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Identifying, implementing and assessing the generic capabilities of a good engineer

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SUMMARY

The paper is grounded in the current need for a change both in the image and education of engineers. Universities of technology have a good track record when it comes to preparing engineers for classical engineering positions in their own society and culture. Such universities concentrate on teaching specific capabilities and testing them with traditional examinations. Such capabilities include basic knowledge in their particular area of engineering (construction, power engineering etc), solving problems related to it and the practical skills needed to use equipment in their area of expertise. Naturally graduates also learn more generic skills from associating with fellow students, organising their time and planning for exams. However, these learning outcomes are not usually a planned part of the course and may or may not have been acquired earlier. Today a new set of generic capabilities is demanded of engineering graduates.

The globalisation of industry, a revolution in information communication technology, technological changes within engineering and a more critical public means that graduates need to be able to communicate in cross-cultural situations, be more aware of gender and equity issues, take into account ethical, environmental and other questions when solving problems and have the capacity to anticipate as well solve existing problems. Above all they need to be creative and resourceful in the way that renaissance engineers were. In Florence at the close of the fifteenth century the distinction between the artist and the engineer was blurred. Today’s world requires a similar blurring of technical and creative skills. Today’s engineer must be able think and act holistically. Much more stress is being placed on producing engineers who are not only competent in their specific disciplines but who also possess some of the generic capabilities we have mentioned. But who defines these capabilities, how can they be taught and how can they be tested? These are the questions that are the focus of this paper.
1. DEFINING CAPABILITIES

The Oxford English Dictionary defines capability as the power, ability, competence or talent to do something. The eighteenth century English landscape gardener, Lancelot ‘Capability’ Brown got his nickname because he embodied this definition. He combined specific knowledge and practical skills in his chosen profession with more general talents: the ability to see the big picture, to communicate with his clients, to motivate his workers and to combine economics and aesthetics. As far as his profession went he possessed both specific and generic capabilities. In recent years these terms have been used to describe the sort of qualities that universities hope their students will graduate with. Unfortunately the terms are often used loosely and in different contexts. In this paper we spend some time explaining why universities in the west tend to use the word capability rather than any number of other synonymous terms. We also distinguish between specific and generic capabilities at the subject level, the degree level and the university level.

1.1. Specific capabilities at the subject or discipline level

It is not so difficult to describe what we mean by specific capabilities at the subject level. These are usually mentioned in course handbooks. One way to locate them is to go to the aims and objectives of a course. For the most part the specific capabilities that are mentioned there relate to knowledge of the subject. For example a course in physics might require that its students can demonstrate specific capabilities in regard to a key concept like force. Those capabilities might include both intellectual capacity (the ability to solve certain equations) as well as more practical skills (the ability to build experimental models or carry out laboratory experiments). Even in disciplines like maths, literature or history that rely so much more on mental skills there are always some practical skills that are needed, even if it is simply using computer tools such as matlab or literary or historical databases. The term specific capability can, it seems, embrace both intellectual and practical skills. Sometimes the course handbook will also contain references to attitudes and values. For example a handbook from the Law faculty might mention that the aim of such and such a course is to develop an understanding of and commitment to client confidentiality. A similar aim might be mentioned in medicine where client confidentiality is also important. Does the fact that such an aim crosses discipline borders mean it is generic rather than specific? We would argue that as long as the capability can be linked directly to the subject or set of subjects it is best referred to as a specific capability. Client confidentiality for example is not of concern to traditional historians whose work is
based on documents that are in the public domain. On the other hand as disciplines change so do the sort of capabilities required of graduates. Now that oral history is an acceptable form of research an ethical attitude towards client confidentiality is also important.

