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Curriculum mapping to embed graduate capabilities

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Graduate capabilities are an essential aspect of undergraduate development in higher education. Accordingly, La Trobe University's *Design for learning* has identified particular university-wide graduate capabilities and required all faculties to explicitly embed these in their curricula. The Faculty of Law and Management developed an approach to map the teaching and assessment of eight graduate capabilities across the first year of the faculty's degree programmes, allowing staff to evaluate the embedding of graduate capabilities and identifying where they might further develop their curricula. This article describes a process designed to collect, analyse and present data on current teaching and assessment of graduate capabilities. The discursive approach supports reflective practice in curriculum design while the resulting heat maps provide diagrammatic accounts of current practices and indicators of where redesign of curriculum should centre.

Keywords: curriculum mapping; curriculum redesign; graduate capabilities; law and management

Introduction

It has become increasingly evident over the past two decades that higher education is about more than instilling discipline-based knowledge. It involves preparing students in ways that will equip them to engage successfully with the world beyond university (Barnett, 2004; Barrie, Smith, Hughes, & Thomson, 2009; Jackson & Chapman, 2009; Precision Consultancy, 2007). Accordingly, La Trobe University's new blueprint for teaching and learning, *Design for learning*, requires that faculties review and renew their curricula to ensure that, among other things, they have a coherent, sequenced curriculum structure that not only achieves discipline-specific student outcomes, but also supports the development of university-determined graduate capabilities for all undergraduate students.

Across the university these graduate capabilities have been identified as: writing, speaking, inquiry/research, critical thinking, creative problem-solving and team work. While these are shared by all teaching programmes, they are to be defined in appropriate discipline or field-specific terms, assessed against agreed standards of student achievement and supplemented by faculties as required. It is recognised that graduate capabilities entail different features in different disciplinary contexts, so teaching of capabilities should be intertwined with disciplinary content of the respective

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academic group (Bath, Smith, Stein, & Swann, 2004; Christensen & Cuffe, 2002; Jones, Dermoudy, Hannan, Osborn, & Yates, 2007).

To support the redesign of curricula, in 2009 the University funded a number of faculty-based pilot projects. The Faculty of Law and Management (FLM) undertook a 'curriculum alignment' mapping exercise (English & Steffy, 2001; Squires, 2008), mapping its first-year curricula to determine strengths and weaknesses of current practices with respect to teaching and assessing graduate capabilities. The authors headed a team of FLM academic developers, academics and student support staff who worked on the project, known as C-Ren (Curriculum Renewal). We designed the project to develop evidence-based practices to establish how extensively graduate capabilities were being taught and assessed. Thus we would be better positioned to know where redesign was required to ensure students were developing these capabilities as intended.

This article situates C-Ren within relevant literature and describes the methodology that allowed Faculty academics to reflect on their current teaching practices of graduate capabilities, providing a starting point for future curriculum development.

Graduate capabilities

'Graduate capabilities' is the term adopted at La Trobe University for what are variously known as 'Transferable/key/core/generic/lifelong learning skills; personal/graduate attributes; competencies and capabilities' (Sumsion & Goodfellow, 2004, p. 329). Notwithstanding their different nomenclature and nuances, these terms have similar meaning and intent, that is, 'the skills, personal attributes and values which should be acquired by all graduates regardless of their discipline or field of study. In other words, generic skills should represent the central achievements of higher education as a process' (Higher Education Council of Australia, 1992, as cited in Bath et al., 2004, p. 313). While largely agreeing with this definition, the term 'capabilities' was adopted to emphasise the importance of students being able to use these at a level beyond 'competence' and 'in response to new and challenging circumstances' (Stephenson, 1998, p. 2).

Graduate capabilities are those skills that, while best learned in the context of a discipline (Bath et al., 2004; Christensen & Cuffe, 2002; Jones et al., 2007), have application beyond the discipline itself and that allow graduates to succeed in an '*age of supercomplexity*' (Barnett, 2000) even in professions in which specific discipline knowledge may not apply. Whether described in terms of affective characteristics (such as 'curiosity', 'global awareness' etc.) or as cognitive and practical skills (such as 'critical thinking', 'speaking' etc.), graduate capabilities can be seen to represent a 'growing convergence of the goals and values of business, government and education' (James, Lefoe, & Hadi, 2004, p. 174).

