problem-solving can be found in varying levels in the way in which a work of art is manifested.
• **Exploiting creativity through improvisation:** Thinking about and making intelligent use of materials to transform and innovate visual forms are essential to creativity and improvisation. Creative intelligence shifts the interpretation of the familiar, revealing something new about the world we inhabit.

• **Curiosity:** Developing a sense of inquisitiveness and a desire to know more about the material world is an accepted attribute of thinking and learning in relation to the practice of art.

• **Situational sense-making:** Socially responsive project assignments encourage students to work outside of the lecture theatre, studio and workshop, by engaging with many facets of the city – visiting museums, exhibitions, sites of heritage and public interest – as well as informal settlements and industrial locations. Through this process of engagement, students work in complex situations, finding solutions for many of the conceptual, material and social aspects related to projects. For example, students are exposed to topical events and issues in an ever-changing social and cultural context when making artwork such as a conceptual intervention in the city that sets up challenging situations for the reception of the work.

• **Respecting difference:** Giving students access to modes of learning through engagement with the material world assists them to understand how this process develops an understanding of empathy that can lead to the development of more responsible citizens, no matter what their chosen field of study. Several creative projects specifically draw on individual student life histories for the conceptual context. These projects, when presented in the context of seminars, encourage and develop understanding and respect for difference through discussion and critique.

• **Reciprocity and the ability to collaborate:** Understanding and exchanging ideas, skills and privileges are at the centre of discourse and work processes in contemporary art production, often necessitating the ability to collaborate as a key attribute in realising what is in the imagination. Many workshop-based projects encourage students to work in concert with one another in developing highly technical skills and solutions for creative projects.

• **Pursuit of excellence:** The very nature of creative work encourages an engagement with and the pursuit of mastering concepts, techniques and materials to produce work to the highest possible standard. Students’ ability to critique the visual, including their own production, to be attentive to detail, to understand that the visual is a powerful site of
meaning and knowledge, develops an understanding of and engenders excellence.

- **Collective moral values:** This is achieved by revealing through courses how we are all a product of our traditions of art and ideas, and how visual representations of our world reflect our values, ideas, prejudices and freedoms. Giving students a heightened awareness and appreciation of beauty and what this means in different contexts can also lead to a sense of justice. In all projects, students develop ways of empathising, not only with materials, but also with subject matter. This quality of empathy and heightened awareness of the place of both objects and people, for example, draws on the creative, religious and cultural traditions of family. The communal realm of the creative process and discourse brings about an awareness of how they have been shaped.

Giving students a sense of the richness of creative work through the study and practice of art is a means of enhancing their understanding that the visual is a powerful site of meaning and knowledge. Our graduates will ideally become agents of knowledge production who bring about diversity and intercultural dialogue while facilitating a more open sense of the world.

*Harsha Kathard: Reflections on implementing a curriculum of relevance in the School of Health and Rehabilitation Sciences*

This think-piece provides an excerpt from the School’s desired graduate outcomes and attributes, and then considers educational opportunities supporting the development of these outcomes and attributes. The elements of the curriculum process reflected on are embedded in a questioning of the future of health and healthcare in the 21st century. The programmes have recognised the dire need for change as traditional/historical professional and educational practices have contributed to social inequities. Our taken-for-granted practices were rooted in a medical model and benefited a privileged minority. Changes in the curriculum were therefore necessary to inspire a socially-just practice.

As part of these deliberations, we drafted a profile of core competencies, outcomes and graduate attributes common to the professions of Occupational Therapy and Speech-language therapy, Physiotherapy and Audiology. We recognise that these competencies, outcomes and attributes are both contested and provisional, and will be shaped through further dialogue.

*Excerpt from graduate competencies and outcomes*

Graduates should demonstrate the following knowledge, values and skills:
• Empathy, caring, compassion, patience, gentleness, cultural and gender sensitivity, acceptance of diversity, respect for patients’ dignity, privacy and confidentiality, personal honesty, open communication with and responsiveness to patients of all ages
• An understanding of the total spectrum of health needs of the country and recognition of their duty to commit themselves to the service of society
• Knowledge of the historical, cultural, socio-political, economic and environmental factors that influence health and wellbeing in the South African population
• Ability to plan, implement and participate in health promotion programmes as a team in relation to the profession, including the ability to advocate on behalf of the health needs of the individual, family and community.