1.2. Generic capabilities at the subject or discipline level

Occasionally course descriptions will mention aims that are not directly related to the course content. They might say for example that an aim of the course is that students should learn how to think laterally or to work in groups or to effectively present the results of a project. Such capabilities are obviously useful no matter what the subject. Since they transcend subject and discipline boundaries we can call such capabilities generic. Generic capabilities, like the specific capabilities mentioned above, can refer to both cognitive and behavioural capacity. Problem solving ability could require an ability to think analytically or laterally, but it might also require the capacity to carry out experiments that depend for their accuracy using equipment in a competent manner. Being adept at the use of ‘scientific method’ is a fairly obvious case of a generic capability that applies across the sciences, just as logical, rational argument is generic to the humanities. One needs to be careful of course. Postmodernism presents a potent challenge to this claim for both science and the humanities. Most of the knowledge produced in western universities has been founded on these rational, empirical ‘skills’. When postmodernism challenges the truth claims produced by these methods it inevitably challenges the methods or skills themselves. In a postmodern world knowledge, skills and values are relative. Nevertheless if a course description refers to a desirable knowledge, skills or values which transcend the particular subject or course, for example the ability to make ethical decisions, then we can argue at least for its generic nature. That different groups might define ethical behaviour differently is another issue.

1.3. Specific and generic capabilities at the degree level

In studying to obtain a degree as an engineer a person will study maths, physics, chemistry, and then more specialised subjects in fields such as electrical, construction or power engineering. Each of the courses and the subjects that comprise them may strive to teach the sort of specific and generic capabilities mentioned above. After a number of years of study at a technical university a student takes out an engineering degree. What are the specific and generic capabilities he or she should possess? In other words what constitutes the good engineer? This is a loaded question since it
begs further inquiry? Good for whom? Good for what? Who owns the degree? How negotiable should it be?

There is no doubt that the conferring of a degree involves a wide range of interest groups. A degree is after all a meal ticket. Because of this industry will stress certain specific and generic capabilities, government others while the university will advocate capabilities related to its own vision (see below). Teachers and students will tend to endorse the sort of capabilities that were integral to the various courses making up the degree. Many of the capabilities will overlap but if we take a particular example, say power engineering, most will agree that a power engineer needs to have a fundamental understanding of the maths, physic and chemistry related to power production (specific capability) as well as the ability to recognise and deal with economic and environmental restraints connected with power production (a generic capability). Of course special interest groups might argue about constitutes such constraints. Because of this it is essential that all those concerned in the conferring of degrees map the sort of capabilities a good engineer should have. This means a regular updating of specific and generic capabilities at the subject and discipline level.

1.4. Specific and generic capabilities at the university level

Because universities are founded for particular purposes they can, in their turn, support the development of a special set of specific and generic capabilities. Small rural universities for example often have as part of their vision the aim to develop specific and generic capabilities in their graduates which will serve the community that supports them. The Northern Territory University in Australia for example, which is established in an area where 25% of the population are Aboriginal people aims at developing graduate attributes that include multicultural awareness. This is a conscious attempt to define and promote capabilities that suit the environment in which the university is placed. On the other hand some of the oldest and most prestigious universities around the world have evolved an academic aura based on the assumption that attending them confers certain specific and generic capabilities. In Britain for example the civil service accepted Oxbridge graduates irrespective of the particular degree they took. It was assumed that an Oxbridge graduate, by virtue of attending Oxford or Cambridge, would be urbane, knowledgeable and articulate and therefore fit for public service. It was never explained exactly how these qualities were engendered nor were there any examinations to test for them.
In other countries similar assumptions were made about the efficacy of a university education. Prior to the second world war when most university graduates were males from a well-to-do families the phrase ‘a university man’ conjured up a person with a set of defining characteristics. They almost always included the trinity of generic capabilities mentioned above. Over the last half century the composition of students has altered dramatically. Not only are there increasing numbers of people undertaking university education (a jump from two to twenty percent and more) but gender and class are also more evenly represented. One has to speak today of ‘a university person’. Which begs a number of questions: are there a set of desirable, generic capabilities that all university graduates should be endowed with? Do they change over time? Who decides what they should be? How does one engender them? And how does one know if any organised attempts to do so are successful? Before turning to these questions it is worth explaining some of the background to what can be called the beginnings of a ‘capabilities movement’ in higher education.