Given the importance of graduate capabilities in the learning outcomes of students, it is vital that students should be able to develop these capabilities in a coherent and structured way. Often, however, 'implementation of generic attributes curricula have been patchy, both within and between universities worldwide' (Jones et al., 2007, p. 40). In order that any curriculum change should avoid such 'patchy' implementation, and to identify areas of good practice in the teaching and assessment of graduate capabilities, FLM undertook to develop a systematic process that would identify strengths and weaknesses in the current teaching and assessment of graduate capabilities across all first-year core (compulsory) subjects. These subjects were chosen for mapping because all students in FLM must include some combination of between four and eight of these core subjects in their eight-subject first-year programme.

Approaches to curriculum mapping

Variation in the depth of mapping approaches

The concept of mapping graduate capabilities in curricula, described as 'tracing where support for graduate attribute development occurs within a degree program' (Bath et al., 2004, p. 318), is relatively new to the higher education sector, although it is common in the school sector (see, for example, Jacobs, 1997). Despite this, the range of mapping approaches already show increasing diversity in terms of the complexity of what is mapped. This range can be described in terms of three focal categories outlined by English (1978): declared, taught and learned curriculum.

Britton, Letassy, Medina and Nelson (2008) focused on the 'declared' curriculum, developing methods for collecting and organising curriculum documentation to support auditing and development of programmes. Tariq, Scott, Cochrane, Lee and Ryles (2004) designed a tool which allowed staff to audit graduate capabilities in their own subjects, including levels of proficiency and support for students. However, this tool focused on the declared curriculum of staff, without necessarily providing evidence of whether the curriculum was 'taught' or 'learned'.

On the other hand, Robley, Whittle and Murdoch-Eaton (2005a, 2005b) addressed all of English's categories and added a fourth, 'assessed'. Robley et al. (2005b) used document analysis for mapping 'declared' and 'assessed' curriculum, supervisor feedback forms and individual interviews with staff to map 'taught' curriculum, and student feedback forms and interviews to map 'learned' curriculum. These different maps could be overlaid to determine the extent to which all aspects of the curriculum maps were aligned. Harden (2001) also adopted English's (1978) categories to map entire curricula, including discipline content. Harden (2001) used this approach not only to identify graduate capabilities, but the 'different aspects of the curriculum and the relationships and the nature of the relationships between them' (p. 125).

Others have taken a middle stance, focusing on the curriculum at a 'declared' and 'taught' or 'declared' and 'assessed' level. Such an approach was adopted by Sumsion and Goodfellow (2004), who mapped graduate capabilities in an Education programme focusing on whether such capabilities were declared, taught and/or assessed. The researchers focused on teacher perceptions, but did so in greater depth than had tended to be done previously. They were critical of 'technical and mechanistic' approaches (p. 333), adopting methods that centred on collegial dialogue to capture the complexity of what a graduate capability might mean in different contexts. Their mapping approach sought to identify a range of aspects of graduate capabilities: how they are assessed, the different ways they are taught and where they are assumed to have been taught in other places (either in secondary school study or in prior university subjects). Sumsion and Goodfellow's approach was of particular importance to our own developing methodology, as will be seen below.

Variation in the breadth of curriculum mapping

The literature reports variation in the breadth to which curriculum maps have been applied. Maps are reported that account for curricula at a range of levels, from single subjects (Harden, 2001), to programmes (Britton, et al., 2008; Robley, et al., 2005b; Tariq et al., 2004; Uchiyama & Radin, 2008), to faculty-wide offerings (Bath et al., 2004; Jones et al., 2007). However, with a few notable exceptions (e.g. Bowden, Hart, King, Trigwell, & Watts, 2002; Crebert, 2002) there is little reported concerning systematic

curriculum mapping across an entire university. Also, while a good number of reported cases related to professionally accredited subject areas, such as medicine (Harden, 2001; Robley et al., 2005a, 2005b) and education (Sumsion & Goodfellow, 2004), there appeared to be significantly less work reported concerning mapping of graduate capabilities in the professional disciplines of Law and Business, although there is work relating to the embedding of the capabilities themselves (Christensen & Cuffe, 2002; Gammie, Gammie, & Cargill, 2002; Medlin, Graves, & McGowan, 2003). This is somewhat surprising given that accrediting and professional bodies require a type of external accountability singularly appropriate to a curriculum mapping process.