In short, graduates are required to become professionals who are change agents – an extraordinary challenge.

**Equity and diversity**

After intense debate we agreed that it was unjust to implement an equity-driven curriculum when the student profile itself did not reflect the equity and diversity. The classroom as a place of learning could be enriched only if students had the opportunity to appreciate issues of equity, diversity and difference in their immediate learning environments. We resisted the forced choice between equity and excellence and considered equity as excellence. Therefore, the School changed the admission criteria to allow access to students who would otherwise be excluded, while at the same time making provision for additional learning support in order to be successful at university. The classroom has become a critical space to engage students of diverse backgrounds. Some students report that they haven’t had the opportunity to interact with students of backgrounds different from their own. The process is not without challenge, as we are discovering through our “diversity and equity dialogues”, during which students actively debate issues of prejudice and stereotyping within the context of professional learning. Managed skilfully, the diverse classroom offers opportunity for fostering respect for varied experiential knowledge, managing power and dominance, appreciating different histories, and valuing multiple ways of understanding issues.
Political reasoning

Traditionally, students were trained to do clinical reasoning and procedural reasoning as part of a medical model which taught them to solve problems about a disease or disorder. While such reasoning is important, it can mask issues of social justice because it is narrowly focused on the specific condition, for example, a hearing loss or a spinal cord injury, with little consideration of the person or people in context. The curriculum now includes an integrated layer of political reasoning which sensitises students to key issues of equity, justice and social inclusion – a political consciousness in their practice learning. The process involves in-depth exploration of interrelated personal, professional and political values. Students are able to interrogate the potential conflict and/or co-operation between values systems, the choices they have (as citizens and professionals), and the actions they could take. By expanding their thinking and reasoning frames beyond the technical dimensions of professional practice, students are encouraged to consider what their next actions might be. This type of reasoning encourages them to consider new or different actions, thereby creating opportunities for change.

To illustrate: During an aural rehabilitation programme, the students asked participants (not patients) with hearing aids what they would like as the next outcome in the intervention process. Far from the usual answers about changing hearing aid settings and how to listen better in noise, the participants said they would like access to the cinema (social inclusion). The students were then challenged – through this dialogue – to consider how the environment could become more inclusive, and proceeded to negotiate with a cinema to install wireless FM systems which connect to hearing aids. The cinema was further persuaded to screen movies with subtitles (special showings) to create further opportunities for inclusion. Through such engagement, students began to understand their roles as advocates and change agents. They also had an opportunity to understand that while impairment (hearing loss) is a medical or biological condition which results in difficulties with communication, it is the loss of opportunity for social inclusion which creates disability and isolation.

Assessment changes

Assessment, as part of the learning cycle, has been a crucial dimension of curriculum change. With a curriculum intending to encourage lifelong learning, value shifts, and independent practice, we are challenged to develop assessment methods which promote these outcomes and attributes. Some of the questions we deliberated on include: What range of assessments would effectively promote a curriculum of relevance? Where and how do we assess content,
procedural and political knowledge? Is the assessment policy of the University aligned with the intention of changing the curriculum?

In the senior years of study we require students to:

- Use a variety of resources for independent case management.
- Demonstrate value shifts.
- Think deeply to formulate innovative strategies for case management.
- Apply and integrate knowledge.

The traditional time-bound examination format is therefore not useful for some courses. Assessment methods are under review throughout the curriculum with new and revised methods being introduced continually. As example, a “take-home case study exam” has been tried in some courses. While it presents challenges, this type of assessment has provided an opportunity for students to engage with deep learning. We have found that student responses to South African challenges have been rich, innovative and individualised. This approach to assessment provides an opportunity to value diverse responses to a problem rather than a “one right answer” approach. Students have demonstrated their willingness and eagerness to explore interventions that extend beyond traditional practices (they are more willing to take risks), thereby fostering their development as change agents. In preparation for such assessments, students are given formative tasks which ensure that they develop the necessary academic skills to be successful.

