

Developing and assessing graduate attributes

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Introduction

This professional development module seeks to provide an overview of the concept of graduate attributes and how they relate to program and unit design, and to assessment. The interest in graduate attributes in higher education is only likely to increase, as professional and/or program accrediting bodies adopt closer scrutiny of individual student attainment of specified attributes, and as Australian higher education institutions implement strategies to improve institutional rankings in the Course Experience Questionnaire and the Australasian Survey of Student Engagement. This module presents some examples drawn from practice and the literature in various disciplines, but doesn't pretend to describe how every attribute might be appropriately identified, developed and assessed in every discipline at every expected level of attainment. That can only be done in the unique context of each discipline and program.

Graduate attributes - what are they?

Background

Arising from the push in higher education for quality assurance, accountability for outcomes and capability of graduates (Leathwood & Phillips, 2000), specifying a list of qualities or capabilities that graduates will attain provides a benchmark against which the performance of a higher education institution can be measured. Required by DEST since 1998, most higher education institutions, including Deakin (Deakin University, 2010), identify a list of expected graduate attributes or outcomes. In addition, many program accrediting professional bodies also specify a list of graduate attributes that accredited undergraduate programs must incorporate. An inventory of desired/intended graduate attributes may be expressed in a range of forms, including:

- a simple list;
- in terms of **generic attributes** that are common to all or most graduates, and **discipline specific attributes** that relate to the particular program(s) the student is studying;
- **knowledge** or **understandings**, **attitudes** or **qualities**, and **skills** or **abilities**, representing theoretical knowledge, beliefs and practical abilities (and related to Bloom's taxonomy of educational objectives, including the cognitive, affective and psychomotor domains) developed during the program; or
- some combination of these categories.

Currently, Deakin has structured its statement of graduate attributes using the categories of 'knowledge and understanding' and 'skills'.

As an example of a professional body's required curriculum specification that incorporates both discipline-specific content and generic attributes, consider the CPA Australia (accounting) curriculum requirements:

Core Curriculum in Accounting and Business Areas

1. Accounting Systems and Processes
2. Financial Accounting
3. Professional and Regulatory Processes
4. Accounting Theory
5. Management Accounting
6. Finance
7. Auditing
8. Commercial and Corporations Law

9. Taxation
10. Organisational Functioning
11. Information Systems Design and Development
12. Economics
13. Quantitative Methods

Ethics across the curriculum – Ethics is an important element in the development of new accounting and business professionals. It is expected that universities will refer to ethical decision-making models, principles and values across the curriculum of accredited courses and, where possible, encourage debate on ethical issues based on practical cases.

Generic Skills in the Core Curriculum

COGNITIVE SKILLS

Routine Skills

Particularly:

- report writing;
- computer literacy.

Analytic/Design Skills

Particularly the ability to:

- identify, find, evaluate, organise and manage information and evidence;
- initiate and conduct research;
- analyse, reason logically, conceptualise issues;
- solve problems and construct arguments;
- interpret data and reports;
- engage in ethical reasoning.

Appreciative Skills

Particularly the ability to:

- receive, evaluate and react to new ideas;
- adapt and respond positively to challenges;
- make judgements derived from one's own value framework;
- think and act critically;
- know what questions to ask;
- engage in lifelong learning;
- recognise own strengths and limitations;
- appreciate ethical dimensions of situations;
- apply disciplinary and multi-disciplinary perspectives;
- appreciate processes of professional adaptation and behaviour.

BEHAVIOURAL SKILLS

Personal Skills

Particularly the ability to:

- be flexible in new/different situations;
- act strategically;
- think and act independently;
- be focused on outcomes;
- tolerate ambiguity;
- think creatively.

Interpersonal Skills

Particularly the ability to:

- listen effectively;
- present, discuss and defend views;

- transfer and receive knowledge;
- negotiate with people from different backgrounds and with different value systems;
- understand group dynamics;
- collaborate with colleagues. (CPA Australia & The Institute of Chartered Accountants in Australia, 2005)

It has been suggested that it is the generic attributes that are the most important (Hager, Holland & Beckett, 2002), perhaps because the discipline specific body of knowledge is prone to obsolescence and will require continual renewal, and, in the longer term, as graduates progress in their careers, they may become less involved in the details of their discipline, and more reliant on their generic skills. A large consultation project with Australian industry and business in 2001 identified the following generic ‘employability’ skills that enterprises sought in their staff, in addition to job-specific and/or relevant technical skills:

- Communication that contributes to productive and harmonious relations between employees and customers;
- Teamwork that contributes to productive working relationships and outcomes;
- Problem-solving that contributes to productive outcomes;
- Initiative and enterprise that contribute to innovative outcomes;
- Planning and organizing that contribute to long-term and short-term strategic planning;
- Self-management that contributes to employee satisfaction and growth;
- Learning that contributes to ongoing improvement and expansion in employee and company operations and outcomes;
- Technology that contributes to effective execution of tasks; and a list of
- Personal attributes that contribute to overall employability (e.g. loyalty, honesty & integrity, adaptability) (Department of Education Science & Training, 2002).

In the discussion surrounding graduate attributes, it is important to make the (perhaps subtle) distinction between a program of study that has been designed to provide opportunities for students to be exposed to activities intended to develop, exercise and assess certain graduate attributes, and those attributes that students have actually developed by the time they graduate from their program of study. It is the former ‘certification of programs’ that is still most commonly required in internal and external program accreditation exercises; while it is the latter that really determines the competency/capacity of the graduate. I can imagine the possibility of a ‘pass student’ carefully negotiating through their accredited program curriculum and assessment, to the point of graduation, having consciously avoided one or more desirable attributes that they are uncomfortable with.

In the literature related to graduate attributes, there can be observed varying levels of ‘sophistication’ in approach. The range includes:

- identifying and prioritising desirable graduate attributes (Scott & Yates, 2002);
- identifying where and at what level in the curriculum attributes will be covered (Atrens, Truss, Dahl, Schaffer & St John, 2004; Teaching and Learning Centre, 2005);
- designing assessment to explicitly measure graduate attributes (Yeo, 2004);
- evaluation of the effectiveness of delivery of graduate attributes (Bullen, Waters, Bullen & de la Barra, 2004); and
- evidence-based certification of attainment of graduate attributes (Williams & Sher, 2004).

Though the topic of graduate attributes has been around for some time, for some universities, statements of graduate attributes have historically been more rhetorical than real (Lister & Nouwens, 2004). Having a list of graduate attributes published on a web site or in a program handbook does not automatically mean that:

- their existence and importance has been well communicated to students, staff and other stakeholders;
- students appreciate the importance and relevance of the various attributes in their studies; and
- exposure to the theory, practise and assessment of attributes has been coherently integrated across the program curriculum.

It is important to acknowledge that the concept of graduate attributes in higher education is not uncontested or universally accepted. I have had colleagues suggest that specifying required graduate attributes is just another step in the vocationalisation of higher education, or just another mechanism for the administrators of higher education to micro-manage the activities of staff and students. Though, perhaps begrudgingly, one of these colleagues acknowledged that it might be a good thing if the engineers and others who designed and built the plane she was to fly on actually knew certain basic things about aircraft design and construction, and the other colleague did agree that they would like to be confident that the surgeon operating on them was at least minimally competent and knowledgeable in certain matters relating to human anatomy! There are probably some things that most graduates need to know and be able to do, and the conception of a profession is premised on the acquisition of a specialised body of knowledge and the practice of particular skills.

Activity

Does the program accrediting professional/discipline body for the program(s) that you contribute to specify a desired/mandatory list of graduate attributes? If yes, what are they, and why do you think they are important for graduates in your area? If no, what are some graduate attributes that you think are important/relevant to the program(s) that you contribute to?

Graduate attributes at Deakin

Deakin's *Higher Education Courses operational policy* (Deakin University, 2010) includes a schedule of graduate attributes for all programs:

SCHEDULE A: ATTRIBUTES OF A DEAKIN GRADUATE

All Deakin programs will encourage students to develop attitudes of intellectual curiosity and motivation for independent thinking, autonomous learning and reflective professional and personal practice, and a commitment to ethical and sustainable practices. Appropriate to its level of study and discipline composition, each program will be designed to ensure that students develop their knowledge and understanding as well as a range of generic skills. These are described below.