2. WHAT’S IN A NAME?

There are some historical and political reasons why the terms ‘specific and generic capability’ have gained acceptance within the higher education sector. Naming is rarely an arbitrary or insignificant activity. It both embodies and projects power. It can also drain power. This is why at the religious level the name of a god is often sacred or secret or why aboriginal people are loathe to use the name of a dead person. One reason why ‘capability’ is used in higher education is to distinguish it from a similar name and concept used in vocational training institutions. In the latter part of the twentieth century most western countries experienced what can only be described as an educational revolution in the tertiary sector. The driving force was economics. In the face of globalisation in industry so called first world countries realised that the only antidote they had to the threat of cheap third-world labour was a highly educated workforce.

2.1. Competency based training

Given this background it was argued that vocational education was outdated, inefficient, inflexible and divorced from industry. Many governments embraced a new form of vocational education called competency based training (hereafter CBT) and invested huge amounts of money in creating national agencies to implement it. The system should have been more accurately termed ‘competency based assessment’ because the method of assessment was the key ingredient. Trade skills were analysed,
learning outcomes specified and as long as students could demonstrate that they were competent (could do what was required) they were given a national trade certificate. The system was designed to cut out lock-step education, maintain up-to-date standards and certify people no matter where or how long they took to develop the desired competence. Of course industry soon realised that a skilled tradesperson could also be a hopeless communicator or a racial bigot and the last person they wanted to employ at their goldmine in Papua New Guinea or their electronics factory in Indonesia. Because of this generic as well as specific competencies were introduced. While the movement was clear about specific competencies it was much less certain when it came to generic competencies. There were heated debates about the twelve generic competencies that all trainees should develop irrespective of their trade.

2.2. The pressure to introduce CBT into universities
In tertiary education the universities had already gained an ascendancy in the post-war period by referring to themselves as higher education. Nevertheless government desire to transform universities from elite institutions into places of mass education began to exert a similar pressure to that experienced by the vocational education sector. The transformation and amalgamation of colleges of education into regional universities was one result of this pressure. Another was the push to implement an academic version of competency based training. This was particularly strong in vocational degrees like nursing and teaching degrees that were relocated from teacher colleges and training hospitals and placed within the university system. It was argued that if the skills of a secretary or a carpenter could be analysed, audited and translated into learning outcomes why not those of a teacher, engineer, doctor, nurse or lawyer? Why not have a national authority that oversaw this process and developed national curricula for law, education, engineering, medicine and so on?

2.3. The university response to CBT
The first unguarded response from academics was an intellectual attack on competency based training and its inappropriateness for higher education. It was a not a particularly effective attack. Most of the universities of the late twentieth century did not share the independent wealth, patronage or prestige of Oxford and Cambridge. Much of their money came from government. They had survived by enrolling more and more students and starting up new programs, some of which looked very similar to ones offered by vocational colleges. Governments insisted on
more accountability from universities as well as changes to the types of programs they offered. Given the threat of government intervention academics developed a more considered response to demands for a revamped curriculum. They began to develop and implement programs which identified specific and generic capabilities.

The choice of terms was deliberate. Capability was meant to conjure up something more than competence. University graduates should indeed be competent in the particular knowledge and skills associated with their discipline but in acquiring that competence they should also develop as independent, self confident, critical, analytical learners. Competency based training, it was argued, derived its strength as an educational method because it focused on what learners could do. Capability based education was designed to focus not only on what they could do but also on what they were capable of doing. Competence had currency as a doing word. Capability implied latent talent. University graduates might not have the answer to a particular problem but they should have the capacity to find a solution.

