Mapping the Curriculum for Quality Enhancement: Refining a Tool and Processes for the Purpose of Curriculum Renewal

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Abstract

Curriculum mapping has become a topic of interest in recent years in Australian higher education, and is associated with Graduate Attributes and curriculum renewal. Views of its usefulness differ. This paper reports on the curriculum mapping tool and process developed and refined at Curtin University in recent years. This tool started as a useful, yet time-consuming Word template, and has evolved into a more refined Excel-based tool which can provide visual representations of various aspects of the curriculum. While it is hoped that version three of the curriculum map will be a dynamic tool that updates automatically from the course database and other curriculum maps, the current version (version two) is being used by multiple universities across Australia to interrogate learning outcomes and curriculum themes. This paper is a case study which provides an overview of the level and depth of the analysis through the curriculum mapping tool, and how curriculum mapping has been carried out at Curtin University. Samples of the visuals produced by the curriculum map are provided, showing the spread of graduate attributes, thinking levels, assessment tasks, learning experiences and engagement with curriculum themes across a course. The curriculum mapping process undertaken at Curtin University is described and the benefits to staff and institutions discussed.

The curriculum mapping tool described here is available for use in other institutions through the ALTC Fellowship, Benchmarking Partnerships for Graduate Employability (see http://tiny.cc/boliver).

1. Introduction

There has been a major focus on curriculum renewal in Australian higher education in recent years, and increasing interest in measuring quality related to the curriculum. There has also been a stronger focus on Graduate Attributes—what they mean in terms of graduate outcomes, how staff and students engage with them, and how achievement might be assessed and reported (Barrie *et al.* 2009a; Radloff *et al.* 2009). The nexus between these two areas—curriculum renewal and graduate attributes—is often curriculum mapping. A 2009 survey of teaching and learning representatives from 36 Australian universities found that interest in mapping the curriculum is high: many universities have templates and matrices to map graduate attributes, others are developing appropriate tools and processes, or intending to do so (Oliver and Whelan 2010). Interest is likely to increase as one of the roles of the Tertiary Education Quality and Standards Agency (TEQSA) will be to oversee strengthened quality assurance arrangements in Australian higher education (Gillard 2010). Institutions will be required to demonstrate that their graduates have the capabilities that are required for successful engagement in today's complex world. There appears a natural link between curriculum renewal, standards and graduate attributes: Barrie *et al.* note that "the way a higher education system, university or discipline monitors and assures the development of graduate attributes is one of the most influential drivers of effective implementation" (Barrie *et al.* 2009a).

Scholarship about curriculum mapping in higher education appears to be somewhat limited. Curriculum mapping can be a matrix approach whereby teachers indicate where attributes are taught, practiced and assessed (Oliver and Tucker 2004; Sumsion and Goodfellow 2004; Oliver *et al.* 2008a). It is useful in identifying gaps where skill development has been overlooked (Sumsion and Goodfellow 2004). However, Barrie *et al.* note that "curriculum mapping exercises often simply note that learning outcomes reference graduate attributes" (p.14) (Barrie *et al.* 2009a). The latter approach is likely to lead to a compliance culture where engagement is limited to 'tick and flick'. Curriculum mapping can also be a fearful exercise for academics, particularly if they do not understand, are resistant to change or have a sense of exclusive ownership of content (Davenport *et al.* 2009). Staff may also be fearful if they see the *purpose* of curriculum review as course-cutting, rather than improvement. Attitudes towards curriculum mapping and pedagogical vocabulary need to be addressed through the mapping process to ensure that staff understand the value and become engaged in the process. It is important that staff do not perceive the curriculum mapping exercise as threatening or as an administrative burden (Sumsion and Goodfellow 2004). The empowerment of academic teaching staff is vital in curriculum review as they are the principal source of curriculum development (Graduate Careers Australia 2008). Curriculum mapping should also be a cyclical process which includes the creation of visual representations to create a curriculum that is fluid and adaptable to the changing needs of students, employers and the discipline (Uchiyama and Radin 2009).

