This project will put in place processes to encourage students to take responsibility for developing generic attributes that embody the values of scholarship and citizenship, and which may be directly related to the qualities sought by employers. It will also provide mechanisms to allow students to self-assess the development of these attributes throughout their degree program. The project will build on the work of the 2002 pilot program (*Faculty of Science Skills Awareness Program*), and take into account the difficulties encountered.

**The target group**
In the long term, the project outcomes will be delivered to all undergraduate on-campus students from Faculty of Science degree programs. In 2003 segments of the project will be trialled using a small group of students from one of the larger degree programs.

**Goals of the project**
To help students develop a suitable set of attributes by the time they graduate, this project has the immediate goals of:

- developing clear explanations of the core generic attributes;
- defining levels of competence for the generic attributes;
- providing students with a framework to understand the nature of the core generic attributes by incorporating them in a series of illustrative case scenarios;
- helping students learn the language of these attributes so that they can identify them in curricula;

and the longer term goals of:

- helping students identify from their learning experiences opportunities to develop desirable attributes;
- developing a mechanism for students to self-assess their awareness of and competence in the various attributes;
- developing a set of guidelines for staff to help them to identify skill development opportunities for students within the curricula; and
- offering recommendations to Faculty about how to mandate an audit process whereby students self-assess and keep a personal record of their development.

**Project personnel**
Project team: Mary Peat, Anne Fernandez, Chris Stewart, Charlotte Taylor, Cyril Latimer

Planning/Steering committee: Beryl Hesketh, Mary Peat, Anne Fernandez, Chris Stewart, Cyril Latimer, Simon Barrie, Charlotte Taylor, (cc: Adrian George)

Skills Reference Group: Carol Sheldrake (Academic Skills Advisor, Orange), Elizabeth May (Biological Sciences), Erica Sainsbury (Pharmacy), Phil McManus (Environmental Science), Craig Barnes (Environmental Science), Peter O’Carroll (Learning Centre), Ian Johnston (UniServe Science), Mike Prosser (ITL), Adrian George (Chemistry), David Livesey (Psychology), Fiona White (Psychology), Geoffrey Kennedy (Info Tech), Hilary Lloyd (Pharmacology), Peter New (Mol & Micro), Sandra Britton (Maths & Stats), Tim Bedding (Physics), Tom Hubble (Geosciences), Bjorn Landfeldt (Info Tech)
The project will report to the Faculty Teaching and Learning Committee.

Methodology of the project
The project consists of the following steps:

**Preliminary phase:**
- Literature review
- Identification of University of Sydney graduate attributes
- Identification of existing generic attributes projects at the University of Sydney
- Identification of generic attributes projects at other universities
- Establishment of a Skills Reference Group
- Articulation of related language used by employers

**Development phase:**
- Articulation of generic attributes and skills to be included in the project
- Definition of levels of competence within the attributes and skills
- Identification of opportunities within degree programs where skills may be practiced
- Identification of ways to integrate add-on and embedded generic skills into curricula
- Articulation of the scaffolding for students to make linkages relating to generic attributes
- Development of language-related case scenarios
- Documentation of typical tasks
- Articulation of student benchmarking opportunities
- Articulation of process for student personal audit

**Implementation phase:**
- Pilot

**Evaluation and reporting phase:**
- Evaluation of project
- Documentation of project and reporting of outcomes

The project team will report formally to the planning/steering committee at the end of each phase.

**Preliminary phase**

**Literature review**
A literature review will focus on published papers relating to generic attributes in higher education. In the first instance this will be primarily online publications and will include academic papers and government reports.

The literature review will cover four main areas:
- employability attributes (and skills) of graduates;
- integration of graduate attributes into higher education curricula;
- teaching and assessment of graduate attributes; and
- resources and staff development implications of introducing graduate attributes.