Whatever their depth or breadth, curriculum maps do not provide a definitive picture of the state of a curriculum, either in terms of discipline content or graduate capabilities. Rather, 'even when done to the highest standards, embedding opportunities for the development of graduate attributes in curricula, and mapping those opportunities in documented representations of curricula, will only produce a static snapshot of a curriculum' (Bath et al., 2004, p. 325). While this is an important limitation, such a 'static snapshot' does provide a starting point for academics and curriculum designers reflecting on current curricula, so they may design subjects and programmes that better enable students to develop the graduate capabilities they require within and beyond their university experience. In turn, these same mapping procedures can be used after changing a curriculum to evaluate the effectiveness of any redesign.

The C-Ren mapping process

The C-Ren mapping exercise aimed to guide future curriculum development. However it was not feasible in this relatively short project (nine months) to develop processes and tools for mapping all those aspects of curriculum identified by English. With this in mind, we focused on English's 'declared', 'taught' and Robley et al.'s 'assessed' factors, omitting the 'learned' category. Sumsion and Goodfellow's (2004) approach provided a useful basis for maps at this level of complexity and so their methodology was initially adopted and then refined for our purposes.

There were a number of challenges at the onset of this project. Firstly, FLM did not have a complete set of agreed graduate capabilities. University-based graduate capabilities provided a loose framework but, after consultation with faculty discipline leaders, two additional faculty-specific graduate capabilities, 'information literacy' and 'ethical awareness' were introduced. Given the different contexts in which they were embedded, it was decided that discipline-specific descriptors were essential for each graduate capability. This was particularly important given that a number of degree programmes have external accreditation requirements, involving diverse understandings of what each of the graduate capabilities means in practice.

Coordinators of core first-year subjects were identified as key informants of the project as it was understood that these academics would lead future curriculum change. Figure 1 shows an overview of the procedure that was adopted to provide FLM threshold data and enable coordinators to develop curricula across the disciplines that would achieve a more embedded and scaffolded approach to the teaching and assessment of graduate capabilities once the curricula redesign process commenced.

Stage one: initial consultations with discipline academics

The first stage of the process identified groupings of disciplines with similar understandings of each graduate capability. Discipline leaders affirmed the groupings and

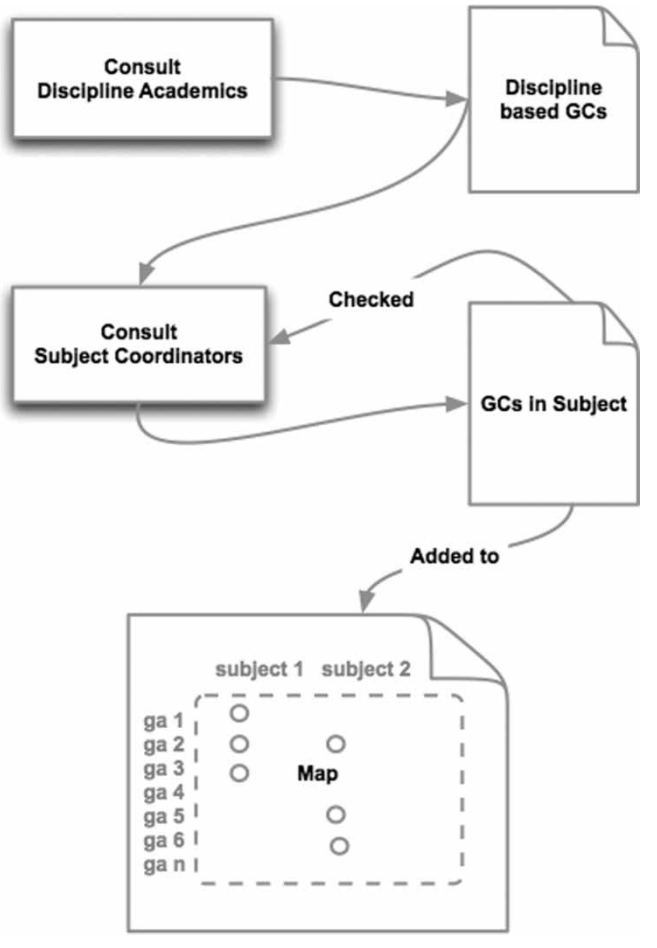

Figure 1. Overview of project methods.

their own sets of graduate capabilities, where these existed, whether provided by external professional and/or accrediting bodies or previously identified by the discipline itself. Six discipline groups were identified across the FLM: Accounting, Economics and Finance, Law, Management, Management Information Systems and Marketing. Between them, these disciplines offer 34 degree programmes and have 37 core first-year subjects.