Three major considerations for effective practice emerge from the literature: (1) the tool—an instrument, document or package which allows aggregation of a course; (2) a process—the way in which the tool is used with and by teaching and support staff; and (3) the purpose for which curriculum mapping is adopted. Judicious use of the tool and the process for an appropriate purpose is likely to enhance staff engagement—the best tool used poorly will not engage staff; nor will the process be worthwhile if seen by teaching staff as bureaucratic 'busywork'. The limitations of mapping the curriculum must also be considered: the mapped formal curriculum is likely to change somewhat when it is enacted within the 'classroom'. Using mapping to achieve a 'broad-brush overview' of the degree from the student's view is worthwhile and achievable. Drilling down to infinite detail is likely to seem tedious and overly bureaucratic to teaching staff whose engagement is key to success.

2. Curriculum Mapping at Curtin

Curtin University, as part of Curriculum 2010 (C2010), its university-wide curriculum renewal project, began using a mapping tool (Version 1) and process in 2007 (Oliver *et al.* 2007) which was enhanced to include visuals of aspects of the curriculum in 2009 (Ferns *et al.* 2009). Version 1 focused particularly on how and where in a degree the graduate attributes were contextualised, embedded and assessed. Mapping with Version 1 was a labour-intensive 'copy and paste' process using a Word template. Moreover, key aspects of the curriculum required further interrogation, namely:

- the effectiveness of learning experiences and resources in assisting students to achieve unit learning outcomes, aspects reported in Curtin's unit survey, *e*VALUate (Oliver *et al.* 2008b); and
- levels of engagement with curriculum themes such as those identified in Curtin's triple-i curriculum (such as industry, internationalisation and interdisciplinarity) (Hare 2008).

The envisaged Version 3 of Curtin's Mapping Tool, referred to hereafter as CCMap, will be an enhanced online tool that meshes dynamically with Curtin's information systems. In the meantime, the current Version 2 is a work-in-progress, designed to give broad-brush course analyses related to Unit Learning Outcomes (and Graduate Attributes), Assessment, Learning experiences, Learning resources, Curriculum themes, and Career Development Learning. Version 2 is currently available for sharing with other universities through an ALTC Teaching Fellowship, *Benchmarking partnerships for graduate employability* (Oliver 2009). This paper describes the enhanced tool and the process used to engage teaching staff for the purpose of curriculum renewal.

3. The Tool: CCMap Version 2

The CCMap is an Excel workbook designed to aggregate course information from 'Unit Worksheets'. The CCMap creates six Course Analyses which display charts for quick visual analysis. The following descriptions are available in full in the CCMap Introduction and User Guide (see http://tiny.cc/boliver). Each unit has learning outcomes indicating what successful students know or can do. In the CCMap, each is coded to at least one and up to three Graduate Attributes. The associated chart (see Figure 1) shows the relative emphasis of the Graduate Attributes in the course. Using this overview, the teaching team decides whether the spread is appropriate for the course. If adjustments need to be made, they can change the individual unit worksheets, then re-generate the chart. Another chart (not shown here) shows the emphasis on Graduate Attributes in each semester.