**Identification of University of Sydney graduate attributes**
The ITL is currently conducting research in the area of graduate attributes and is carrying out a review of the University’s graduate attributes policy. The introduction of a new policy will require much general debate by the University community before its adoption. Even though the University’s policy statement issued by the Academic Board is to be superseded, the current documents will be used.

**Identification of existing generic attributes projects within The University of Sydney**
This will involve the identification of generic attributes projects within The University of Sydney and the collection of position papers, policy statements, staff guidelines and student materials relating to the projects. A contact person will be sought for each project. The ITL
project has collected a number of case studies from within the University and these will be added to those we identify.

**Identification of generic attributes projects at other universities**
This will involve the identification of generic attributes projects within other Australian universities, and overseas universities, particularly those in the United Kingdom and New Zealand. For those projects which are seen to be of special interest, a contact person will be sought.

**Establishment of a Skills Reference Group**
This will involve the identification of individuals, both within and external to The University of Sydney, who will be invited to provide valuable discussion and comments as members of a Skills Reference Group. Many of these individuals would be those involved in the previously identified generic attributes projects. The Skills Reference Group will be an e-reference group – no meetings are expected, all communication will take place electronically.

A web site will be set up and maintained to disseminate information to the Skills Reference Group and other interested parties (http://science.uniserve.edu.au/projects/skills/).

**Articulation of related language used by employers**
This will involve the compilation of a list of terms used by employers when referring to the qualities they seek in graduates and the collection of some typical job advertisements. Some specific examples will be included.

**Development phase**

**Articulation of generic attributes and skills to be included in the project**
This will involve the compilation of an extensive list of generic attributes and skills from the literature review and existing generic attributes projects, followed by the identification of the generic attributes and skills that the Faculty of Science is interested in fostering in science graduates. The Faculty list is expected to be a subset of the full set of identified skills and attributes. The lists will include a description of the attribute or skill and associated keywords, for example:

| Team work | The ability to interact effectively with others in order to contribute to a common outcome, and to take a leadership role when necessary | Collaborative, joint goals |

As part of their research the ITL have defined a hierarchical model of the interaction between skills and attributes. Attributes are seen to be acquired through the mastery of one or more generic skills. Generic skills are seen to range from foundation (e.g. English language), through add-on (modular, unrelated to discipline content, e.g. essay writing), to embedded (linked clusters, related to discipline content, e.g. problem solving, thinking). The Faculty of Science project is integrating global and professional attributes with skills to define a working model suitable for the Faculty.

Discipline specific skills (e.g. ability to carry out a titration, ability to dissect a frog, ability to perform a particular calculation) are seen to be part of the content for a particular discipline and are therefore not part of the Faculty project (or the ITL project).

Having identified the required attributes and skills, the project will use the ITL hierarchical model as a guide to map the attributes and skills. This is expected to clarify the relationships between the attributes and skills, assist in identifying gaps within the set and present a picture of where the skills fall in terms of integration within the students’ learning experiences. This mapping will also allow us to decide if the ITL model, or a modification of it, is appropriate as a guide for this project. If the ITL model is found to be inappropriate other models will be
sought and trialled. This mapping is expected to lead to the development of a model that the Faculty of Science can use for this project and beyond. A similar mapping process may be used as a visual representation to assist students in recognising, and understanding the value to them of mastering, the appropriate skills and thus acquiring the attributes.

A more detailed explanation for each attribute and skill, within the final mapping, will then be produced.

**Definition of levels of competence within the attributes and skills**
The development of these attributes and skills cannot occur in isolation and is seen to be from within any of the learning experiences the students encounter in their degree programs. Staged levels of competence that can be recognised and achieved during a degree program will be defined for each attribute and skill. Students will need to monitor their own progress in attaining the skills and developing the attributes. It is expected that levels of development for the attributes will fit a three-level scale, such as unsatisfactory/satisfactory/outstanding, while levels of competence in the skills will be stated as unable to perform task x/able to perform task x/excels at task x.