Knowledge and understanding

- understanding of, and the ability to work with, a systematic body of knowledge, appropriate to the focus and level of the qualification based on the highest standards of scholarship and research

and where research is undertaken:

- ability to initiate and formulate viable and relevant research questions
- contribution to new knowledge, or an original interpretation and application of existing knowledge
- understanding of the social, economic and cultural impact and application of their research, and its academic relevance and value
- understanding of the professional, social, economic and cultural contexts of the discipline

and related fields

- awareness of ethical issues, social responsibility and cultural diversity
- awareness of environmental sustainability issues and the contribution of the field of study to address such issues
- understanding and appreciation of international perspectives in a global environment.

Skills

- critical analysis, problem solving, and creative thinking
- identifying, gathering, evaluating and using information
- communicating effectively and appropriately in a range of contexts
- developing, planning and managing independent work
- working effectively as part of a team
- effectively using information and communication technologies
- applying knowledge learned in the program to new situations.

The policy also addresses the requirements for the incorporation of graduate attributes into Deakin programs:

Graduate Attributes must be incorporated at all stages of every program from its original design to the assessment of its performance. To effectively manage this process, the following list identifies where and how the Graduate Attributes might be employed at various stages of course design and evaluation.

1 *Identification of Graduate Attributes in Course Design*

Course approval documents (relating to academic merit) should specify the knowledge/understanding and skills that a course will develop, consistent with the course aims.

2 *Incorporation and assessment of Attributes*

Course approval documents (relating to academic merit) should indicate how the units that comprise the course will develop graduate attributes and how these will be assessed. Each unit description (as approved by the faculty boards) indicates what knowledge and skills it develops and how students' achievements of these are assessed. This can be summarised in a matrix which shows how the specified attributes will be developed through units and their respective assessment tasks.

3 *Communication and promotion to Students*

Communication to students about the specific Graduate Attributes they will develop through the course and a rationale for how they benefit from these attributes will be included in handbook descriptions, induction programs, unit guides, course materials, assessment criteria, assignment feedback and other media as developed by Course Teams. The communication strategy will be summarised in annual course reviews and course approval/major review documents.

4 *Students' Documentation of their Attributes*

Students will be encouraged to document their achievement of the specified attributes by compiling individual portfolios. This will involve portfolio tools under development and advisory services provided by Student Life.

5 *Program Performance Measures*

Evidence that Graduate Attributes are effectively being incorporated into a course and promoted to students will be presented in annual course review reports. Evidence can be derived from a range of sources including Course Experience Questionnaire (CEQ) data and

other student feedback.

6 *Review of the Attributes*

The Graduate Attributes for each course will be reviewed periodically to determine whether they remain appropriate or need revision and whether the course has been successful in achieving the desired outcomes. This will be done systematically during major course reviews but an annual consideration of these matters will be supported by advice from Advisory Boards, reference to the Course Experience Questionnaire outcomes (CEQ generic skills scores) and other student feedback as well as input from surveys of employers and incorporated into annual course reviews.

7 *Improvement cycle*

The performance of each course will be evaluated and measures for improvement will be managed via annual course reviews and the major course review process. This will be reported to Advisory Boards, Faculty Boards and the Academic Board as appropriate.

In December 2004 and January 2005, the Deakin Planning Unit undertook a survey of a range of employers of Deakin graduates to, "...determine whether Deakin's graduates are seen by employers to possess the skills expected by those employers and the graduate attributes identified by the University." (Deakin University Planning Unit, 2005) While the survey was based on a previous set of Deakin graduate attributes, and while the number of respondents to the survey was comparatively small (45) and skewed to employers from a relatively small number of professions, the survey provided some general information about which attributes employers want, which attributes they think are important and how they assess the performance of Deakin's graduates with respect to those attributes. Attributes that were ranked as important by employers and for which they rated Deakin graduates highly included interpersonal skills, capacity to work in teams and work collaboratively, information and communication technology literacy, and an appreciation of the need to keep up to date in their field of education. Attributes which were ranked as important by employers and for which they rated Deakin graduates as not performing highly included oral communication skills, written communication skills and conflict management skills. These results, while interesting, were based on a small sample that did not represent the full range of programs at Deakin. Individual programs would be wise to conduct their own research to determine what attributes are considered valuable by potential employers of graduates, and how their graduates are rated by their employers.

The 2005 Australian Universities Quality Agency (AUQA) audit of Deakin made the recommendation, "...that Deakin University communicate to students more effectively the nature and aims of the Deakin Advantage [the then current name of the suite of Deakin's graduate attributes] and assist them to document the discipline-specific and generic skills they are developing throughout their course." (Australian Universities Quality Agency, 2005, p. 19) A 2006 survey of completing engineering students at Deakin found that, although more than half (52.1 percent) of respondents were aware that Engineers Australia specified required graduate attributes, only one third were aware that Deakin University did the same (Palmer & Hall, 2006). This information suggests that we can do more in communicating the existence and relevance of graduate attributes to students.

Activity

What methods (at the program level and at the unit level) does your School use to communicate the existence and importance of graduate attributes to current students in the program(s) that you contribute to? If you are unsure, what methods could your School use?

Developing graduate attributes

Identifying graduate attributes

Traditionally, particularly for professional undergraduate programs, the relevant program accrediting body has been a strong influence in specifying program graduate attributes. For example, for undergraduate engineering programs in Australia, the program accrediting body (Engineers Australia) requires that...

Graduates from an accredited [engineering] program should have the following attributes:

- ability to apply knowledge of basic science and engineering fundamentals;
- ability to communicate effectively, not only with engineers but also with the community at large;
- in-depth technical competence in at least one engineering discipline;
- ability to undertake problem identification, formulation and solution;
- ability to utilise a systems approach to design and operational performance;
- ability to function effectively as an individual and in multi-disciplinary and multi-cultural teams, with the capacity to be a leader or manager as well as an effective team member;
- understanding of the social, cultural, global and environmental responsibilities of the professional engineer, and the need for sustainable development;
- understanding of the principles of sustainable design and development;
- understanding of professional and ethical responsibilities and commitment to them; and
- expectation of the need to undertake lifelong learning, and capacity to do so. (Engineers Australia, 2005)

Where the University also articulates a list of graduate attributes, a program would normally be expected to incorporate those graduate attributes as well. Apart from addressing these internal and external program accreditation requirements, there is a growing awareness that there are other important stakeholders that have a valid claim in contributing to the definition of a relevant, comprehensive and contemporary set of graduate attributes for a particular program, including:

- academic staff;
- current students;
- alumni;
- employers of graduates from the program;
- adjunct professors and other external academic advisors; and
- program academic advisory boards.

Activity

What methods/processes/reference points does your School use for identifying an appropriate list of graduate attributes for the program(s) that you contribute to? If you are unsure, what methods/processes/reference points could your School use?

Implementing graduate attributes

The nomenclature surrounding, and approaches to, the implementation of 'graduate attributes' are varied, but many institutions identify a hierarchy of levels, with general graduate attributes (such as those specified by Deakin) at the top. At the next level, each attribute may have a range of elements that students must demonstrate, which are often program-specific. There may be additional levels of discipline-specific specification between this level and the complete range of individual student learning objectives for a program. The exact approach is institution-specific and would depend on the institutions policy(s) relating to graduate attributes. Apart from specifying the top-level graduate attributes and requiring programs to

provide opportunities for students to develop them, the current Deakin policy doesn't articulate a specific approach for translating the top-level attributes into program/discipline learning objectives.

As an example, consider the approach currently taken by the University of Sydney. At the top level, they identify three generic attributes of graduates:

- **scholarship**: An attitude or stance towards knowledge:
- **global citizenship**: An attitude or stance towards the world:
- **lifelong learning**: An attitude or stance towards themselves:

Each of these overarching attributes is considered to be a combination of five overlapping clusters of skills and abilities.