**Research: Students as knowledge producers**

As a key attribute, the graduate must be a knowledge producer to be an agent of change. Research is embedded in the curriculum in two ways. Firstly, the curriculum has a research thread from first year to final year. In their final year, students are expected to conduct a research study and write a report. A key outcome of the project is that students must demonstrate skills to produce knowledge and to critique existing bodies of knowledge. Secondly, lecturers and researchers are including their research as well as other local/contextual research in the curriculum as part of a purposive initiative to extend the local evidence-base. These strategies help in integrating research into the curriculum to enable the graduate to become a clinician-researcher – a key attribute of the UCT graduate. The practice of heightening the awareness of research in the curriculum is helping graduates to see themselves as knowledge producers. This has increased the demand for postgraduate studies.
There are many other issues which influence the implementation of a curriculum of relevance. It is clear that for as long as the world is changing and remains uncertain, the curriculum will always be in process. The issues highlighted illustrate initial attempts at providing educational opportunities which promote the development of the graduate as a change agent. We have more questions than we have answers, and that too is a good thing.

**Carrol Clarkson: The aesthetics of justice – towards an argument for teaching-led research**

The mission statement includes the desire to develop postgraduate students “who will have a spirit of critical enquiry through research-led teaching; and who will have an understanding of the role they can play in addressing social justice issues”. These are the central concerns of this paper – but with a twist: instead of “research-led teaching”, I would like to broach an argument for “teaching-led research”, not only as a way of developing a spirit of critical enquiry amongst students, but also as a way of sensitising students to questions of social justice.

Many of my colleagues, across different departments and faculties, have spoken of the difficulty of attracting postgraduate students to their specialised areas of research. At undergraduate levels, we often find ourselves giving introductory or mainstream classes in our respective disciplines, sometimes with little chance of bringing our own research interests and strategies to the attention of the students; at postgraduate level it is as if we suddenly expect a long-term commitment from students to a line of research inquiry to which they have never been exposed before. In making the argument for the impact of teaching-led research on postgraduate students, I highlight a teaching strategy at undergraduate level. I refer specifically to two courses I have taught in the English Department: third-year lectures on JM Coetzee’s *Disgrace*, and second-year lectures on Charles Dickens’s novel, *Bleak House*.

A few months before I took up my post at UCT in 2005, I received a phone-call from the English Department asking me to give three lectures on JM Coetzee’s *Disgrace* to third-year students. Not wishing to upset my would-be employers, I agreed – but with some trepidation: I had read *Disgrace*, but at the time, it was the only Coetzee novel I had read! I gave the three lectures, and the following year a handful of Honours and Master’s students chose to write dissertations on Coetzee. A few PhD students soon joined the ranks, and to ease my growing supervision load, I started a Coetzee discussion group. In turn, the discussion group attracted international attention, and soon friends and colleagues from all over the world were asking
to present papers to the “Coetzee Collective”. We now have over 100 participants on our mailing list, representing thirteen different countries. My engagement with Coetzee’s *Disgrace*, and the rest of his oeuvre, has culminated in the publication of my own book: *JM Coetzee: Countervoices*.

What happened in those third-year lectures on *Disgrace*? Reflecting on it now, I realise that because I knew so little about Coetzee myself, I had to pitch all my research energies and strategies into the lecture-room, even though this was not my own research area at the time. The distinction I am making is a subtle but important one: to bring a research strategy to the classroom, rather than a research field. I now do this as a matter of course: I take undergraduate students to the brink of what I know myself within the prescribed topic of the lectures, so that when I ask a question, the enquiry is genuine, and students have the sense that they are active participants in pushing the boundaries of the discipline. It is not that they are simply giving the “right” or “wrong” answer to something that I have seemingly always known in advance. It is when students realise that lecturers don’t always have all the answers yet that they begin to appreciate their own potential to make a valuable contribution to their field. Research is an intellectual adventure, and students need to sense this at an early stage if they are to become good researchers themselves. I would go so far as to say that instilling the excitement of a spirit of enquiry should take precedence (even over funding questions) when it comes to attracting strong postgraduate students.