**Identification of opportunities within the degree program where skills may be practiced**
Generic skills are seen to range from foundation (e.g. English language), through those adjunct to content material (e.g. essay writing), to those integrated with the content and delivery of courses (e.g. problem solving, thinking). Foundation skills are those that students would normally be expected to bring with them to university or are outside the degree program structure. If students are not competent in these they would be directed to places such as the Learning Centre, the Mathematics Learning Centre, the Centre for English Teaching, or Continuing Education (e.g. University Preparation Courses, Bridging Courses) for assistance. Add-on skills are usually associated with units of study but can be taught in a modular fashion – for example, students could attend a short course or workshop, or may be given a printed guide, such as an essay writing booklet. These skills may be developed within a unit of study, or from material available from the Learning Centre (e.g. Writing a Laboratory Report), or from Continuing Education (e.g. Microsoft Office). Embedded skills are usually associated more directly with units of study and are often incorporated into assignments and assessments. Students will need to be offered a range of opportunities within their degree programs for practising the embedded skills. Opportunities for practising the embedded skills within degree programs will be identified.

**Identification of ways in which the add-on/adjunct and embedded generic skills can be integrated into curricula**
As previously noted, attributes are seen to be acquired through the mastery of one or more generic skills. Integrating opportunities for practising the add-on and embedded generic skills into curricula is a major focus of this project. This will involve the identification of activities within degree programs that could allow for such opportunities. For example, team member skills may be practised in laboratory activities, in a group presentation, in a group project, during PBL activities, and so on. These opportunities will need to be spread across and throughout the degree programs. Examples to illustrate the linkage between the skill and the opportunity will be sought from the previously identified existing generic attributes projects. These examples will be used to assist staff and students to recognise, acknowledge and use the opportunities. Guidelines for helping staff to create or identify skill development opportunities for students within curricula will be produced.

**Articulation of the scaffolding for students to make the linkages relating to generic attributes**
Students acquiring these generic attributes will need to identify their value, and to take responsibility for practising them and monitoring their progress. To facilitate this process a scaffold will be produced for students which is well-structured but at the same time welcoming and encouraging.
Students need to:
• understand the language associated with the generic attributes and skills, so that they can recognise the link between ‘employer speak’ and the attributes and skills;
• recognise opportunities within their degree programs to develop and practise the skills;
• self-assess their awareness and competence for the various skills; and
• keep a personal record of their progress in developing the attributes.

This stage of the project will involve the documentation of a package (the graduate employability attributes package) that includes a framework in which students will be made aware of the value of the generic attributes, introduced to the associated language, shown how to recognise appropriate learning opportunities, provided with tools for self-assessment, provided with guidelines for producing a personal audit, and strongly encouraged to embrace the package from orientation through to graduation. In addition, the graduate employability attributes package will itself provide students with first-hand experience of being independent learners.

To assist students in understanding the language associated with the generic attributes and skills a series of case scenarios will be developed. So that students can recognise the skills and identify opportunities within the curriculum for their development, a set of typical tasks will be documented. To enable them to self-assess their levels of competence, students will be provided with benchmarking opportunities. Students will also be given instruction on how to keep a personal audit.

Development of language related case scenarios
In order to see the value of acquiring the generic attributes students need to understand what employers are referring to when they talk of ‘employability skills’ and to see the relationship between these and the generic skills they practise at University. To assist students in understanding the language associated with these generic attributes and skills a series of case scenarios will be developed. Sample job advertisements and media articles will be used with University documentation, such as course outlines and policy documents, to illustrate the linkages. There may also be existing scenarios from existing generic skills project materials that are suited to this purpose.

Documentation of typical tasks
To help students recognise these skills and identify opportunities within the curriculum for their development, a set of typical tasks will be documented. A series of case scenarios that illustrate opportunities for the development of these skills will also be compiled. The ITL has already collected several case studies which may be used by this project.

Articulation of student benchmarking opportunities (self-assessment)
To be able to self-assess levels of competence, students will be provided with benchmarking opportunities. This will involve the identification and documentation of available benchmarking tools, including the ACER Graduate Skills Assessment (GSA) test, and the production of benchmarking guidelines, including case scenarios, where necessary.