1. **Research and Inquiry**: Graduates of the University will be able to create new knowledge and understanding through the process of research and inquiry.
2. **Information Literacy**: Graduates of the University will be able to use information effectively in a range of contexts.
3. **Personal and Intellectual Autonomy**: Graduates of the University will be able to work independently and sustainably, in a way that is informed by openness, curiosity and a desire to meet new challenges.
4. **Ethical, Social and Professional Understanding**: Graduates of the University will hold personal values and beliefs consistent with their role as responsible members of local, national, international and professional communities.
5. **Communication**: Graduates of the University will recognise and value communication as a tool for negotiating and creating new understanding, interacting with others, and furthering their own learning.

An 'indicative interpretation' is provided for each of the clusters of skills and abilities, for example, **Information Literacy** might be understood as the ability to:

- recognise the extent of information needed
- locate needed information efficiently and effectively
- evaluate information and its sources
- use information in critical thinking and problem solving contexts to construct knowledge
- understand economic, legal, social and cultural issues in the use of information
- use contemporary media and technology to access and manage information (University of Sydney, 2004).

Normally, university-level lists of graduate attributes are necessarily general, as they nominally apply to students in all programs. It is also common for the lists of graduate attributes published by program accrediting professional bodies to be comparatively general in nature, as many professions now encompass a diversity of practice areas and specialisms, for which it may not be practical to produce a tightly specified list of attributes. Virtually all authors agree that institution- and/or profession-level graduate attributes must be contextualised/interpreted into more meaningful attribute specifications for particular discipline areas and/or discipline specialisms. Returning to the University of Sydney case, Faculties can contextualise the 'indicative interpretation' for each of the attribute clusters into their own disciplinary domain. For example, the **Faculty of Medicine** contextualises the attribute of **Information Literacy** as:

Graduates of the Faculty of Medicine will be able to use information effectively in a range of contexts.

- Apply an understanding of normal and abnormal human structure, function and behaviour to the diagnosis, management and prevention of health problems
- Use the best available evidence on outcomes to prevent or cure disease, relieve symptoms or minimise disability

- Analyse clinical data and published work to determine their validity and generalisability
- The ability to elicit and interpret clinical symptoms and signs by interviewing and examining patients systematically and with sensitivity, and to use this information to guide further investigations
- Make evidence-based, ethical and economically responsible decisions about the most appropriate management of health problems in individuals and in communities (Faculty of Medicine - University of Sydney, 2004)

Activity

Does your School contextualise the standard set of Deakin graduate attributes into more discipline-specific terms for the program(s) that you contribute to? If yes, in what ways are they made more relevant to the program(s)? If no, how could the standard set of Deakin graduate attributes be contextualised into terms more specific for the program(s) that you contribute to?

Interpreting Deakin's graduate attributes

Prior to the current formulation of Deakin's graduate attributes, there existed a set of guidelines for developing the attributes of a Deakin graduate (Deakin University, 2000). While these guidelines no longer hold any official status, the information that they contained has not been diminished by the re-formulation of Deakin's graduate attributes. The guidelines presented a range of 'exemplary characteristics' that elaborated the meaning of each attribute and provided some examples of qualities that are likely to constitute 'evidence' of a graduate attribute. In the absence of easy access to these guidelines, the essential information is reproduced here (with due acknowledgement to the original authors), structured around the attribute categories used in the current presentation of Deakin's graduate attributes.

Understanding of, and the ability to work with, a systematic body of knowledge, appropriate to the focus and level of the qualification based on the highest standards of scholarship and research

- Demonstrate up-to-date, systematic and coherent knowledge of a field of study.
- Understand how knowledge is dynamically produced in the field of study and have a working knowledge of its characteristic methods of inquiry.
- Be aware of the central debates within the field of study and recognise the historical contingency and transient nature of the knowledge base.
- Demonstrate applications of theory to practice in real or simulated situations.

Understanding of the professional, social, economic and cultural contexts of the discipline and related fields

- Demonstrate an active interest in the field and a critical understanding of the questions, problems and issues facing practitioners in its current and emerging professional and social contexts.
- Be able to work within specific constraints (policy constraints, government guidelines, and organisational realities), as well as being able to critique them.
- Demonstrate knowledge of relevant policies, systems and processes and the capacity to think strategically about the field.
- Understand the importance, use and application of personal, social, professional and commercial skills required to practice effectively in the field.
- Begin to participate in and, if appropriate, use personal and professional networks and associations.
- Recognise the social justice issues, ethical practices and legal considerations pertinent to the field of study.

Awareness of ethical issues, social responsibility and cultural diversity

- Demonstrate awareness and understanding of their own personal value systems.
- Appreciate aspects of their own culture's forms of expression, and be responsive to the differences manifest in other forms of cultural expression.
- Understand the concept of ethics and ethical practices and apply the ethical requirements of their professional field.
- Appreciate the ethical and legal imperatives of citizenship, ethical practice and social responsibility.
- Appreciate and value difference (physical, gender, class, cultural, etc.).
- Demonstrate awareness of and commitment to ethical practice and social responsibility in student life (eg equity, cultural sensitivity, copyright and plagiarism).

Awareness of environmental sustainability issues and the contribution of the field of study to address such issues

- Understand the interdependence of humans and environments, and the significance of the social, cultural, economic and ecological determinants of sustainable development.
- Articulate personal and collective responsibilities for sustaining environments and communities.
- Recognise the relevance of sustainability to their field of study.
- Understand the need for interdisciplinary approaches to the resolution of complex problems of sustainability.

Understanding and appreciation of international perspectives in a global environment.

- Understand the processes of internationalisation and globalisation and the distinctions that can be made between these processes.
- Demonstrate an understanding of cultural difference and intercultural communication and of the values and attitudes that foster positive interculturalism and internationalisation.
- Demonstrate awareness and understanding of international and intercultural perspectives as they relate to the field of study.
- Communicate and work effectively with people from different cultures within Australia and the world.

Critical analysis, problem solving, and creative thinking

- Be open to new ideas and changing contexts, and be willing and able to update approaches.
- Demonstrate problem solving capabilities and skills and a working knowledge of a variety of problem-solving techniques (including lateral thinking, analysis, synthesis).
- Have the ability and confidence to bring a variety of skills to an issue or situation, and to consider alternative ways of working with individual people and situations.
- Demonstrate the capacity for critical and reflective thinking in intellectual and practical activity, and draw upon a range of frameworks.

Identifying, gathering, evaluating and using information

- Demonstrate information literacy skills including the ability to: identify the types and sources of information required to address a problem; find and retrieve information; use the information effectively and appropriately; and critically evaluate information resources.
- Interpret and solve problems appropriate for a beginning professional within the discipline.
- Demonstrate knowledge of typical problems met at initial levels of practice.
- Read, interpret, synthesise, evaluate and communicate using the vocabularies, modes, genres, symbols and terms used within the field of study.
- Use current technologies appropriate to entry level work in the field.

Communicating effectively and appropriately in a range of contexts

- Communicate effectively in all domains (reading, writing, speaking, listening).
- Demonstrate a breadth of vocabulary skills and genres suitable for a variety of audiences and occasions.
- Read, analyse, synthesise and apply relevant literature in developing their ideas, and communicate these in an appropriate and professional manner.
- Show confidence and competence in using a variety of appropriate communication technologies in various presentation contexts.
- Be able to construct an argument, supported by appropriate evidence and reasoning, and to present it coherently.
- Be able to speak confidently and effectively in a group situation.

Developing, planning and managing independent work

- Demonstrate awareness of the realities of contemporary career paths and the skills to develop personal opportunities.
- Demonstrate the ability to inspire, guide and encourage self-reliance in individuals and groups.
- Use effective management skills including management of time, human resources, physical assets, information and relevant financial systems.
- Demonstrate the capacity for self-directed activity.
- Demonstrate the ability to function effectively in changing environments.
- Demonstrate skills in negotiation and liaison.
- Show initiative in recognising and applying personal skills in the workplace to establish a niche of expertise.

Working effectively as part of a team

- Understand and have experience with cooperative group processes.
- Be able to acknowledge more than one perspective and value varied contributions.
- Be able to participate in networks and work in teams on a local, national and international basis where appropriate.
- Be sensitive to the subtleties of interpersonal communication (eg verbal and non-verbal communication in various cultural and multicultural contexts).
- Recognise, value and capitalise on the strengths of other people in interactive situations.
- Manage conflict sensitively and effectively.