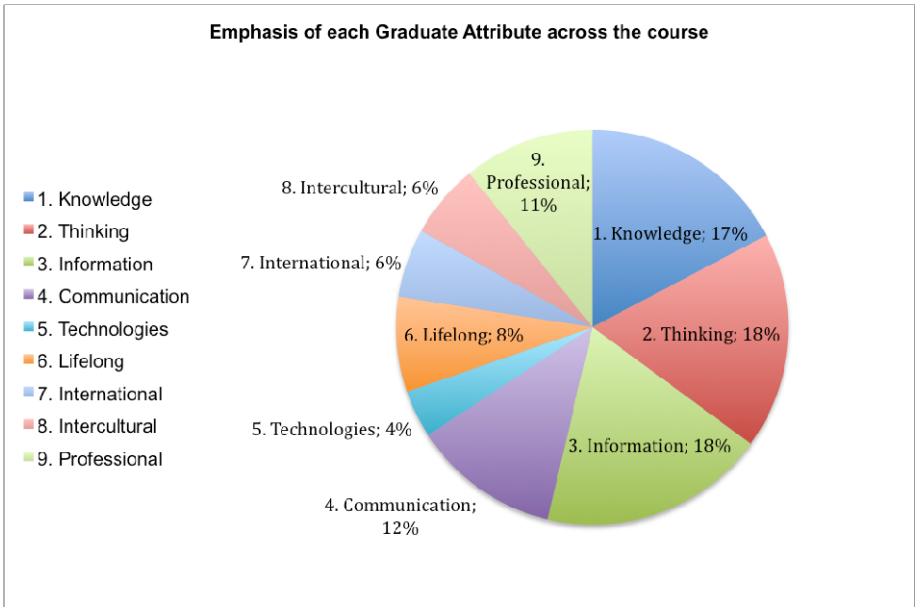

Figure 1: Emphasis of Each Graduate Attribute in a (Hypothetical) Degree

Similarly, each unit learning outcome is given a 'star rating' from one to six to indicate the highest 'level of thinking' (or cognitive demand) required to achieve that outcome, based on Krathwohl's Revised Teaching Taxonomy (Krathwohl 2002), showing that the outcome requires the student to Recall, Explain, Apply, Analyse, Evaluate or Create. Figure 2 shows the emphasis on Levels of Thinking for each semester in a course:

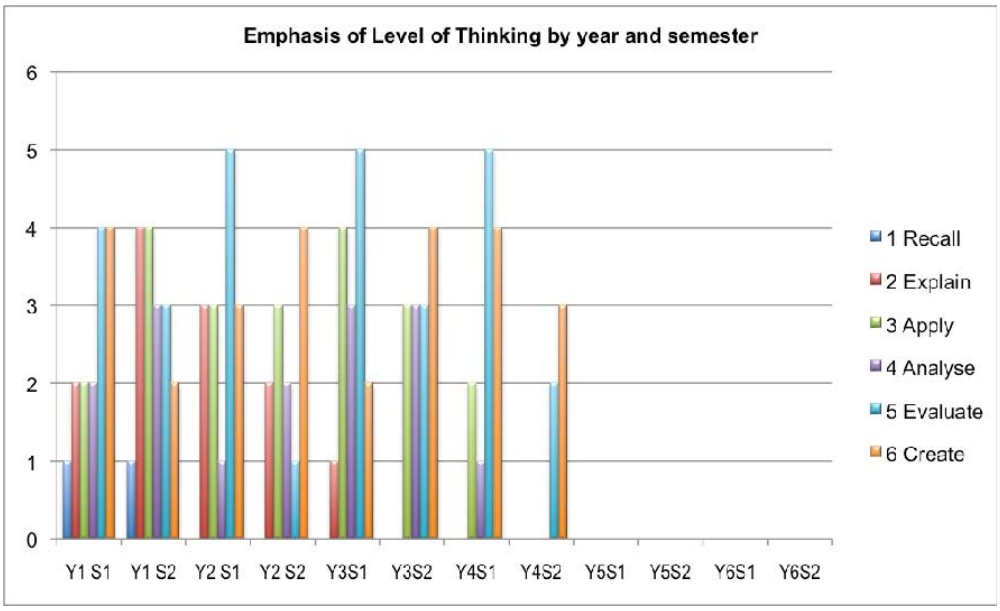

Figure 2: Emphasis of Level of Thinking in Each Semester

Each unit has up to four assessments constructively aligned with learning outcomes. Assessments are complex and multifaceted tasks, and many defy simple categorisation: the intent in the CCMap is to capture the predominant features of assessments. Version 2 attempts to categorise the proportion of assessment tasks by:

- Type: such as test, presentation, reflection, investigation, exercise, work placement, laboratory, studio, final exam;
- Medium: such as written, oral, performance, practical;
- Format of written tasks: such as essays, reports, multiple-choice testing, short answer, or a combination of these;
- Student role: such as individual, pair, group tasks;
- Level of supervision: such as closed book, open book and unsupervised;
- Mode: face to face and in blended learning;
- Principal assessor: for example, by teaching staff, industry preceptor, student, peer, and combinations of these;
- Purpose: assessment of learning and assessment *for* learning; and
- Level of authenticity (work-integrated learning). Because there are many types of WIL, this chart draws on four broad categories—Nil (to show where there is absence of WIL), Low, Medium and High, as shown in Figure 3:

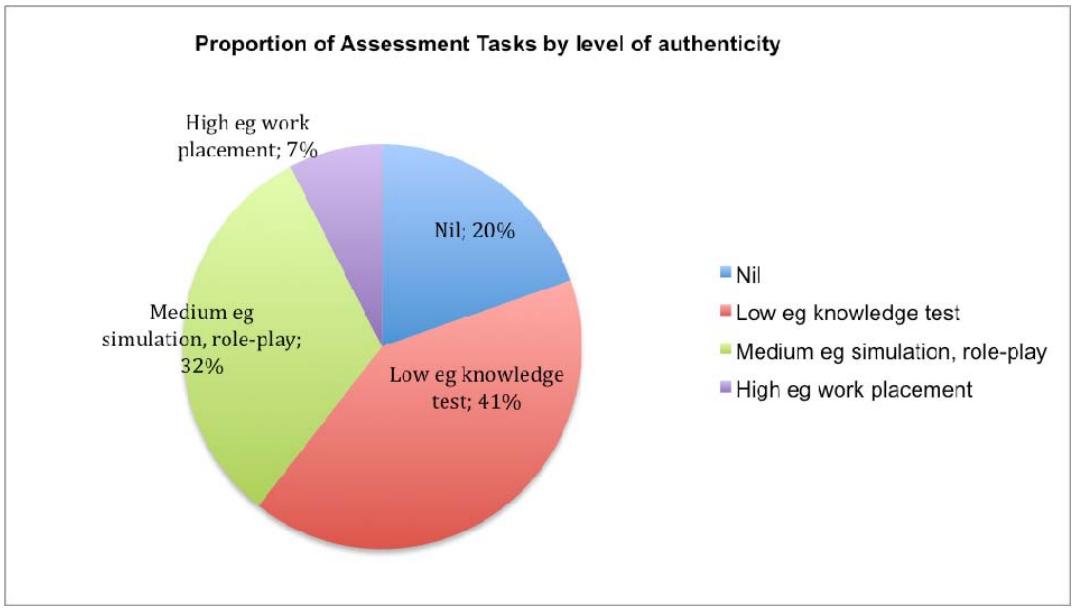

Figure 3: Proportion of assessment tasks by level of authenticity and work-integrated learning

Version 2 attempts to capture an overview of the experiences the student encounters across the course. The categories here attempt to investigate the level of engagement or active learning as: type (showing the most common types such as lectures, tutorials, seminars and so on); duration (length of classes); frequency (daily, weekly and so on); and predominant student activity, enabling a view of, for example, the proportion of the degree in which students largely listen and take notes (shown in Figure 4):

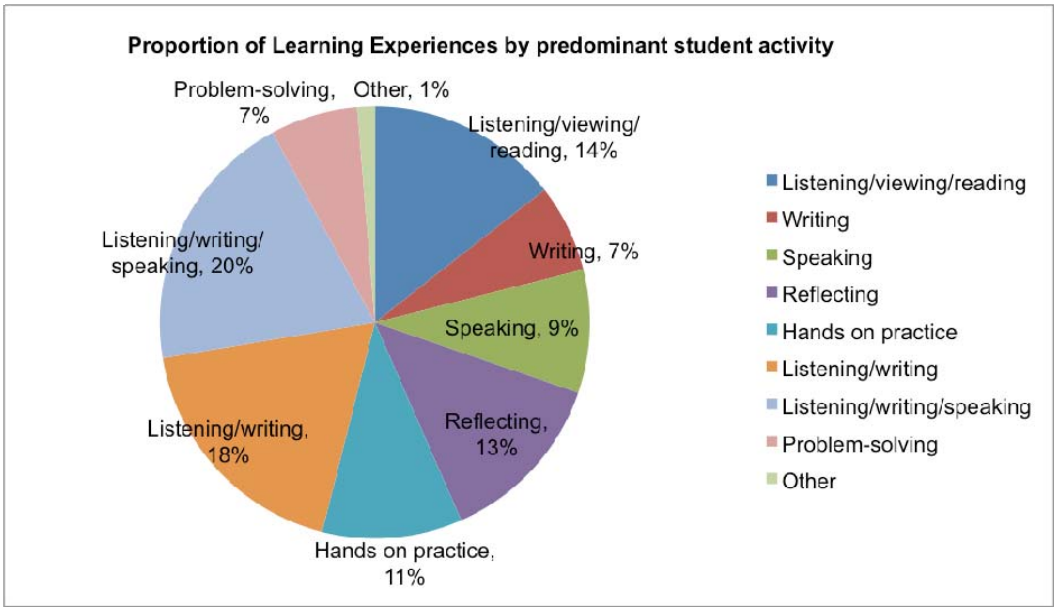

Figure 4: Proportion of learning experiences by predominant student learning activity