Articulation of process for student personal audit
Students need to keep a personal portfolio to demonstrate the progress of their competence. This will involve documentation of what students might collect as evidence and the identification and documentation of available tools for maintaining the personal audit. Students will be encouraged to incorporate both curricular and extra-curricular activities into their portfolio.
Implementation phase

Pilot
A pilot will be conducted during second semester. The details of this require further investigation but will include answers to the following questions.

- What student group are we using?
- Do we plan to do anything that requires ethics clearance?
- How is it to be introduced to students?
- Which aspects will be trialled?
- How long will the trial run?
- How is it to be trialled?
- What method of delivery will be used, e.g. focus groups?

Students may be asked to fill in some of the holes in the model.

Evaluation and reporting phase

Evaluation methodology
This will involve the identification and use of an appropriate methodology for evaluating the level of success of the pilot and the project outcomes. Feedback may be sought from students, staff, and employer groups, using surveys, questionnaires, interviews, reflective journals, sample audits, and audits of opportunities developed within the disciplines.

Documentation of project and reporting
This will include a written report to Faculty with recommendations on packaging and implementation.

Outcomes of the project
The project will produce:

- a mechanism for introducing students to the skills and attributes at the start of their university studies;
- a mechanism for providing student access to skills materials, this is most likely to be a website;
- a series of case scenarios to help students learn the language;
- documentation for students that clearly explains the identified core generic attributes and associated levels of competence;
- a set of typical curricula-based tasks that foster these generic attributes;
- guidelines for helping staff to create/identify skill development opportunities for students within curricula;
- a mechanism for students to self-assess their awareness and competence of the various skills; and
- a mechanism to show students how to keep a personal audit.

Timeline

<table>
<thead>
<tr>
<th>January</th>
<th>Planning</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Selection and explanation of attributes and skills</td>
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<td></td>
<td>Development of model</td>
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<td>February – June</td>
<td>Definition of levels of competence</td>
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<td>Design of scaffolding</td>
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<td>Development of case scenarios</td>
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<td>Development of typical tasks and case studies</td>
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<td>Mechanism for self-assessment</td>
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<td></td>
<td>Mechanism for personal audit</td>
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<td>July – October (i.e. 2nd semester)</td>
<td>Pilot</td>
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<tr>
<td></td>
<td>Evaluation</td>
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<tr>
<td>November</td>
<td>Recommendations to Faculty</td>
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</tbody>
</table>
## Project plan

<table>
<thead>
<tr>
<th>Project goals</th>
<th>Methodology</th>
<th>Outcomes</th>
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</thead>
<tbody>
<tr>
<td>1. To identify the core generic attributes and skills of interest to the Faculty of Science</td>
<td>Identification of University of Sydney graduate attributes Identification of existing generic attributes projects at the University of Sydney Identification of generic attributes projects at other universities Articulation of generic attributes and skills to be included in the project Discussion with Skills Reference Group Presentation to Faculty Teaching and Learning Committee</td>
<td>List of generic attributes and skills to be included in the project Mapping of the relationship between the skills and attributes</td>
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<td>2. To develop clear explanations of these core generic attributes and skills</td>
<td>Articulation of generic attributes and skills to be included in the project</td>
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<td>3. To define levels of competence for these core generic attributes and skills</td>
<td>Definition of levels of competence within the attributes and skills</td>
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<td>4. To provide students with a framework to understand the nature of the core generic attributes and skills</td>
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<td>5. To help students learn the language of these attributes and skills</td>
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<td>6. To help students identify opportunities for building these skills and attributes</td>
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<td>7. To help students self-assess their awareness and competence of these attributes and skills</td>
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<td>8. To help students keep a personal record of their competence</td>
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<td>9. To help staff identify student skill development opportunities</td>
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<td>10. To offer recommendations to Faculty</td>
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