2.4. The pressure of quality reviews

It is not easy to determine whether or not the choice of words represented a substantial difference or was once again an example of good marketing. Universities argued that national curriculum bodies and national audits of trades and professions did not suit academia. Academic learning depended on a link between discovering new knowledge and teaching established knowledge. Because of this the onus for curriculum development, for defining specific and generic capabilities, should rest with the academic expert – the university researcher and teacher.

Truly independent universities continue to argue this but the creation in most western countries of quality assurance agencies with a brief to maintain standards of teaching and research in higher education has weakened the resolve of many universities. Given that money, status and the possibility to continue programs can rest with the findings of a quality review team, many universities instruct their teachers and researchers to follow guidelines laid down by such agencies. As long as review teams compose concerned academics and students as well as government bureaucrats this may not be a bad thing. But it will undoubtedly lead to greater homogeneity and conformity rather than to a system in which academics are truly independent of both their own administrators and those employed by government agencies.
3. IDENTIFYING, IMPLEMENTING AND EVALUATING KEY CAPABILITIES

All this brings us back to the questions posed above. Whose responsibility is it to identify and engender desirable generic capabilities in engineering graduates. How can it best be done? And to the question implied in the title of this paper. How will one know if the process has been successful? How one answers these questions depends very much on one’s view of higher education. We have argued that the world of formal adult education changed radically in the latter part of the twentieth century. The key to this change was increased government control, mainly due to a perceived need that tertiary education had to be more accountable and more instrumental. University education went from an elite to a mass form of education. A significant turning point occurred in the 1980s when the battle over which institutions could be called universities was lost and governments in many parts of the western world created a unified system. Colleges of advanced education, technical colleges, teaching colleges even agricultural colleges were merged and multi-campus universities created. In more isolated areas even community colleges that offered a few degree courses were called universities. The rationale for such changes was economic rationalism. The same argument was used to kill off courses and disciplines (classics for example) that were deemed no longer useful. The pressure from both government and industry was for universities to ask a fundamentally different question. Not ‘Is it true?’ but rather ‘Is it useful’. This pressure is being maintained today both in the areas of research and teaching. Applied research and the teaching of subjects that prepare students for a professional career are much more likely to receive funding.

3.1. Who is responsible for identifying generic capabilities?

In the changed world of higher education one thing has remained remarkably stable. Although courses and even disciplines might die a slow death those that remain healthy are still given a fair amount of academic freedom. This is in contrast with what has happened in vocational education where national curriculum bodies are common. When it comes to specific capabilities, as we have defined them, the academics themselves are still largely responsible for identifying them. They also have a large degree of input into choosing generic capabilities. On the other hand industry and government, especially through funding and quality assurance agencies, exert a great deal of power. In order to compete for funds universities and academics themselves tend to include in their curriculum those sort of generic capabilities that
are in vogue. The enormous investment that universities have made in information communication technology and the pressure on teachers to make all courses available in a flexible learning mode is an example of this. Computer skills are a generic capability that all university students are expected to develop, irrespective of the course they take. The fact that many academics are reluctant to adapt their courses so that such skills will be engendered naturally via email contact, discussion forums on the web, net based assessment and so on, highlights the point that others, outside the subject or discipline level, are often the ones who call the shots when it comes to generic capabilities.

3.2. Who is responsible for the development of generic capabilities

In one sense it is the responsibility of all the various stakeholders in higher education to agree on and engender appropriate generic capabilities. This is obvious if we take a fundamental capability such as communication skills. At the subject and course level individual academics and teaching teams can affect the development of this skill by varying traditional ways of teaching. Lectures and tutorials, where the tutor holds the floor, are possibly helpful in developing the teachers one-way communication skills. We only assert this because if these academics are already woeful communicators and never get any feedback they could go on being woeful. On the other hand lecturers can help engender communication skills by making sure that students have to work together in a subject or better still across subjects, present ideas verbally as individuals and in groups and occasionally do pair work in lectures. At the university level planners and administrators can design teaching and meeting places that really encourage interaction. Industry, government and other funding bodies can also seek expert guidance on how generic capabilities might be fostered before committing large sums of money to teaching and learning infrastructure. Lecture halls may persist at university because of economies of scale but there is no reason why the seating arrangement has to always imply one way communication. Rows of fixed seats be replaced with groups of swivel chairs to allow students to communicate more easily with others nearby. In other words timely planning by funding bodies can help ensure that the media they pay for deliver the right messages.