Similarly, CCMap tracks the type of resources students experience across a course (for example, texts, web resources, equipment); frequency of use (daily, weekly, monthly); and direct costs to the student.

The CCMap charts the level of engagement with five Curriculum Themes—industry, indigenous, international, intercultural and interdisciplinary. Analysis is based on broad levels: Nil; Low (student

engages with information about the theme; for example, information about indigenous issues); Medium (the student is required to achieve a skill related to the theme; for example, designing a culturally inclusive teaching plan for indigenous students); and High (the student has 'hands on' engagement related to the theme; for example, completing teaching practice in an Aboriginal community school). Figure 5 illustrates the extent to which the themes are evidenced in a hypothetical course.

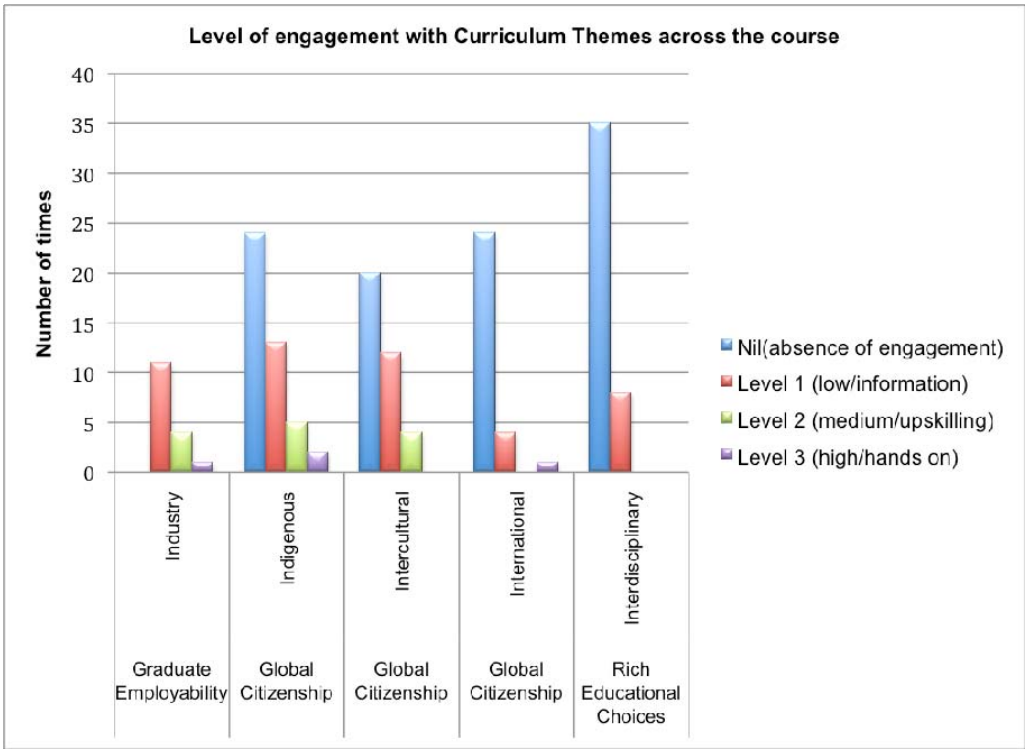

Figure 5: Level of engagement with curriculum themes

The CCMap analyses Career Development Learning in the curriculum, using the *Australian Blueprint for Career Development (ABCD)* as a guide (see http://www.blueprint.edu.au/). Eleven key competencies are outlined in three broad areas, in keeping with the *ABCD*: Personal Management, Learning and Work Exploration and Career Building. Four levels of engagement with each are nominated: Act, Personalize, Apply and Acquire.