A few years ago I was preparing my second-year lectures on Charles Dickens’s 1853 novel, *Bleak House*, and at the same time I was teaching second-year seminars on post-apartheid South African fiction. In 2004 I had walked through the streets of Hillbrow with author, Phaswane Mpe, retracing the footsteps of the characters in his novel, *Welcome to Our Hillbrow*. I took several photographs along the way in black and white film. While I was preparing the Dickens lectures, I came across photographs of nineteenth-century London, and was struck by the similarity of some of the inner-city Johannesburg photographs I had taken, and those taken in London more than a hundred and fifty years ago. In my *Bleak House* lectures, I show the students photographs of London, but unbeknown to them, I slipped in two of the Hillbrow photographs. A passage from Dickens’s novel has a striking resonance when it is read alongside the photograph of a deserted alley in Johannesburg, with its derelict buildings and slimy effluent on the street itself:

“Mr Snagsby passes along the middle of a villainous street, undrained, unventilated, deep in black mud and corrupt water – though the roads are dry elsewhere – and reeking with such smells and sights that
he, who has lived in London all his life, can scarce believe his senses.” (Dickens, *Bleak House*, Chapter 22)

Again, I show a photograph of a completely gutted, but clearly inhabited apartment building in Twist Street, Hillbrow. I read a passage from Dickens’s novel:

“It is a black, dilapidated street, avoided by all decent people; where the crazy houses were seized upon, when their decay was far advanced, by some bold vagrants…” (Dickens, *Bleak House*, Chapter 16)

When the students realise that some of the photographs are of contemporary *Johannesburg*, and not of nineteenth-century London, then all the questions that Dickens asks about social justice and responsibility, about poverty, about housing, about sanitation and disease, suddenly bear striking relevance to our lives in contemporary South Africa. The lectures led to a publication of my own (“Fever and AIDS: Teaching *Bleak House* in South Africa”). But further, the juxtaposition of the photographs, spanning two seemingly discrete courses (nineteenth-century British literature, and post-apartheid South African fiction) has led to several postgraduate student projects in our department specifically addressing questions of social justice, and the role that literature and the arts more generally might play in dealing with issues such as reconciliation, and personal, cultural and political trauma. Much of my own teaching at postgraduate level is now interdisciplinary – perhaps most notably the course I have taught in the Law Faculty together with Drucilla Cornell, “Revolution in Law and Literature”.

To conclude: it is vital to bring one’s research energies and strategies – if not one’s usual research field – into the classroom. This has the potential to generate further research areas of one’s own – thanks to the *teaching* opportunity. At the same time, it has the potential to inspire the next generation of socially responsive and passionate researchers.

**Jenni Case & Brandon Collier-Reed: Embedding and assessing graduate attributes in Engineering curricula at UCT**

Engineering programmes across South Africa are accredited by the Engineering Council of South Africa (ECSA), a statutory body which represents the profession. In 1998, ECSA adopted an outcomes-based framework for accreditation, in line with the Washington Accord, a system of mutual accreditation across similar professional bodies in a range of countries including the United States of America, the United Kingdom, Australia and Canada. Accreditation takes place in a five-yearly cycle, and UCT underwent its first outcomes-based
accreditation in 2000, followed by another in 2005, when there was an intensified demand for us to demonstrate that our courses and programmes were structured along outcomes-based lines.

The programme-level outcomes central to ECSA’s accreditation process can be seen as analogous to graduate attributes in so far as they are the “qualities, skills and understandings ... students would desirably develop during their time at [an] institution and, consequently, shape the contribution they are able to make to their profession and as a citizen” (Bowden, Hart, King, Trigwell, & Watts, 2000). ECSA describe these capabilities in terms of Exit Level Outcomes (ELOs). Neither content nor structure of a programme is prescribed, and it is satisfying these generic ELOs which form the cornerstone around which Engineering programmes develop their own unique curricula.

In a 2001 article our colleague, Jeff Jawitz, argued that the ECSA shift to outcomes-based accreditation offered unique opportunities for engineering educators, which he summarised as follows:

- “It has brought key educational issues, namely the relationship between learning objectives, the learning process and assessment, to the fore for discussion in engineering departments.
- It allows much greater freedom for programmes to define their own content as the emphasis has shifted from what students know to how students can use what they know.
- It is focusing attention on how we assess our students.
- It requires that our programmes have in place systems of continuous evaluation and improvement, a healthy change from the ad-hoc approach that we currently depend on, and one that will force us to apply in our educational design the same principles that we teach our students to adopt in their engineering design.” (Jawitz, 2001)

