Chapter 1: Overview

Introduction
The Faculty of Science has initiated a number of projects in line with University and external trends toward student-centred flexible learning and web-enhanced teaching. It is committed to extending its current web presence through the use of WebCT for delivery of unit materials and communication with students. It has an ongoing strong commitment to the provision of a positive total experience for its students as evidenced by its Student Transition Workshop, and its use of IT in teaching especially in large first year classes.

In line with these considerations the Faculty plans to enhance the quality and relevance of service teaching to contribute to the total experience of first year students in client faculties.

The project
The Faculty teaches in a large number of client degree programs with some tailored units of study and others that are more broadly based for a variety of clients. The underlying aim of this project was to restructure and enhance the teaching of first year science units of study for client faculties through curriculum reform and by the introduction of new delivery modes, which include the use of IT.

The project focused on the development of several strategies to ensure more appropriate materials are delivered to suit the clients’ needs. These strategies included the development of small modules both within and across units of study and the development of contextualised strands within units of study.

The short term aims of this project were to:
- improve the first year experience for students in client faculties;
- meet the needs of client faculties;
- achieve transferability of approaches to delivery across disciplines; and
- raise staff awareness of the needs of incoming students.

The long term aims were to:
- devise a sustainable development process that could be used in further development at the departmental level; and
- maintain effective liaison with client faculties so that service teaching remains responsive to their needs.

One of the objectives of the project was to trial a number of different approaches to delivery, i.e. modules across units of study; modules within a unit of study; and streams within a unit of study. The project had four development groups:
- Biological Sciences delivering to Education;
- Chemistry delivering to Agriculture;
- Mathematics and Statistics delivering to Engineering; and
- Physics delivering to Agriculture.
See Appendix 1 for a list of team members and other interested parties.

Two of the groups, Chemistry and Mathematics and Statistics, produced modules across units of study; Physics worked on modules within a unit of study; and
Biological Sciences focused on streams within a unit of study. Details for the four developments can be found in chapters 2 through 5.

Each development group followed an action research model, which included the iterative development, evaluation and implementation of each of the innovations. At the end of the project it was possible to enunciate an explicit teaching improvement model for each group, which could hopefully be transferred to other units of study and Schools.

**Deliverables**
For each targeted unit of study the deliverables were:
- context-based teaching materials in the form of small components (modules or strands); and
- a web presence.

For the Faculty the deliverables were:
- two models for implementing curriculum reform that might be usable by other departments; and
- guidelines for the integration of content, references, formative and summative assessment tools, etc. into WebCT.

**Project Management**
UniServe Science was given management of this project. This included:
- liaising with the four development groups;
- reporting regularly to the Dean of Science;
- managing the project budget;
- scheduling regular group meetings, to monitor progress;
- advising on the design of pedagogically sound web materials;
- advising on appropriate evaluation methodologies; and
- conducting project-wide evaluations.

Each of the development groups had a team with a team leader from the specific Faculty of Science discipline. Each team also included at least one member from the client faculty and the project manager. See Appendix 1 for details of people involved in the project.

A startup meeting, attended by members from all development groups, was held to:
- introduce project members, including those from the client faculties;
- outline the budget;
- reiterate the goals of the overall project;
- establish guidelines for carrying out the project; and
- emphasize the importance of evaluation.

Subsequent meetings were restricted to individual development groups. The first of these for each group was to:
- clarify the aims, objectives, client faculty needs and target student cohort;
- define intended outcomes; and
- establish a proposed timeline.
Evaluation
When introducing any new innovation it is vital that some level of evaluation is carried out. Evaluation for this project was quite complex and it needed to provide feedback to the Schools involved, the Faculties, the College, and the University. Appropriate evaluation for this project was identified as:

- for each group, evaluation of the innovation within the School;
- for each group, evaluation of student satisfaction;
- for each group, the carry-on effect of the intervention on students moving on into second year;
- for each group, evaluation and documentation of teaching improvement models that could be transported to other departments within the Faculty, the College, or even other parts of the University; and
- the impact of the innovations, the project, the models, etc. on future direction of teaching and learning in science.

The information gathered from these evaluations will help inform the debate on curriculum developments and the use of IT in teaching and learning.

Kirkpatrick’s four-level model for assessing training effectiveness was seen as a useful starting point. We adapted it to suit our evaluation needs, defining the levels to be:

- level 1 – reaction, a measure of student satisfaction, assessed through questionnaires, surveys, focus groups, etc.
- level 2 – learning, a measure of skills and knowledge learned, assessed using criterion-referenced tests, pre-tests/post-tests, observations, interviews, etc.
- level 3 – transfer, a measure of transfer of the knowledge, skills and understanding gained in the first year unit of study to an appropriate second year unit of study, assessed using observations, interviews, surveys, etc. For groups where it was appropriate we correlated the second year student’s awareness of relevant objectives of first year units of study with his/her second year results.
- level 4 – value to the organization, including dissemination, a measure of cost effectiveness and organisational benefits, such as, does the innovation meet the long and short term goals of the organisation, has the innovation produced the results the organisation expected.

See Appendix 2 for a discussion of Kirkpatrick’s model.

Evaluation was planned and carried out in consultation with the ITL. To assist with the planning of the evaluations we also referred to the Evaluation Cookbook prepared by the Scottish Learning Technology Dissemination Initiative. The Cookbook includes:

- ‘recipes’ for different evaluation methods;
- useful information drawing on the expertise of a range of practising evaluators;
- a framework for planning and preparing your evaluation;
- guidelines for reporting and acting on the results; and
- short exemplars of evaluation studies using some of the methods described.

Staff interviews were conducted to evaluate the project management.
Budget

*Faculty component* - $50 000 towards salary of one UniServe Science person to work half-time over two years on the project.

*College component* - $85 000 used to fund:
- academic support for four Schools within the Faculty of Science to develop the appropriate materials/units of study for their clients. ($13 750 to each of four Schools)
- web support ($23 000) - $2 405 to Biological Sciences, $2 500 to Chemistry, $7 855 to Mathematics and Statistics, and $10 240 to Physics
- related expenses ($7 000) to UniServe Science