4. The Curriculum Mapping Process

Central course review teams, usually two curriculum developers and one administrative staff member, work directly with teaching staff in mapping the curriculum for review. Administrative work is largely completed by this team; this assists in getting 'buy-in' by busy teaching staff. A major part of the process is building relationships and trust with the teaching staff, and ensuring they retain ownership of how the course might change. In the early stages, time is devoted to establishing a collaborative relationship with curriculum developers who provide advice and support to teaching staff who are the discipline experts. This ensures teaching staff are involved in the planning and decision making, essential for managing educational change. Two sources of evidence are the basis for the discussion—the CCMap, described here, as well as the Needs Analysis which provides a 360-degree view of stakeholder feedback, drawing on indicators such as the Course Experience Questionnaire (CEQ), Graduate Destination Survey (GDS), student feedback on units, course demand, progression rates, employer and teaching team perceptions of graduate capability achievement and importance, and so on (Jones and Oliver 2008). These data are used to determine the strengths of the course and areas for improvement, providing an evidence-based focus for the review process. The Needs Analysis is essential in engaging staff in the review process as the evidence triggers rigorous discussion about the existing course, enabling a collaborative and constructive

team approach. The visual stimuli generated by the CCMap encourage innovative thinking and creative approaches in teaching and learning, facilitating a cultural shift in staff perceptions and practices. This form of professional development has heightened staff awareness around quality curriculum and ensured a systematic and streamlined approach to curriculum review.

Research suggests professional development is "best situated within a community that supports learning" and can engage staff with genuine problem solving within their professional practice (Webster-Wright 2009). Professional learning and development should be "active, situated, social and constructed" (Webster-Wright 2009) which is the way the curriculum mapping process was approached at Curtin. That is, the focus was on specific teaching and learning issues rather than being generic or theoretical in its approach, and addressed the conceptualisation, implementation and assessment of graduate attributes, a key challenge for academic staff (Green 2009). Conceptual change requires the ongoing support and commitment from participants (Barrie *et al.* 2009b), which is achieved at Curtin through the involvement of academic staff at all stages of the process and the fostering of conversations about pedagogy and curriculum design to ensure staff have a sense of ownership of the process. Staff ownership of and engagement with the curriculum renewal process was a critical factor to its success. Academic teaching staff play an active role in defining the structure of a course and designing the curriculum. According to Ferns, McMahon & Yorke (2009) this approach empowered staff and was instrumental in facilitating a cultural shift within the organisation. As found in other studies (Sumsion and Goodfellow 2004), staff valued the opportunity for reflection on their curriculum and the ability to look at the course holistically. Further, as the staff develop greater understanding of teaching and learning practices, they are able to engage in deeper conversations about pedagogy, allowing for a scaffolding of improvements in both the course and the teacher's understanding.

The process of curriculum mapping, through the C2010 project, has contributed to the systematic improvement in e*VALUate* scores since the beginning of the C2010 project, as shown in Figures 6 and 7 below:

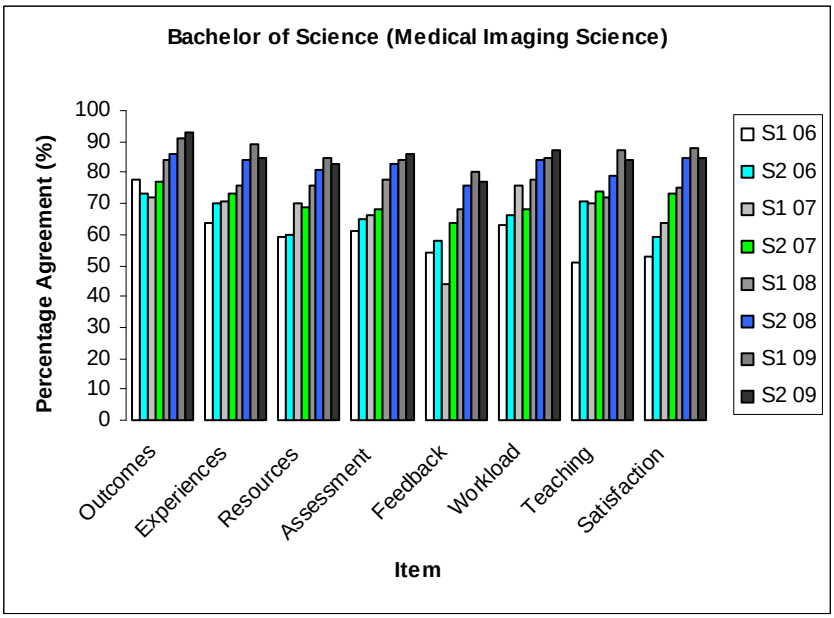

Figure 6: *e*VALUate responses for Medical Imaging Science

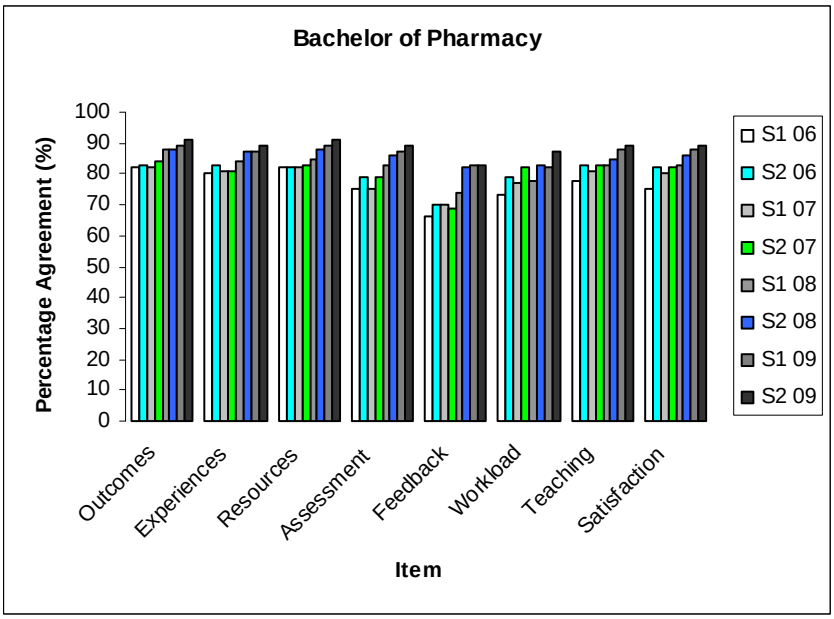

Figure 7: *e*VALUate responses for Bachelor of Pharmacy

It is unsurprising that the curriculum mapping process, which has change management at its heart, would itself 'evolve' through the process. Central support staff (as curriculum developers) have increased their knowledge on issues such as assessment and work-integrated learning. Teaching staff have more sophisticated knowledge about teaching and learning practices and changed attitudes to issues such as authentic assessment. A carefully managed process, complemented by the CCMap and Needs Analysis, has captured the multidimensional nature of educational improvement and ensured active involvement of teaching staff.

5. Conclusion

Improvements in teaching and learning are complex to assess, and even more complex to attribute to any one cause. Nevertheless, it is likely that curriculum mapping through the C2010 implementation of Comprehensive Course Review has made a major contribution towards improving the quality of teaching at Curtin. There has been a systematic improvement in student satisfaction with learning across the University as shown by the improvement in *e*VALUate results since the commencement of C2010 in 2007. This systematic improvement in *e*VALUate responses is shown in Figures 6 and 7, which provide two programme-specific case studies.

Curriculum mapping is now implemented and embedded at Curtin and is likely to have contributed to significant cultural change, improving staff engagement and practice in teaching and learning. That change, directly related to mapping courses, is centred on moving beyond individual perspectives on discrete units to a student's eye view of the entire course. CCMap Version 2 has been provided to several other universities for trialling and for external review through an ALTC Fellowship (see http://tiny.cc/boliver). To date, representatives from eleven Australian and two international universities have requested access to the CCMap tool. Feedback will be used to fine-tune the tool and process. Curriculum mapping at Curtin has undergone changes during Curriculum 2010, and will undoubtedly continue to change and adapt, and probably be enhanced to include scrutiny of academic standards. This 'evolution' of the mapping tool is vital for change management, reflecting different foci and priorities in teaching and learning.

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Acknowledgements

The authors would like to acknowledge the work of the Medical Imaging Science and Pharmacy course teams at Curtin, who have agreed to be included as a case study in this paper.