In this reflective piece we consider the ways in which the UCT Engineering curricula have developed over the last decade in order to be able to more clearly develop and assess our desired graduate attributes. Engineering curricula have traditionally been focused on problem-solving, application of scientific and engineering knowledge, engineering design, laboratory work, and engineering tools. There has also been a focus on professional and technical communication. In this piece we will therefore focus particularly on those attributes which have traditionally been less emphasised in engineering programmes, namely: (1)
Impact of engineering activity; (2) individual, team and multidisciplinary work; (3) independent learning ability; and (4) professionalism. Although we may always have thought that our programmes in at least a serendipitous manner would have developed these competencies, we are now required to show explicitly that we do develop them across a programme, and moreover that we are able to assess them – a considerable challenge for each programme. In this short piece we are not able to cover the full range of curriculum modifications that we have made; instead, we highlight in each instance exemplar innovations from the programmes where we have been most closely involved.

**Impact of engineering activity**

This outcome requires graduates to be able to “demonstrate critical awareness of the impact of the engineering activity on the social, industrial and physical environment”. This broad-ranging statement includes those aspects of Engineering curricula that have traditionally focused on safety and risk assessment, but now also include an engagement with environmental and social impacts.

In Mechanical Engineering, a triad of activities has been integrated into the fourth-year “capstone” project course, where students are required to engage critically with this outcome. Firstly, each student must complete an ethics questionnaire, which must be approved before they collect any data for their project. This compels the students to consider the ethical implications of the work that they are doing and the impact that what they are doing may have on a community. Secondly, a risk assessment form must be completed by each student for any new activity related to the practical aspect of their project. In this way students are made to consider the occupational and public health and safety requirements for any activity in which they are involved during their project. Finally, students are required to write a short essay that critically considers the impact of their project on society. Assessment is conducted by examiners (including an external examiner), using their professional judgement as to whether a student has satisfactorily managed to demonstrate satisfactory performance in this outcome.

In a final year course in Chemical Engineering, students have to analyse and describe the social and environmental considerations in a new process industry project. They have to discuss approaches for engaging with the conflicting interests of multiple stakeholders. They also need to demonstrate that they appreciate the role of the process engineer in responsible value-creation and prevention of harm.
Individual, team and multidisciplinary work

This outcome requires graduates to be able to “work effectively as an individual, in teams and in multi-disciplinary environments”.

In Chemical Engineering there is a strong emphasis on groupwork throughout the programme. The final year Design Project takes place in a randomly assigned group of six students, while the Research Project is conducted in a self-selected pair. The assessment of the Design Project includes both individual and group submissions. Both courses also make extensive use of individual oral presentations to assess individual competence. In Mechanical Engineering, multidisciplinary working has been integrated into the final-year design course as there are typically both mechanical as well as electro-mechanical students in each project team. Students are able to work across disciplinary boundaries (the mechanical/electrical boundary) in the development of the solution to their design problem.

Independent learning ability

Here graduates are required to be able to “engage in independent learning through well developed learning skills”.

In Mechanical Engineering this outcome is assessed in, among others, the fourth-year project. Here, students are given the opportunity to demonstrate that they are effective learners by showing that they can determine learning requirements and strategies by sourcing and evaluating information. Furthermore, projects are constructed in such a way as to require students to access, comprehend and apply knowledge acquired outside formal instruction, and then critically challenge assumptions they may have and embrace new thinking.

Chemical Engineering uses problem-based learning in one final year course to provide students with the opportunity to demonstrate their ability to learn independently. In this case, the mode of learning is limited lecturer input, with students learning through engagement with real-world problems. The assessment of problem-based learning activities takes place through the monitoring of performance in regular examinations, as well as through the reflective learning journals that students submit for assessment. In these journals, students are required to evaluate what they have learned and how they have learned it.

Professionalism
The ECSA requires graduates to be able to “demonstrate critical awareness of the need to act professionally and ethically and to exercise judgment and take responsibility within own limits of competence”.

Throughout their final year Mechanical Engineering project, students are required to behave in a professional manner in their relations not only with the technical and workshop staff, but also their supervisor and peers. This outcome is assessed by the supervisor (the internal examiner) qualitatively in the form of a report on a student’s performance which the supervisor compiles. In this report, the supervisor is required to give evidence as to what extent he or she believes that a student has accepted responsibility for his or her actions, displayed judgement in decision-making, limited his or her decision-making to his or her area of current competence, and discerned his or her boundary of competence in the project. Similarly, in the Chemical Engineering Research Project, students are explicitly assessed on their professionalism by the course co-ordinator as well as by their supervisors.