Effectively using information and communication technologies

- Demonstrate the knowledge, operational skills and attitudes that underpin the efficient and appropriate use of communication and information technology in a variety of everyday and professional contexts.
- Be willing and able to use appropriate online tools and techniques for communication and to find, manage and disseminate information.

Applying knowledge learned in the program to new situations

- Have the confidence to keep growing as experts in the field and to explore it further.
- Recognise that learning is dynamic and that one needs to maintain professional reading, to keep developing knowledge and to update approaches.
- Take personal responsibility for improving skills and developing new skills.
- Recognise the need to continually develop and expand personal and professional knowledge bases to create new opportunities.
- Demonstrate an awareness of their personal learning style, recognition of what constitutes

- good learning and the ability to develop a learning agenda.
- Actively seek new learning opportunities.

Activity

Using the list provided above, and/or your own experience, develop a list of ‘exemplary characteristics’ that could demonstrate attainment of each of Deakin’s graduate attributes in the context of the program(s) that you contribute to.

Embedding graduate attributes in the curriculum

Once the list of appropriate graduate attributes has been agreed upon, there is a need to consider where in the program/curriculum the various attributes will be addressed. This is because; a) no single element of a program could hope to be responsible for more than a small part of the total graduate attribution formation; and b) each attribute will, typically, involve staged development across the program, increasing in depth and sophistication as the student progresses through their studies (Hager et al., 2002). Implementing graduate attributes in a program of study is a complex process, and there must be coordination in curriculum design to ensure adequate coverage of the required attributes (Jolly, 2001). The common, core units in a program of study carry a particular burden in the coverage of graduate attributes, and the use of elective or optional units for sole exposure to particular attributes should be avoided (Yeo, 2004).

The University of Queensland Value Added Career Start (VACS) program provides one model for thinking about the implementation of graduate attributes:

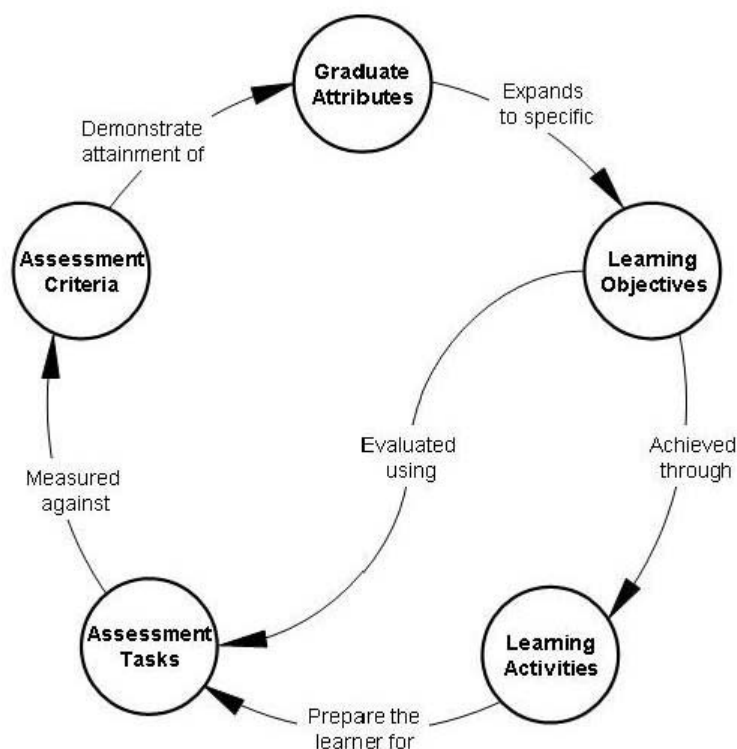
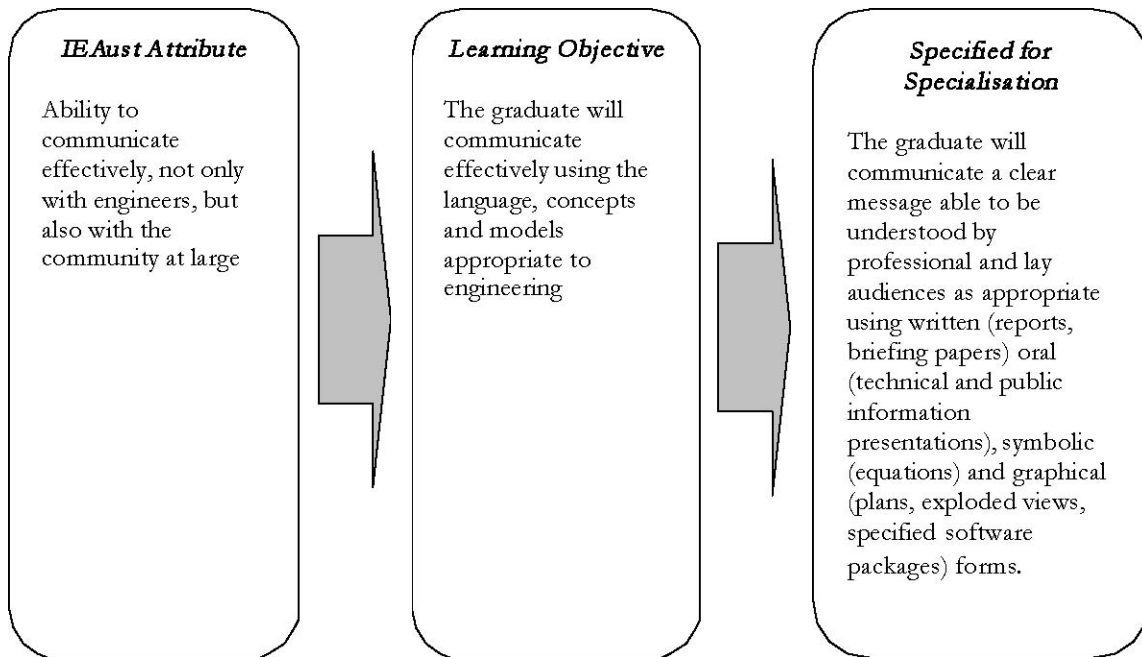


Figure 1 from (Jolly, 2001)

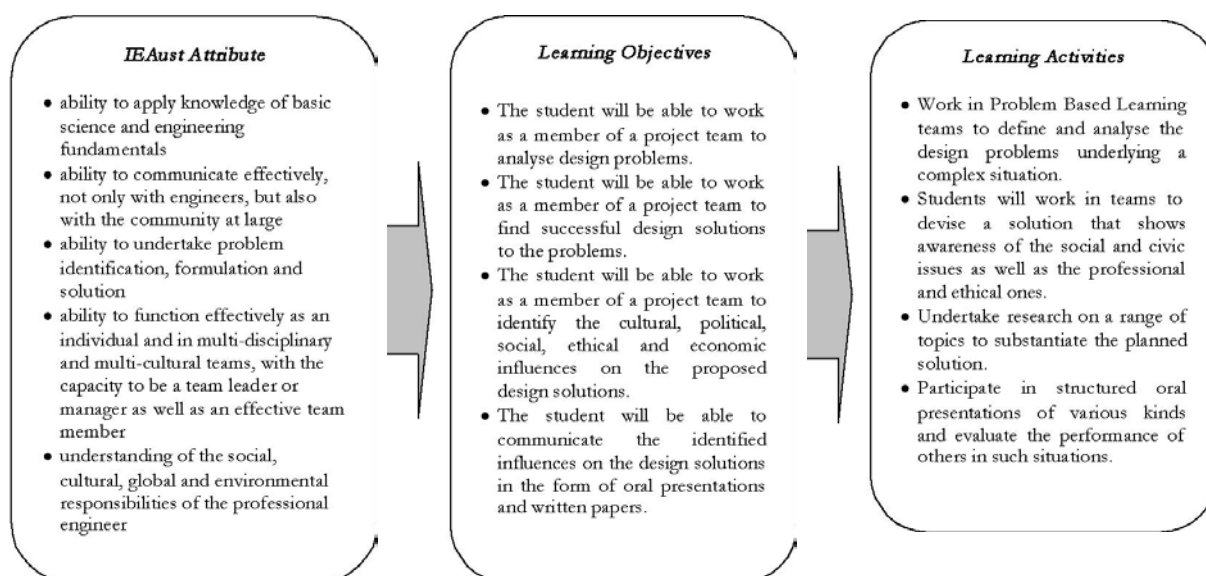
The general process is one of contextualising general graduate attributes into meaningful, discipline-based learning objectives, which inform teaching and learning activities and assessment design, and for which student assessment against objective criteria documents the attainment of specific attributes. This top-down design/implementation process can occur in its

ideal form as part of a ‘green fields’ development of a new program, where all or most aspects of the program are open to variation. The same source (Jolly, 2001), using engineering as a basis, provides some examples of this approach to implementing the graduate attributes specified by the professional body, Engineers Australia. Engineering encompasses a range of discipline specialisms with different requirements under the broad umbrella of ‘communication skills’ – electronic engineers need to be proficient in reading and preparing electronic circuit diagrams; mechanical engineers need to be skilled in reading and preparing workshop drawings for metal fabrication. The generic requirement for communication skills needs to be expanded into more specific learning objectives that are relevant to the specialism, and that can be concretely observed and assessed:



From (Jolly, 2001)

From a specification of learning objectives for a program we must progress to pedagogy – the learning processes/activities employed to achieve the objectives. In the example below, it can be seen that, although the learning activities must, across the program as a whole, address the desired learning objectives and graduate attributes, there need not be a strict one-to-one correspondence between attributes, learning objectives and learning activities:



From (Jolly, 2001)

In practice, many programs already exist, and the opportunities to vary the program design may be comparatively limited, due to the pre-existing structures of prerequisites, unit streams, assessment types, etc. An alternative approach is conduct an audit of how an existing program addresses the development and assessment of graduate attributes. This is a bottom-up approach that requires each unit in the program to assess its contribution to the program's identified graduate attributes. A typical audit approach requires each unit to report the level/depth of development of each attribute on a rating scale (for example, 0 = not a focus, 1 = a minor focus and 2 = a major focus). Some approaches to auditing differentiate between how a unit addresses a particular graduate attribute – i.e., is the unit coverage theoretical only?, does the unit require the student to exercise the attribute? and, is student competence with the attribute tested? – an audit schema of taught and/or practised and/or assessed may be used for each attribute. The individual contributions of all units in a program can be summed up to give an indication of the depth of coverage of graduate attributes across the duration of the program. Like all post-facto audits, the accuracy of the information obtained will depend on the skill of the assessor(s). Rather than an end in itself, the audit process is perhaps most useful as an element of a program improvement process that compares an existing program to a desired ideal design, identifying the graduate attribute 'gaps' to be addressed in program revisions.

Normally, we would expect graduate attributes to be developed in more than one place in a program curriculum, such that the students' understanding of, and ability to use, an attribute grows in sophistication as their studies progress. A commencing student requires foundation skills to get started in tertiary study, but a final-year study should be developing attributes at a level commensurate with the fact that they will shortly be completing their undergraduate studies and expecting to be equipped to start the practice of their chosen career or profession. In the process of embedding attributes into the curriculum, when thinking about program and unit learning objectives and the appropriate pedagogies to achieve these, we should consider the staged development of attributes across the program. The following example from the University of New England, based on the graduate attributes from the Bachelor of Natural Resources, Bachelor of Rural Science and Bachelor of Agriculture programs, shows how one attribute, oral communications skills, is defined for the programs as a whole, and then how its development could be staged in different levels of attainment, perhaps, but not necessarily, related to the year level of the program:

Oral communication skills

Utilization of oral and aural skills within a two way process both between individuals and in

groups, in order to inform, educate, persuade, and to influence behaviour. Oral communication skills should be demonstrated in a wide variety of contexts, and should display progressively increasing complexity and challenge, throughout the degree program.

Level and Description

1. Students should be competent in giving a short oral presentation using appropriate structure and technologies in a range of classroom contexts.
2. Debate — students should competently present arguments, evidence and counter arguments in a mildly adversarial environment.
3. Group facilitation (homogeneous group) — Students should be able to utilize dialogue and active listening skills to facilitate a group through some form of problem solving, strategic planning, evaluation, learning etc. exercise.
- 3+. Group facilitation (heterogeneous group) — as for 3 but with a higher level of conflict resolution, discourse, divergent and convergent thinking skills evidenced in communication, group management and information flow. (Chapman, 2004)

An important opportunity for the development of graduate attributes is offered by a period(s) of work placement (work experience, cooperative education programs, practicums, clinical practice, etc.) during undergraduate studies – such placements are valued by both students and employers, and can provide the additional benefit of authentic exposure to the expectations and unstructured nature of the typical workplace (Crebert, Bates, Bell, Patrick & Cragnolini, 2004b; Hart & Stone, 2002). The value of such periods of ‘work experience’ is maximised when they are considered as ‘work integrated learning’, and made part of the students’ formal learning programme through being:

- embedded into the curriculum;
- complemented with central support services;
- embedded in a discipline context; (Hart & Stone, 2002);
- brought back into the classroom through associated critical reflection exercises;
- included in stated program/unit learning objectives;
- formally assessed; and
- supported by both academic and workplace supervisors (Crebert, Bates, Bell, Patrick & Cragnolini, 2004a).

Activity

If your School has a documented mapping of graduate attributes onto the curriculum, and/or an audit of coverage of graduate attributes within the curriculum, for the program(s) you contribute to, please locate and familiarise yourself with this/these curriculum documents. Select one of the graduate attribute from the program(s) that you contribute to, and consider how the level of sophistication of development/attainment of that attribute could be staged across successive years of the program.

Implementing Deakin’s graduate attributes

As noted previously, the former guidelines for developing the attributes of a Deakin graduate (Deakin University, 2000) provided some resources related to implementing graduate attributes in a Deakin context. The guidelines presented a range of ‘illustrative educational strategies’ that provided examples of how a particular attribute might be developed. In the absence of easy access to these guidelines, the essential information is reproduced and updated here (with due acknowledgement to the original authors), structured around the attribute categories used in the current presentation of Deakin’s graduate attributes.

Understanding of, and the ability to work with, a systematic body of knowledge, appropriate to the focus and level of the qualification based on the highest standards of

scholarship and research

- Set assignments that require students to demonstrate their critical understanding of how knowledge develops in their field of study.
- Assign research topics where students appraise and choose from different methodologies.
- Require students to maintain a reflective journal in which they focus on theories and methods within the field.
- In unit evaluations, ask students to write about the extent to which the unit makes connections with other units they have studied, how well it relates to their experiential learning and how it has supported their own development.
- Foster active learning and application of knowledge with projects, case studies, problem-solving exercises, problem-based learning and hypotheticals.
- Develop and reinforce disciplinary knowledge through mastery learning, computer-based exercises and assessment.
- Give students insight into how knowledge is created in the field through computer-based modelling and knowledge construction processes.
- Introduce students to the research environment through computer-based multimedia learning programs.

Understanding of the professional, social, economic and cultural contexts of the discipline and related fields

- Relate teaching topics and assessment tasks to current events and public issues.
- Provide opportunities for experiential learning that are designed to develop specific understandings of external contexts.
- Use peer observation of teaching and learning activities to draw attention to ethical and social justice issues.
- Invite external people working in the field to contribute their perspectives on specific topics in group learning situations.
- Involve students in collaborative projects with relevant University professionals (eg health science students with health service staff).
- Introduce students early in their course to professional associations and their work.
- Assign an exercise for assessment that makes use of the Job Ready Career Ready program (accessible on the Division of Student Life website).
- Provide opportunities for working students to develop their understanding of professional contexts through focus on their current jobs.

Awareness of ethical issues, social responsibility and cultural diversity

- Use the Internet to expose students to the practices and customs of different cultural groups.
- Invite people from different cultural groups to give presentations to students on practices and customs.
- Invite employers and members of community groups to discuss their roles and how they deal with ethics, social justice issues and cultural sensitivity.
- Expose students to ethical theories and modes of reasoning to help them address ethical dilemmas.
- Use such theoretical understandings to develop and possibly challenge students' own value systems, and reinforce developing values over the duration of a program of study.
- Present ethical problems, cases and vignettes for resolution that are relevant to students' professional fields of study.
- Invite practitioners to provide perspectives on ethical problems relevant to the profession and ways of dealing with them appropriately.
- Where relevant raise the ethical dimensions of any subject matter in the context of the

presentation of the topic itself.