3.3. The ultimate responsibility for developing generic capabilities

There is simple answer as to who is ultimately responsible for developing desirable generic capabilities. Since such capabilities have to be learned the responsibility rests with the learner. Learners learn. Teachers, institutions, government, professional
bodies, industry and ultimately society can facilitate or hinder their learning. In a world where established values have been eroded some of the most important generic capabilities are linked to values. University graduates are expected to become leaders in their field, whether that be bio-technology, law, medicine, education, social work, information communication technology, environmental studies or engineering. What does society want from such leaders? Surely that they will create a better world. But what is better? In order to answer that question one needs a good grasp of ethics. Each discipline can try to inculcate the ethical values associated with it. But it is important that students also develop a generic capability that enables them to analyse their own actions and those of others and make ethical judgements about them. More importantly they need to act on the basis of such judgements. A knowledgeable lawyer, equipped with all the skills of the legal profession, who favours white Anglo-Saxon clients and discriminates against black clients is acting unethically according to a specific capability taught at law school. If the same lawyer insists that all black people are genetically inferior to whites then another important generic capability is lacking – cross cultural understanding. Like many other generic capabilities training has to begin very early on in life. It is for this reason that including generic capabilities as part of a tertiary education in any formal, organised way presents difficulties.

3.4. Engendering generic capabilities

So how should we try to engender and test for such capabilities. Just as specific capabilities are best planned and implemented at the subject and discipline level, so generic capabilities are most effectively considered and enacted at the course level. The Australian Technical universities Network (hereafter ATN) have developed a helpful checklist for dividing responsibilities and activities in setting up a co-ordinated approach to generic capabilities. In this scheme the university administration has responsibility for maintaining an appropriate, individual, qualitative development record for each student that is confidential and only available to relevant teachers during enrolment and to the student after graduation. The university’s academic board has the responsibility to specify a set of generic capabilities it expects of each of its graduates, to disseminate them and show how they are linked to the various disciplines within the university. The course team has the responsibility to ensure that these generic capabilities are incorporated into its curriculum. The subject team needs to define the ways these capabilities are engendered and assessed in its particular subject. Finally it is the students’
responsibility to develop portfolios that demonstrate their progress in attaining the generic capabilities that are identified by academic board.

3.5. Assessing generic capabilities

The ATN insist on basic pedagogical principles such as aligning learning outcomes and assessment and making feedback varied and progressive. What is not made clear is whether or not a generic capabilities program is to be graded or not. Can a student fail on the basis of the portfolio that is submitted? This seems to be implied. We would argue that grading generic capabilities is next to impossible, especially when one tries to do so with those that involve attitudes and values. In this respect higher education can learn a lot from non-formal adult education. If universities, course teams, disciplines and individual academics committed themselves to developing the capability for ‘transformative learning’ in all their graduates they would lay the foundation for a successful generic capabilities program. Essentially transformative learning equips the individual with the capacity to recognise the paradigmatic, causal and prescriptive assumptions that underpin his or her belief system, to hunt down those that are invalid and enact changes accordingly. Changing behaviour is of course the hardest thing to achieve in this process. It ultimately depends on the individual’s willingness to change. The influence of peers and mentors and the educational environment itself can help here. But until the individual students recognise that there is a need for change, that their ‘habits of mind’ or ‘frames of reference’ need changing then no such change is possible. A university education can help develop this capability by emphasising in all subjects analytical, critically reflective thought. But sometimes this in not enough. A commitment to transformative learning, which deliberately hunts the assumptions underlying all aspects of a students tertiary education (knowledge, skills and attitudes) and helps students determine their validity is a first step in engendering the sort of generic capability we refer to above.