The exemplars presented above have hopefully illustrated how two departments have made use of the ECSA accreditation process to facilitate the articulation between course-level learning objectives, programme level outcomes, and assessment. A focus on “educational design” has emerged as an integral part of our programme planning and the “ad hoc” approach referred to by Jawitz is slowly having less of an influence on the way we operate. What remains is to recognise that what ECSA (and thus industry) may require and what UCT may view as important generic graduate attributes are not necessarily a perfect match. Our programmes will continue to evolve to ensure that every student graduating not only meets ECSA’s Exit Level Outcome requirements, but also the generic graduate attributes that emerge from within the University’s structures.

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**Steve Reid: Personal reflection on producing socially responsive Health Science graduates**

The UCT Faculty of Health Sciences stated some 10 years ago that primary healthcare should be the faculty-led theme to guide teaching and research activities. So a well-written mission statement signed by the senior academics at the time spells out the intention to pursue equity and social justice as central issues, and produce health science graduates who are socially
responsible. In interacting with key informants I have asked how that stated intention has
been translated into practice in teaching and learning, research and clinical practice, and I
have received a wide range of responses which have been illuminating.

Firstly, my sense is that there is some conceptual confusion around what primary
healthcare actually means in a medical and clinical context. Primary healthcare very simply
means health for all, not just health for a privileged few: not health for those who can afford
it, but health for everybody. Those who gain access to healthcare and present themselves as
patients are a small sub-set of those who need care, who may be termed the “population at
risk”. Among the population at risk we find those who are not yet ill, those who don’t know
that they are at risk, and those who are too poor or live too far away to access the care they
know they need. Extending clinical care beyond the individual patients who present
themselves to those in the community who do not present for care is a crucial conceptual step
that addresses the challenges and barriers of access to care. These barriers are directly related
to the notions of equity and social justice, and need to be addressed as part of the professional
responsibility of every clinician. Primary healthcare is therefore a very appropriate lead
theme for the production of socially responsive graduates in the health sciences.

Traditionally, clinical teaching and learning has taken place almost exclusively within
large urban hospitals where the “medical model” roles and patterns are entrenched, and the
population at risk is, to all intents and purposes, out of sight and out of mind. The teaching
platform has to be extended to include more primary care and rural sites, so that the context
of all the people of South Africa, and indeed the rest of Africa, can directly inform the type of
clinical learning that takes place.

I have found at UCT some amazing and inspirational examples of clinicians who
understand the bigger picture and are deeply involved in bringing about change at a
population level as well as the individual level. These champions of socially responsive
medicine are, however, somewhat isolated, and are not co-ordinated into a systematic faculty-
wide strategy for promoting equity and social justice in the clinical context. Medical and
health science graduates from UCT are highly regarded internationally for their clinical skills
and technical excellence, but this is generally not matched by their capacity and preparedness
for working in an African context, where resources are scarce and patient numbers are large.
Clinicians have to be prepared and able to think critically and act at the higher level of health
systems and leadership in order to effect change beyond the individual patient, and address
the central issue of access to care. Although the faculty’s intended output as stated in the
“MBChB Graduate Profile” includes professional values and public health skills amongst the
seven domains, there is no explicit integration with the clinical role to enable clinicians to act on the priority issues at a population-wide level. So we have embarked on two parallel processes: firstly, augmenting community-based learning and extending the teaching platform into rural areas beyond Cape Town; and secondly, a further curriculum revision that aims to integrate appropriate expressions of social responsibility into the teaching and assessment of routine clinical methods.

When Health Science students graduate, they face their compulsory year of community service, a deep-end exposure to the public service that is unique to health sciences. This in itself provides a testing ground for initiatives by graduates to engage in societal issues beyond the individual patient. After community service, they are faced with career choices between public and private sector, going overseas and staying in South Africa, rural versus urban positions, as well as which speciality to choose. This career crossroads provides a useful opportunity for some educational outcome measurements, and we are currently busy with a national study that will enable interesting comparisons to be made between health science graduates of different universities.

Ultimately, however, the extent to which UCT graduates practise in a socially accountable manner, will be seen in the differences that they make in the communities in which they operate. Since health outcomes as measured by health status or mortality figures are determined by a multitude of factors, this is much more difficult to measure.

References


