Faculty Teaching and Learning Scholarship Project:

**Mapping Chemistry Subjects for Multiple Purposes via an Active Interview Process**

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1 Overview:

Through a series of systematic in-depth, active interviews with subject coordinators across the School of Chemistry, gathered commentary from other staff and gathering of all available hard and soft materials for each subject, we can now:

- track the development of specific skills and conceptual knowledge through chemistry curricula,
- make curricula explicit to students as well as staff,
- identify sharable learning resources and teaching practices,
- identify where support from the Academic Service Division is needed.

This is a ground up approach to identify as much as possible about subjects and their content which can be drawn together to inform both staff and students about the teaching programs. It is part of a larger project mapping subjects in the Science faculty. The following diagram summarizes the process.

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2 Introduction:

The project *Mapping Science Subjects* is a comprehensive gathering of commentary, data and materials about each science subject from staff aimed at making science curricula more accessible to both staff and students. The gathered materials and data will ultimately be stored within the content management system, Equella, with multiple possible outcomes from the project as shown...
in the diagram above. Other staff involved in the faculty wide project as principal investigators are Dr Christine Brown (Academic Development) and Ms Emily Purser (Learning Development). As Teaching and Learning Scholar for the Science faculty for 2009, I have carried out that part of this large project specifically associated with chemistry subjects, being the data collation, development of curricula maps and design of the database.

Student input via discussion in focus groups has also been gathered. This has been done to investigate ways of making the content of concepts and skills more accessible to students for their subsequent studies. Students benefit from explicit degree content and skills mapping to aid scaffolding and elaboration of concepts between subjects.

The overall project, already under way before 2009, is driven by a number of needs perceived by the investigators responding to both faculty requirements and to developments within their own areas of responsibility. The Science Faculty Education Committee agreed to the need for a comprehensive and systematic mapping of the curriculum in terms of development of core concepts and skills such as academic and information literacy, mathematics and statistics needs, and lab / field related practices. For my own teaching development as Director of First Year Studies in Chemistry, my intention is using the mapping methodology to gather detail as to where First Year Chemistry students apply particular chemistry concepts within their further studies.

3  Methodology:

A systematic series of active interviews with subject co-ordinators in all chemistry subjects with associated gathering of all available hard and soft materials concerning each subject has been carried out. In addition to direct staff interviews, content details and learning outcomes have been obtained from other academics for their teaching in particular subjects. Commentary has also been sought from other staff associated with teaching (technical officers, tutors).

Student input has been sought via directed focus group discussion. Two student focus groups were held where student feedback on how best to facilitate ongoing use of chemistry studies was sort via a series of specific statements and prompt questions. Students in the Faculty of Science and the Faculty of Health and Behavioural Sciences from second year Spring session subjects with CHEM101/102 prerequisites were sought to take part. Students who had achieved Pass and Credit grades in CHEM101/102 were asked to take part as these are students most likely to benefit from explicit concept mapping and methodologies which assist constructive and deep learning of concepts integrated across discipline areas.

4  Outputs:

The gathered chemistry subject details have been stored thus far in a spreadsheet, allowing some analysis of the materials. This analysis has delivered:

- Content and skills mapped in detail through Chemistry subjects.
- Sharable content, resources and practices identified, especially with respect to laboratory classes.
- Support needs identified for lab report writing.
- A developed methodology for mapping of curricula for any number of purposes.

5  Data repository:

Ultimately the materials gathered, as either soft copy documents or data or commentary, will be stored in a repository which will be in the form of a searchable data base, within the Equella content management system.
The development of the final repository encompasses design for multiple purposes as summarized in the above diagram. Chemistry subjects will be the first entered into the repository which will guide further development for the rest of the faculty. Storage for each subject includes:

**All soft content:**
- Subject outline
- Content details
- Tutorial materials
- Lab experiments
- Lecture notes (various forms)
- Materials re any other learning activities
- Assessment materials
- Reading materials

**Other files:**
- Development notes / details
- Annual subject review or other review.
- Teaching / Administration requirements: academic, technical, general staff requirements, space requirements, timetabling requirements, lab equipment, instrumentation, software requirements, field work equipment, field instrumentation.
- Data: results, all marks and marks analysis, student body details.
- Other commentary

**eLearning content files**

Apart from searches to reveal particular content or learning objects, the database will also yield reports or mapping outputs for any purpose for which queries can be constructed, for example:
- Mapping of content types such as concepts, skills or graduate qualities through a degree course.
- Subject needs:
  - Report how many of certain assessment items occur across a suite of subjects.
  - Report the need for certain staff, space, instrumentation, computer access….. across a suite of subjects.

6 **Conclusion:**

This project has delivered valuable support for teaching and curricula in the School of Chemistry. Although the development of the final repository is still proceeding, as the University updates and further develops the Equella CMS, the repository design begun for Chemistry subjects is proving a good pilot for the rest of the faculty.