Stage two: defining graduate capabilities

Specific graduate capability descriptors were developed for each of the six disciplines. This involved defining graduate capabilities in two dimensions: what the graduate capability meant in its discipline context and what level of learning outcome should be expected for a student in their first year of study (given that graduate capabilities should be seen to develop in depth and complexity throughout a degree programme). To address the first dimension, professional body descriptors and assessment criteria from subject learning guides were analysed in conjunction with discipline-based

academics. This allowed us to identify how particular graduate capabilities manifested in each discipline area. Ellington's (1999) generic skills level descriptors were adapted for this purpose. While in many cases the resulting descriptors were similar, it was important to distinguish the way they were used in disciplines, as at times they had different emphases. For example, 'Information literacy' included such diverse descriptors as:

- represent business variables symbolically (Economics and Finance),
- be aware of developments and research in Law (Law),
- display information technology skills across a suite of computer applications (Management Information Systems).

Once descriptors had been drafted for each discipline area, they were sent to key discipline academics for comment, and feedback was incorporated into a final set of descriptors. This resulted in a one-page document outlining the graduate capabilities and their descriptors for each discipline. Each document was then converted into an evidence matrix and reformatted into a SurveyMonkey survey tool. Graduate capabilities and their respective descriptors formed the x-axis of the matrix, while the y-axis consisted of six categories of evidence, based on Sumsion and Goodfellow (2004):

- relevant (is a skill required in this subject),
- assumed (students are assumed to have acquired this skill either before coming to university or in another subject in the current programme of study),
- encouraged (students are encouraged to gain/practise/refine the skill in this subject),
- modelled (generally by staff teaching in the subject),
- explicitly taught (to students in this subject),
- assessed (students are evaluated on this skill in this subject).

Stage three: document-based data collection

A keyword search of subject learning guides for each core first-year subject provided initial evidence of the 'declared curriculum' (English, 1978). These subject learning guides were collected in electronic form and coded according to each graduate capability using NVivo. This proved valuable in later stages for determining 'declared' levels of evidence and supporting discussion with coordinators.

First-year core subject coordinators were then asked to complete the discipline-specific survey for their subject(s). The survey asked whether each graduate capability was relevant to a particular subject and, if so, whether the graduate capability was assumed, encouraged, modelled, explicitly taught and/or assessed. Further, subject coordinators were asked to provide evidence for each checked entry. Surveys were submitted electronically and formed the basis of discussion in the next data collection stage.

Stage four: coffee chats

The core stage of data collection was a series of one-hour coffee meetings with each subject coordinator for the 37 core first-year subjects. These informal collegial discussions centred on developing an accurate description of the graduate capabilities which were assumed, taught and/or assessed in each subject and confirming or amending the evidence for these practices.

Using SurveyMonkey, survey data were projected during each coffee chat and results amended online as directed by the subject coordinator during the discussion. Discussion sessions often acted as guided reflection for coordinators and through this process they would identify areas of the survey they would like to confirm, extend or amend.

The final survey tables included quantitative data concerning whether coordinators believed graduate capabilities were assumed, taught in some way and/or assessed, together with qualitative data recording evidence for these claims and where tangible evidence of embedding and practice could be found. For example, in discussion, a coordinator might make reference to a specific lecture, tutorial or assessment activity in which a graduate capability such as writing was specifically taught or practised, something that may have seemed irrelevant when completing the survey before the coffee chat. After each meeting the edited survey was sent to the subject coordinator for final approval and changes if needed. Once finalised, the surveys were used as the unit of coding analysis in the next stages.

Stage five: data analysis

Quantitative data

Two inter-related dimensions were analysed to create curriculum maps that could be used to support curriculum redesign. The first focused on quantitative aspects of the data and concerned the extent to which (or whether) a graduate capability was being assumed, taught or assessed. The second dimension centred on the qualitative data, the level and types of evidence that supported the quantitative data.