CONCLUSION

One of the most ambitious projects to implement generic capabilities into the entire university program was undertaken by the teaching and learning committee of the Australian Technology Network. The Network consists of a cooperation between five of Australia’s major universities, namely RMIT, UTS, UNISA, QUT and Curtin University. According to their own homepage at www.atn.edu.ae the ATN universities teach around 180,000 students, or almost 20 % of Australia’s student population. A similar grouping called the Nordic 5 Technical Universities has
recently been formed in Scandinavia but it is not as well organised or as influential as ATN as yet. The ATN universities are also the largest provider of international education since one quarter of all overseas students are enrolled with them. There is much the Nordic 5 can learn from closer links with ATN, including its experience with the implementation of generic capabilities across the curriculum. The project that focused on this aspect of tertiary education was completed in 2002 and the appendices to this paper give a brief overview of it plus links to several case studies that were carried out by different faculties involved in the project. ATN’s view of the how generic capabilities can be defined, implemented and assessed are more optimistic than the views given in this paper so it is important that readers have access to the project and its conclusions. They can judge for themselves if and how they might embed generic capabilities into their own curricula.

REFERENCES


APPENDIX 1

An overview of the ATN generic capabilities project.


The Australian Technology Network is an influential alliance of five distinctive and prominent Australian universities located in each mainland State. The ATN’s aim is to help secure Australia’s reputation as the clever country, contributing to its social and economic wealth by building strategic partnerships and undertaking solution based research which is relevant to the expectations of industry and the community.
This report is the outcome of a reflective, developmental process involving six academic development staff and thirteen course teams in the five ATN universities. The project involved the analysis of case studies from each institution, a review of the existing literature on graduate capabilities, and reflection on the issues highlighted through the integration of the case studies with the literature.

Graduate attributes are the qualities, skills and understandings a university community agrees its students should develop during their time with the institution. These attributes include, but go beyond, the disciplinary expertise or technical knowledge that has traditionally formed the core of most university courses. They are qualities that also prepare graduates as agents for social good in an unknown future. In this report those attributes that go beyond the disciplinary expertise or technical knowledge are called *generic capabilities*.

The report is intended as a resource for universities and course teams that are developing programs to facilitate and demonstrate achievement of the agreed graduate outcomes. It contains three sections: 1) an introduction to generic capabilities; 2) a conceptual framework for program development; and 3) guidelines for staff who are developing programs based on that framework.

The described conceptual framework is informed by three key ideas.

- The notion of generic capabilities has little meaning until it is elaborated within the context of a discipline.
- The development of a generic capabilities program requires commitment from all members of the course team and this commitment involves the adoption of a student-centred approach rather than a content-driven or teacher-centred approach to the curriculum process.
- Assessment of generic capabilities, and the inclusion of that assessment in the students' overall achievement, involves a challenging set of complex issues for any university.

The major characteristic of the project is the focus on the student's individual development as a person. The proposed programs would enable students to define
their own learning pathways and monitor their own progress in their pursuit of high level, generic capabilities outcomes.

Six principles for consideration in the development of programs are described (see the points a to f below). They address curriculum development, teaching practices, learning experiences and assessment.

a. Desirable capabilities are most usefully formulated at both university and course level.

b. The development, practice and assessment of capabilities are most effectively achieved within the context of discipline knowledge.

c. Exposure to, and reflection on, a variety of teaching approaches and learning experiences fosters a focal awareness of capability development.

d. Assessment practices should align with course/subject goals and teaching/learning practice.

e. A package for assessing generic capabilities incorporates items designed for a range of purposes.

f. Students benefit from progressive feedback on the development of capabilities.

These principles, and their interpretation in the context of generic capability development, are elaborated in the body of the report.