- Strongly encourage students to be ethical citizens of the University by actively promoting the rights and responsibilities of students as outlined in the Student Charter, and as applicable both to virtual and real teaching and learning environments.
- Enforce policies and penalties for unethical behaviour (eg plagiarism).

Awareness of environmental sustainability issues and the contribution of the field of study to address such issues

- Design assignments that require students to develop an understanding of the concepts and principles of sustainability and apply this understanding to knowledge and practice in their discipline.
- Develop topics or assign texts in core units that raise and address sustainability issues and practices.
- Use case studies and examples that focus on sustainability themes.
- Work with colleagues in other disciplines to design projects that require students studying different disciplines to work together towards resolving specific problems of sustainability.
- Promote the importance of health awareness in workplaces (balancing life/workplace stress; social health responsibilities, both local and global; and ethical issues pertaining to health).

Understanding and appreciation of international perspectives in a global environment.

- Incorporate topics on globalisation and internationalisation as they apply to the discipline.
- Include intercultural communication activities in the development of communication skills.
- Build cultural awareness by drawing on the cultural diversity of students enrolled in units.
- Draw attention at appropriate points throughout the course to the cultural history and location of the discipline and its different cultural manifestations, values and practices.
- Use reflective strategies such as individual journals to foster examination of personal values and their relation to behaviour.
- Design activities, including assignments, that incorporate intercultural and international interaction, face-to-face and using communication technology.
- Design activities, including assignments that use the Internet to examine aspects of globalisation and cultural difference and practices.
- Illustrate topics with intercultural and international texts, examples and case studies.
- Promote opportunities for overseas experience, such as study abroad and overseas field trips and internships.

Critical analysis, problem solving, and creative thinking

- Relate theory to simulated or real-life practice through case studies supported by small group work.
- Use problem-based learning strategies and assign projects that require problem solving.
- Introduce debates on contemporary professional issues and dilemmas that demand the construction of arguments and counter-arguments based on different perspectives.
- Assign role-playing exercises based on typical problems germane to the field of study.
- Invite external experts and practitioners to discuss their approaches to the solution of particular problems, and relate expert approaches to those of the novice.
- Use computer-based simulation programs that develop problem-solving skills.

Identifying, gathering, evaluating and using information

- Design assignments that incorporate the Library's information literacy programs.
- Provide opportunities for work experience and other forms of experiential learning that enable students to reflect on the application of knowledge to practice.

- Assign professionally relevant case studies, simulations and projects.
- Ensure that technologies used by students in their courses are similar or comparable to those used in the workplace.

Communicating effectively and appropriately in a range of contexts

- Specify achievement targets for language and literacy with reference to national standards (eg Level 5 in the National Reporting System) and progressively work towards them.
- Design assessment exercises that incorporate, where appropriate, communication skills programs run by the Division of Student Life.
- Assess a variety of communication modes and media (such as oral, spoken dialogues, conventional essay, report, diagram form, modest website, etc.).
- Encourage or require students to use presentation software and provide explicit feedback (and assessment) of its effectiveness.
- Make routine use of feedback proformas on which are detailed such criteria as argumentative skills; syntactic, vocabulary and grammatical skills; and analytical and synthesising abilities.
- Provide opportunities and incentives for students to improve their communication skills in different modes and media.
- Encourage and support tutors to develop communication skills within tutorials.
- Provide facilities for students to document their experiences with and achievements in different forms of communication.
- Ensure that curricula, especially in first year, are language-rich, requiring students to speak, read extensively and write discursively.
- Provide clear guidelines and advice to new students about the expectations for written and oral communication in work to be assessed.

Developing, planning and managing independent work

- Assign students to develop a career plan as an outcome of their course that incorporates the Job Ready Career Ready program (accessible on the Division of Student Life website).
- As part of group assignments, introduce students to the concepts of leadership and ask them to assess their own and others' contributions to outcomes.
- Embed the development of time management skills, including meeting deadlines and punctuality, in assessed work and attendance expectations.
- Work with the Division of Student Life to incorporate their relevant programs into assignments.
- As part of work-related assignments and work placements, encourage reflection on organisational and personal management skills.
- Create a variety of learning environments that require students to work in different ways in different contexts.
- Assign the development of personal portfolios, either paper-based or electronic.

Working effectively as part of a team

- Specify a proportion of assignments that are carried out and assessed as group activities.
- Provide an orientation to working in groups in conjunction with group-based assignments.
- Develop exercises collaboratively with counsellors in the Division of Student Life.
- Introduce scenarios that deal with issues requiring conflict resolution.
- Initiate online discussions to enable local, national and international networking about particular issues and questions.
- Formally assess the processes and products of group work.
- Include peer-appraisal of group processes and products in assessment practices.

- Ask student groups to assess the processes and products of other groups according to pre-determined criteria, for example, using audio and video recordings.
- Use, where possible, a variety of face-to-face and other modes of interaction, including online communication systems, to support communication, collaboration and teamwork processes.
- Expose students to theories of leadership and teamwork to help them appreciate the different roles, including leadership roles, participants can fulfil and contributions they can make in productive group work, including the theories of 'leaderless' and 'distributed leadership' work groups.
- Use role playing to develop intra- and intergroup skills in conflict resolution and cultural sensitivity.

Effectively using information and communication technologies

- Specify information technological literacy skills for each year of study and incorporate their development into learning programs.
- Set minimum computer literacy requirements for commencing students, apply these in assessment and provide remedial opportunities for those who need them.
- Ensure that each unit incorporates appropriate information technological literacy requirements.
- Set assignments that require critical and creative use of electronic tools and information.
- Make the use of technology for information and communication a routine expectation in learning activities and assessment practices.
- Foster and support the use of different technologies in student presentations.
- Encourage students to routinely critique the appropriateness and effectiveness of technologies.

Applying knowledge learned in the program to new situations

- Use projects, problem-based learning, contract learning and student-created case studies to develop self-directed learning skills.
- Encourage a focus on learning processes by requiring students to submit work in progress to peer appraisal, discussion and feedback.
- Assign metacognitive tasks that require students to reflect on how they have had to adjust their thinking in response to new information.
- Incorporate reflective journals and portfolios into assessment requirements.
- Introduce contract learning for work placements and projects.
- Use learning style inventories as a basis for developing self-awareness about preferred learning styles and more desirable, rounded professional learning styles.
- Use a variety of formative assessment methods, which help students to understand and develop their orientations to, conceptions of and approaches to learning.

Activity

Using the list provided above, and/or your own experience, develop a list of 'educational strategies' for the development of each of Deakin's graduate attributes in the context of the program(s) that you contribute to.

Assessing graduate attributes

Assessment and graduate attributes

Before explicitly tackling the link between graduate attributes and assessment, it is worthwhile briefly considering assessment more generally. An Australian Universities Teaching Committee research project entitled 'Assessing Learning in Australian Universities', and

undertaken by the Centre for the Study of Higher Education (CSHE) at Melbourne University, developed the following indicators of effective assessment in higher education:

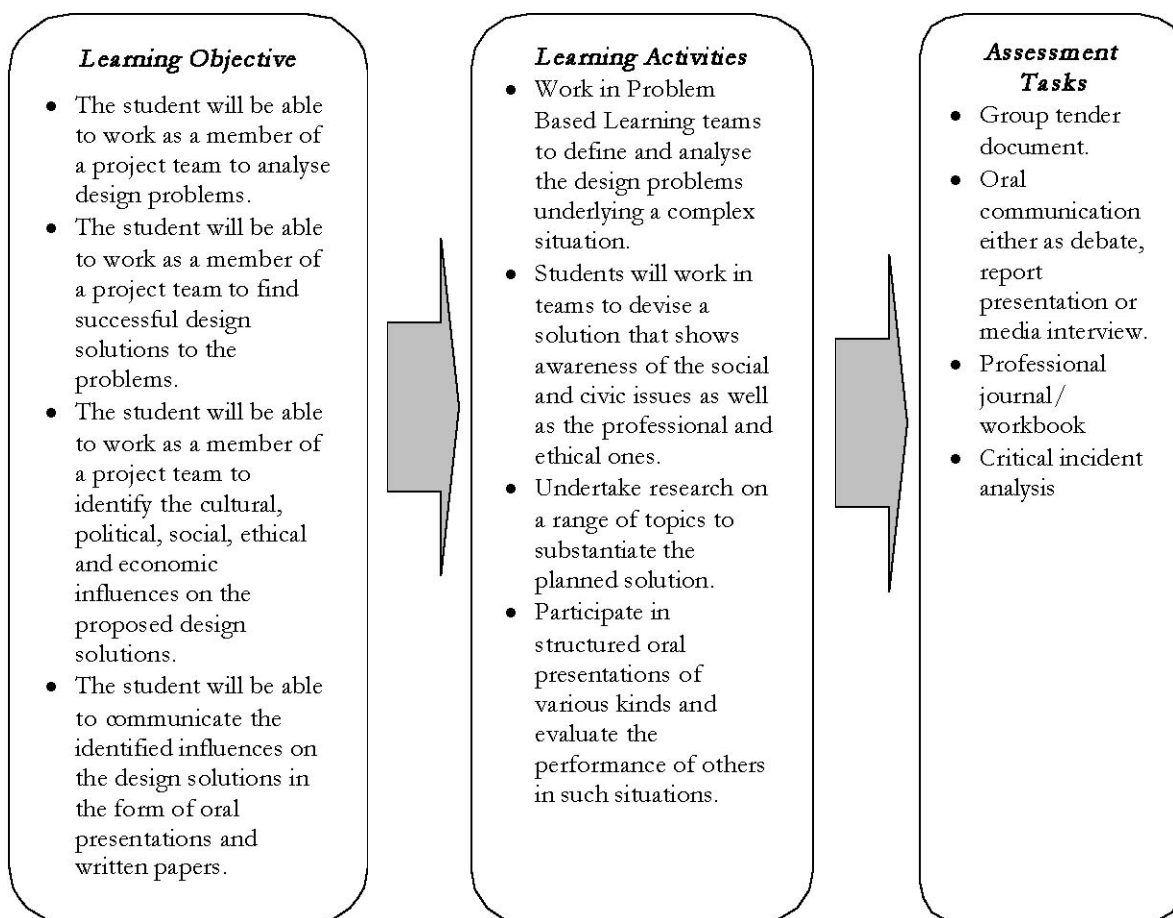
1. Assessment is treated by staff and students as an integral and prominent component of the entire teaching and learning process rather than a final adjunct to it.
2. The multiple roles of assessment are recognised. The powerful motivating effect of assessment requirements on students is understood and assessment tasks are designed to foster valued study habits.
3. There is a faculty/departmental policy that guides individuals' assessment practices. Subject assessment is integrated into an overall plan for course assessment.
4. There is a clear alignment between expected learning outcomes, what is taught and learnt, and the knowledge and skills assessed — there is a closed and coherent 'curriculum loop'.
5. Assessment tasks assess the capacity to analyse and synthesis new information and concepts rather than simply recall information previously presented.
6. A variety of assessment methods is employed so that the limitations of particular methods are minimised.
7. Assessment tasks are designed to assess relevant generic skills as well as subject-specific knowledge and skills.
8. There is a steady progression in the complexity and demands of assessment requirements in the later years of courses.
9. There is provision for student choice in assessment tasks and weighting at certain times.
10. Student and staff workloads are considered in the scheduling and design of assessment tasks.
11. Excessive assessment is avoided. Assessment tasks are designed to sample student learning.
12. Assessment tasks are weighted to balance the developmental ('formative') and judgemental ('summative') roles of assessment. Early low-stakes, low-weight assessment is used to provide students with feedback.
13. Grades are calculated and reported on the basis of clearly articulated learning outcomes and criteria for levels of achievement.
14. Students receive explanatory and diagnostic feedback as well as grades.
15. Assessment tasks are checked to ensure there are no inherent biases that may disadvantage particular student groups.
16. Plagiarism is minimised through careful task design, explicit education and appropriate monitoring of academic honesty. (James, McInnis & Devlin, 2002)

It should be clear that many of these assessment principles are associated with, and analogous to, the development of graduate attributes, i.e.:

- consideration of assessment should be a key element of the teaching and learning process, not an add-on/after-thought;
- assessment should be clearly connected to learning outcomes and learning activities, as part of the curriculum 'loop';
- assessment tasks should measure both generic and discipline specific attributes; and
- assessment complexity should progress across the duration of the program.

Designing a program curriculum to expose students to a range of learning activities intended to develop certain graduate attributes is a necessary step, but, in itself, does not ensure that students have actually developed the desired attributes. One element of such an assurance is including assessment tasks that seek to measure the student's attainment of the desired attribute(s). Of course, the assessment task activity itself is normally a key adjunct to curriculum content in the development of graduate attributes, providing an opportunity for students to operationalise theories and practise skills. Returning to the engineering example

cited previously, we can see the logical link between program/unit learning objectives and assessment:



From (Jolly, 2001)

Activity

Is assessment an integral part of the development of graduate attributes for the program(s) that you contribute to? What is the role of assessment in the development of graduate attributes?

Assessment of graduate attributes

If we wish to ‘close the loop’ between graduate attributes and assessment, we need to specify assessment criteria that provide an objective measure(s) of the level of student mastery of the set assessment task, as well as the level of mastery of the implied learning activity(s), learning objective(s) and graduate attributes that are embedded in the assessment task. Apart from providing an objective comparison benchmarks for the measurement of the level of student attainment of particular graduate attributes, stated assessment criteria also provide the necessary information that students require to effectively complete an assessment task.

Guidelines for good assessment criteria include:

- They should be sufficient to enable an assessor to judge the presence or absence of the ability in a student.
- They should allow for levels of development in a student’s ability.
- They should be clear enough to enable a learner to imagine a performance that would demonstrate the ability.
- They should provide a picture of the ability in action.

- They should include qualitative dimensions of performance.
- They should not be directions, steps, tasks or formal requirements. (Jolly, 2001)

...and...

- specific to each task
- clear and sufficiently detailed so as to provide guidance to students undertaking assessment task
- transparent (i.e. stated in advance)
- justifiable (i.e. linked to learning objectives) and achievable
- appropriate to weightings
- where appropriate, supported by a verbal or written statement about what constitutes the various levels of performance (University of Wollongong, 2007)

Assessment criteria that meet these guidelines can be presented in different formats. These same two sources provide some examples for written and oral assignment work. Note that each example includes a general description of the assessment task requirements, the allocation/share of marks given to different elements/aspects of the task, and the detailed criteria that will be used to assess the level/grade of attainment for each element.

SAMPLE – MARKING & ASSESSMENT CRITERIA	
Example from Graduate School of Public Health GHMD924	
Assignment 1 :	Analysis and critique of a Health Information System
Due date:	Week 5
Weighting:	30%
Length:	Up to 1500 words
<p>Students are required to prepare a report, which critiques one health information system that has been implemented (eg. CHIME, EDIS, DOHRS, AN-SNAP, Acute Episode Funding, Inpatient Statistics Collection, Waiting Times Data Collection, Outpatient Booking System, Midwives Data Collection, Residential Aged Care Collection, Virtual Case Conference) in terms of:</p> <ul style="list-style-type: none"> • conformance with health information standards (ie. vocabulary, structure/content, messaging and security) and • the extent to which the use of the health information system links with recent health reforms. 	