Quantitative survey data were analysed in three categories. The first category focused on evidence that graduate capabilities were being taught in each subject. Given the number of possible activities that might act as evidence, we decided to use the following permutations arranged hierarchically, based on their perceived impact on learning – English's 'taught' curriculum. The resulting activities in ranked order were:

- Explicitly taught + Encouraged + Modelled
- Explicitly taught + Encouraged
- Explicitly taught + Modelled
- Explicitly taught
- Modelled and encouraged
- Encouraged
- Modelled
- Nothing

While all activities were important, in a map designed to support aligned curriculum development, identifying a graduate capability as being explicitly taught was seen as a priority, being encouraged (i.e. allowing students to practice) was also extremely important and being modelled slightly less so. Clearly evidence of all three activities would have the highest ranking and differing combinations would have more or less weight, depending on the emphasis placed on teacher and student action. Quantitative data was represented in terms of the size of a data point on a map, with larger circles used to represent higher order categories (see Figure 2).

The second evidence category recorded whether subject conveners 'assumed' students came into their subjects having developed a particular graduate capability to the required level from previous study, whether through secondary education, further

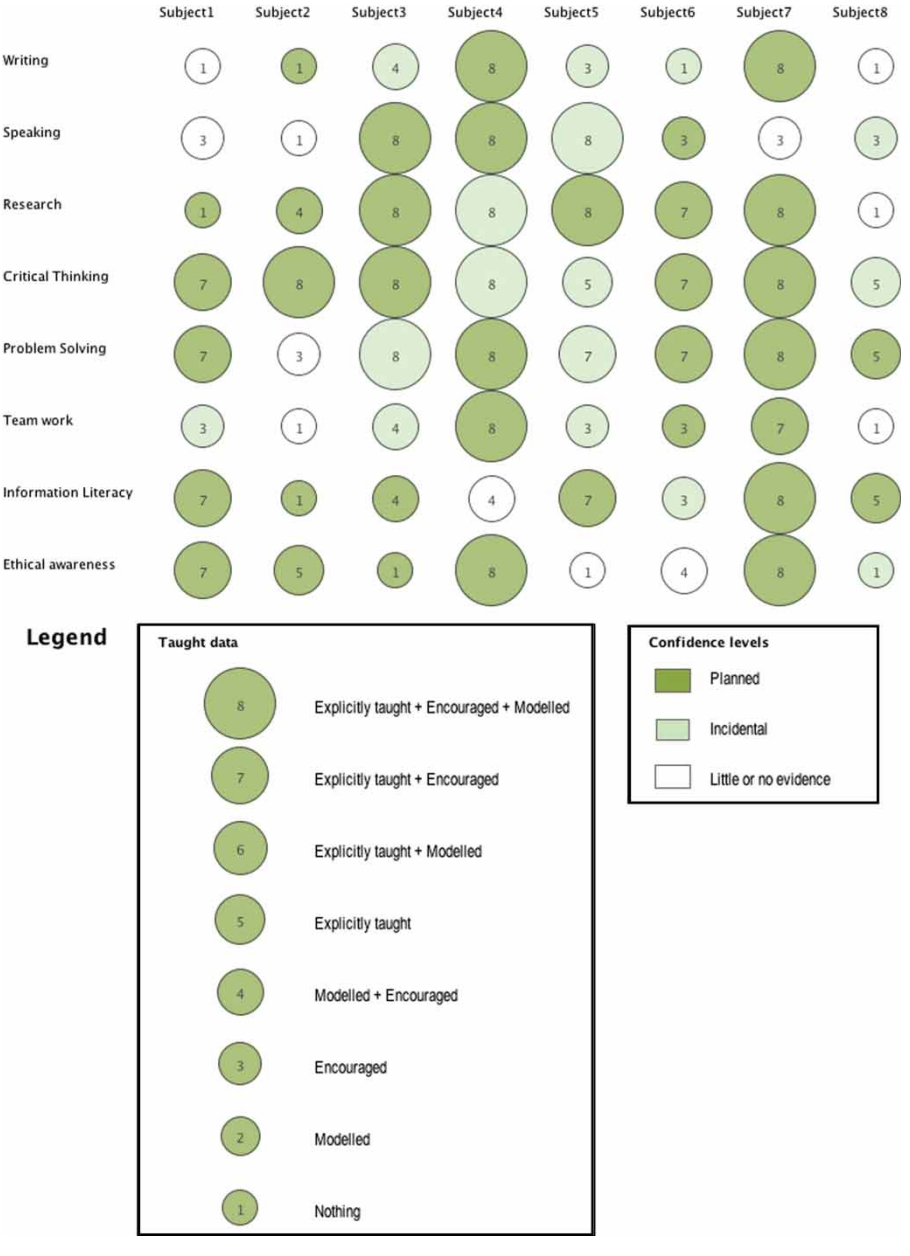

Figure 2. 'Taught' map for the first-year core subjects in a Bachelor of Business programme.

education programme, previous university study or another pathway. The third category concerned whether the identified graduate capability was 'assessed' in the subject's assessment regime. Unlike the 'taught' category, 'assumed' and 'assessed' groups were binary (that is something either was or was not assessed). As a result, these map shapes are either large or small, rather than being graduated as they are in the 'taught' maps. Different shapes were used for each of these types of map, in order that they could be overlaid to check levels of alignment. While circles were used to indicate

'taught' data (see Figure 2), triangles were used for the 'assessed' maps (see Figure 3) and hexagons were used for the 'assumed' maps (See Figure 4).