The report also contains a discussion of three points that underpin the success of generic capabilities programs, but are often inadequately addressed. The first is that there are qualitatively different ways in which students come to understand generic capabilities. The more sophisticated ways are more likely to equip students with the capacity to operate in a range of environments, and should be the level of focus in the attainment of capabilities. The second is the inclusion of knowledge capability (the ability to deal with knowledge in each new situation encountered) as a core capability. The third is the monitoring of student development of generic capabilities by students themselves and by the institution.
The concluding section is presented as a resource for staff wishing to run sessions for academic staff or managers who might be involved in the development of a generic capabilities program. It addresses the four phases of development: policy; achievement of commitment; implementation; and monitoring and evaluation. It incorporates questions designed to raise awareness of the key ideas in the framework, and references to case studies exemplifying those ideas.

By adopting the principles outlined in this report, institutions and the staff in those institutions will be required to commit themselves to activities that will be consuming of both time and financial resources. All five ATN universities have already taken this path in one or more of their courses, and it is argued that the improvement in the quality of student learning, their preparation for later life, and the ability of the institution to demonstrate achievement of the graduate outcomes expectations justifies such a commitment. The gains achievable through the approaches described in this report considerably outweigh the losses.

**APPENDIX 2**  
Case studies from the ATN project

Source: [http://www.clt.uts.edu.au/ATN.grad.cap.project.index.html](http://www.clt.uts.edu.au/ATN.grad.cap.project.index.html)

An index and full descriptions of the case studies can be found at: [http://cea.curtin.edu.au/ATN](http://cea.curtin.edu.au/ATN)

1. **CURTIN - Business** (includes both Bachelor of Commerce and Business descriptors).

Generic capabilities within the discipline of business, coupled with relevant learning experiences and assessment have been embedded within the curriculum using three specially designed tools - a matrix review of units, a standard unit outline template and guidelines for a professional skills portfolio.

2. **QUT - Science**

Students are encouraged to develop a problem based learning approach to scientific problems through the modelling behaviours of academic staff. The generic skills are expected to be developed through participation in group problem-based learning experiences.
3. QUT - Social Science

Generic capabilities within the disciplines of psychology and sociology have been identified through surveys and focus groups with employers and representatives of relevant professional associations.

4. QUT - Technology Literacy

Templates and staff support are provided to assist academic staff members to embed technology literacy learning experiences and assessment within discipline content.

5. QUT - Engineering

An on-line student portfolio assists students to identify, develop and document the achievement of generic capabilities across their course of study.

6. RMIT - Social Science

Students are encouraged to incorporate their experience and learning in previous studies to inform the development of communication skills and portfolio in a unit that explicitly facilitates reflection on and integration of learning.

7. RMIT - Sculpture

Students have the opportunity to discuss their work, learn, collaborate with other students and staff and reflect on the experience of their art, others art and being an artist.

8. RMIT - Business

Students are encouraged to develop a problem-based learning approach to the study of logistics through reflection on group activities including case studies and projects that mirror workplace assignments.

9. RMIT - Engineering

Students engage in learning and assessment experiences centred on group activities addressing projects that mirror workplace assignments.
10. UniSA - Nursing

The identification and curriculum mapping of three generic capabilities - life long learning, critical and creative thinking and internationalisation - across the nursing curriculum.

11. UniSA - Engineering

The identification of indicators for four generic capabilities ñ innovative and creative thinking, life long learning, effective problem solving and working in teams ñ and the application of those indicators in the development of learning experiences and assessment items within three units within the Bachelor of Engineering course.

12. UniSA - Business

Two generic capabilities were identified and embedded incrementally within first year business units ñ collaborative learning and internationalisation. The core unit Economic Environment has been developed as an exemplar unit to model opportunities for collaborative learning and self-assessment of workplace learning.

13. UTS - Engineering

Generic capabilities within the discipline of engineering were identified and introduced into the curriculum of the whole degree programme. The approach to embedding generic capabilities within the subject "Engineering for Sustainability", provides a model for the way subject curriculum was developed.