Marking Criteria		
Aspects	Description	Marks
Report content	Addresses the questions [30]	85
	Critical use of readings/literature [25]	
	Evidence of synthesis and use of unifying concepts [20]	
	Justification of conclusions [10]	
Style and organisation of report	Presentation and structure 5%	15
	(Spelling, grammar, introduction and conclusion; the structure, organization and presentation of ideas; the appropriate use of tables, figures and charts; and referencing)	

Assessment Criteria			
Grading of assignments will be according to the following criteria.			
Criterion	Range of performance		
	Marginal	Good	Excellent
Addresses the questions			
Responsiveness to questions/ issues	Does not focus on question	Generally focussed	Interprets question innovatively and maintains focus throughout
Use of readings			
Evidence of awareness of key ideas or facts brought out in readings	Little or no mention of ideas from readings	Mentions key ideas or thoughts from the readings	Discusses and critically analyses ideas and theories as applied to assignment (citations helpful)
Justification of conclusions			
Conclusions clearly linked to concepts developed within paper	Little logic between conclusions and content of paper	Conclusions mainly summarise issues raised in paper	Conclusions draw main concepts of paper together in a unifying manner; expressed succinctly; makes recommendations for further action
Presentation and structure			
Organisation and presentation of ideas.	Difficult to follow. Sequence hard to see	Clear, crisp logical response.	Innovative organisation. Use of charts, diagrams and other materials.
[Adapted from: Jayasuriya R., GHMD924 subject outline]			

From (University of Wollongong, 2007)

Example - Oral Presentations (20% max)

In professional life it is important to be able to articulate one's ideas and explain one's procedures orally in a number of settings and to various audiences. The basic principles of good oral communication remain the same, however, no matter the setting or audience, and these principles are reflected in the criteria below.

Connects with audience through EFFECTIVE DELIVERY : adequate volume and voice projection, clear articulation, vocal variety, use of gestures/body language, appropriate verbal expression, eye contact and expression of interest in audience and topic, good use of media where appropriate.	
/5	<ul style="list-style-type: none"> 5 Speaks with a refined repertory of effective techniques 4 Speaks consistently with elements of effective delivery 3 Speaks with most elements of effective delivery 2 Speaks with some elements of effective delivery 0 Fails to use elements of effective delivery
Connects with audience through PURPOSEFUL STRUCTURE : gives audience sense of focus and purpose, uses introduction/development/conclusion, main point clear, major/minor connections indicated.	
/5	<ul style="list-style-type: none"> 5 Maintains a refined sense of structure in relation to academic frameworks and interests of audience 4 Without digression from focus of the speech, consistently articulates relationships between point of development 3 Establishes and maintains focus on a clear purpose, providing transitions to clarify relationships between most points of development 2 Presents a message with recognisable introduction, development and conclusion 0 Rambling and disjointed speech with no clear focus and purpose
Connects with audience through SUPPORT FOR A POSITION OR DEVELOPMENT OF AN IDEA .	
/5	<ul style="list-style-type: none"> 5 Uses development of appropriate length and variety and of sufficient interest to convince audience of worth of message 3 Uses development appropriate to audience and purpose to clarify message 2 Supports most generalizations with examples and/or evidence meaningful to audience 1 Shows ability to use examples and/or evidence meaningful to audience 0 States position without using clarifying examples/evidence or uses examples/evidence inappropriate to audience
Connects with audience through APPROPRIATE CONTENT .	
/5	<ul style="list-style-type: none"> 5 Articulates applications, syntheses and/or evaluations of frameworks/theories, citing valid sources where appropriate 4 Identifies key elements that indicate understanding of theories/frameworks 3 Demonstrates appropriate application of ideas 2 Articulates accurate representation of ideas 0 Talks without really saying anything

From (Jolly, 2001)

Activity

Select one of the graduate attribute from the program(s) that you contribute to, and propose a set of appropriate assessment criteria for an assignment that incorporates: a description of the assessment task requirements, the allocation/share of marks given to different elements/aspects of the task, and the detailed criteria that will be used to assess the level/grade of attainment for each element.

Other approaches to assessment of graduate attributes

The use of detailed assessment criteria for individual assignments is an important part of establishing the incremental attainment of graduate attributes. If graduate attributes have been embedded into the program curriculum, then, taken together, satisfactory performance by a student in all of the formal assessment activities should represent satisfactory attainment of the required program graduate attributes. Of course, it is often possible for a student to complete a unit of study by attaining the minimum pass mark, but not actually covering a particular attribute. A 'pass student' may progress through their entire program and successfully graduate having avoided a range of graduate attributes that were designed into the curriculum and dutifully assessed (Ferguson, 2001). It is important to make the distinction between processes which ensure that a program will contain opportunities for student to learn and practise desired attributes, and processes which seek to certify actual student attainment of graduate attributes. The bottom-up, incremental assessment approach can be supplemented by other approaches that seek to measure the student attainment of desired/required graduate attributes.

Student portfolios are another means by which individual attainment of graduate attributes can be assessed. Many professional accrediting bodies identify student portfolios as one possible strategy for demonstrating program outcomes and student attainment of graduate attributes. The benefits of portfolios are summarised as:

- they can contain many different types of evidence;
- they resolve many types of assessment problems in equity and moderation;
- they provide a richer picture of students' learning and competency;
- students are actively involved in the building of the portfolio;
- they are well suited to authentic learning environments;
- they can be used in a wide range of contexts; and
- they provide a means for students to manage their own professional development (Love & Cooper, 2004).

Importantly, for the task of assessing outcomes of an entire program of study, a portfolio can act as an integrator, bringing together and assessing the whole program (Manson, Pegler & Weller, 2004), including allowing students to demonstrate attainment of particular attributes that may not have been explicitly summatively assessed at any point during their prior studies (EPC Assessment Working Group, 2002).

It has been found that the portfolio requirements and the structure/format in which portfolio items must be submitted need to be designed around the intended use of the portfolio, and made clear to students who will be using the portfolio (Heinricher et al., 2002). Additional effort in compiling the portfolio can be minimised by basing it around assessment items/artefacts already currently produced by students (Falk et al., 2002). Of course, this approach can only be employed if the assessment tasks undertaken by students clearly relate to the assessment of attainment of the required graduate attributes. It is well known that students take a strategic approach to study, and the learning activities they engage most fully with are those most clearly associated with what will be assessed (James et al., 2002). Not surprisingly, it has been observed that attaching assessment credit (marks) to the completion of portfolio tasks is an effective motivator for student engagement (Toohey, 2002).

While it is possible to employ a paper- or hardcopy-based student portfolio, the increasing use of online technology by students and educators alike, including in assessment, means that many of the reported applications of student portfolios are online portfolios (or, e-portfolios) (Love & Cooper, 2004; University of Sydney Faculty of Science, 2004; Williams & Sher, 2004). The suggested benefits of online portfolios include:

- ease of use;
- gives students secure control of their portfolio;
- a multimedia archive of the material can be produced;
- the portfolio contents can be searched;
- materials can be easily updated and replaced;
- students and staff can access the portfolio online, anytime;
- portfolio marks can be automatically logged and managed;
- students can be provided with feedback online; and
- the portfolio structure can be aligned with the required graduate attributes, so that student submissions are focused on the outcomes to be measured (Rogers & Williams, 1998).

In addition to the direct assessment of individual student performance, there are other less direct and longer-term means by which student attainment of graduate attributes, at least at the program level, can be measured/inferred. Program graduates/alumni can be surveyed to seek their perceptions of the effectiveness of their studies in equipping them with the required attributes, and the employers of graduates can be surveyed to seek their assessment of how well the graduate exhibits the required attributes (Department of Chemical & Biomolecular Engineering North Carolina State University, 2002; Faculty of Electrical Engineering Universiti Teknologi Malaysia, 2007). Where student evaluation of teaching (SET) surveys include items relating to the development of graduate attributes, this data can provide a measure of the contribution of individual units to the development of program graduate attributes (Johnson, Gerstenfeld & Zeng, 2002).

Whole-of-program level data can be obtained if the institution has a course experience-style questionnaire that includes items relating to the development of graduate attributes (Bath, Smith, Stein & Swann, 2004). In Australia, a version of the Course Experience Questionnaire (CEQ) has been included in the Graduate Careers Council of Australia (GCCA) national survey of graduates from 1993 onward. The Generic Skills scale of the CEQ contains the following question items:

GS06 - The course helped me develop my ability to work as a team member

GS14 - The course sharpened my analytic skills

GS23 - The course developed my problem solving skills

GS32 - The course improved my skills in written communication

GS42 - As a result of my course, I feel confident about tackling unfamiliar problems

GS43 - The course helped me to develop the ability to plan my own work

The results from the Generic Skills scale of the CEQ can provide some measure of the effectiveness of individual programs in developing a range of generic graduate attributes in students (Lister & Nouwens, 2004).

Activity

In addition to individual assessment of set assignment tasks, does your School use any other method(s) for measuring student attainment of graduate attributes in the program(s) that you contribute to? If you are unsure, what methods could your School use?

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