Qualitative data

An important departure from Sumsion and Goodfellow's (2004) methodology was the evaluation of 'confidence' levels. We were concerned that a 'tick-box' arrangement would not adequately account for the range of qualitative commentary and evidence provided during data collection. There was also concern that such an approach might limit the curriculum maps' use as a development tool in the curriculum redesign phase. Therefore, qualitative data from the surveys were imported into NVivo for coding at three levels of confidence and confidence levels were indicated by colour or shade of a particular shape.

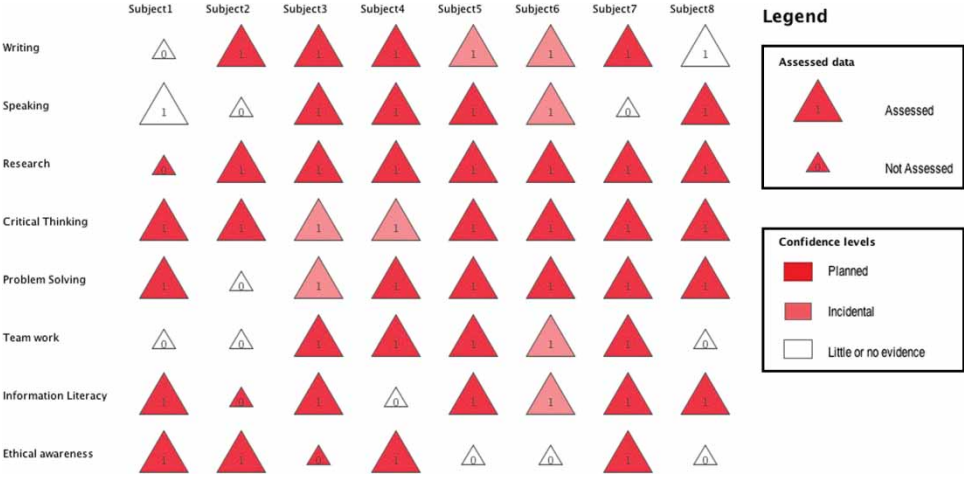

Figure 3. 'Assessed' map for the first-year core subjects in a Bachelor of Business programme.

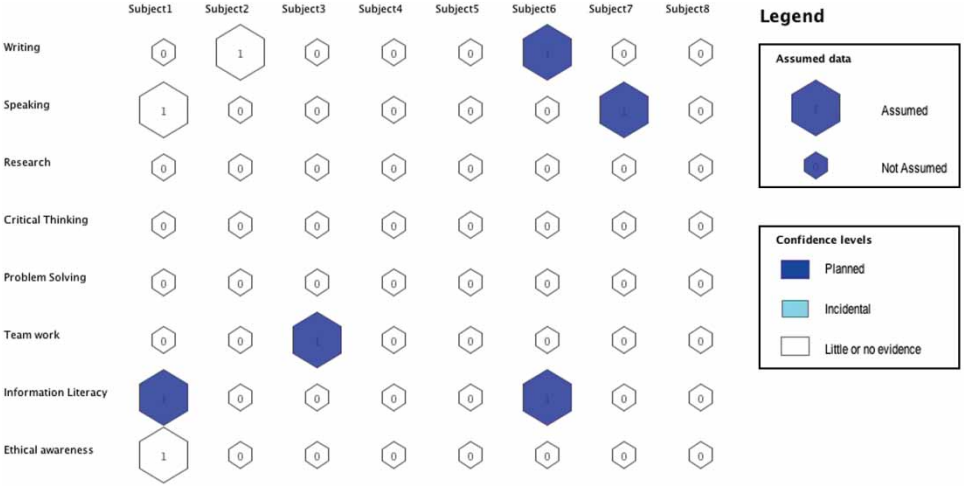

Figure 4. 'Assumed' map for the first-year core subjects in a Bachelor of Business programme.

Confidence relates to the probability that every student would be likely to be taught and/or assessed in a graduate capability. Thus confidence criteria related to evidence that particular graduate capabilities were being taught, assessed or assumed was built into the curriculum maps:

- Planned (clearly planned into the syllabus) = 3
- Incidental (on an 'as-needs' basis) = 2
- Little or no evidence = 1

For example, while a subject coordinator might claim that writing was explicitly taught, modelled and assessed, leading to the largest-sized data circle, qualitative comments might show that 'explicit teaching' of the skill happened only through assessment feedback. Thus, unless a student wrote an assignment that required such feedback, she or he would not in fact have been explicitly taught. Explicit teaching in this case would be 'incidental' and be shaded in a lighter colour than it would be in a map where class time was scheduled so that all students would be taught and practise a particular graduate capability before it was assessed.

The result is a series of curriculum 'heat maps', where differences in size and shading of a particular graduate capability in a 'taught', 'assumed' or 'assessed' map indicate the extent to which it can be claimed to be embedded in the curriculum. Thus we can identify areas of strength and weakness in the embedding of graduate capabilities in the first-year curriculum of different degree programmes and this in turn can inform future curriculum development.

Stage six: heat maps

Heat maps for FLM's 34 degree programmes were created using GradMapper, a software tool designed by Matthew Riddle. GradMapper is designed as a collaborative tool with map data stored online using MySQL. It is a standalone application for Mac OSX and Windows.

In GradMapper, data is entered in tabular form, with each column representing a subject and each row representing a graduate capability. For the 'taught' map (Figure 2), capabilities are ranked 1–8, while confidence levels are represented as 1, 2 or 3. These tables are converted into graphic maps, which indicate the extent to which graduate capabilities are embedded. These maps can be exported as text or graphics in JPEG, GIF and PNG format. GradMapper not only maps a single subject, but all core subjects in a first-year programme. The three different shades of the map combined with the eight circle sizes work effectively to create a heat map of the entire first year of the programme. By looking at the columns it becomes clear which subjects teach graduate capabilities, while the rows enable us to see peaks and valleys in the teaching of each graduate capability in any given programme.

The related heat maps for 'assessed' and 'assumed', while binary, are read in the same way. These three maps can also be overlaid to check for alignment, as will be seen in the analysis below. For example, in the maps shown in Figures 2, 3 and 4 it is interesting to note that while the graduate capability, 'Speaking' is assessed quite often across the programme, only one of the subjects indicates that they explicitly teach speaking. It is perhaps reassuring to note that few of the graduate capabilities appear to be 'assumed' at the first-year level for this degree programme. Dark hexagons represent graduate capabilities that are assumed, but in a planned way. So for example

the coordinator of Subject 7 has actively planned not to teach Speaking skills because she knows that Subject 3 specifically focuses on this graduate capability so the decision to assume students have already developed this graduate capability can be seen as planned.

Discussion

Horizontal analysis – graduate capabilities across the programmes

The heat maps may be analysed in a variety of useful ways. By looking at each row of the 'taught' maps across all of our programmes, we were able to see that in general terms students are exposed to teaching of most of the graduate capabilities, however there are relatively few first year core subjects adequately teaching the skills of speaking and teamwork. Figures 2 to 4 show the teaching, assessed and assumed maps for 9 of the 34 first-year programmes, including the Bachelor of Business. Individual subjects are not labeled to protect the confidentiality of subject coordinators, but to give some context to the maps it is useful to note that the subjects come from multiple discipline areas, including Accounting, Economics and Marketing. Students enrolled in this group of subjects will therefore encounter a range of discipline approaches to graduate capabilities. These maps act as a representative example. The maps show a strong focus on research and critical thinking, with an emphasis on 'explicitly taught' and 'encouraged' (score 7–8) in five or six subjects and strong evidence of planning in the curriculum. Thus first-year students should have plenty of opportunity to develop these skills. This is important because research and critical thinking skills are *assessed* in nearly all subjects (as might be expected). Coordinators do not assume these skills and have designed their subjects to address them.

On the other hand, writing and speaking, graduate capabilities essential for communicating what is learned, and teamwork, a skill deemed essential by many employers, have far less emphasis in the 'taught' maps. Only two subjects show strong evidence of planned teaching and practice of writing skills, although it is a planned part of assessment for four subjects and incidentally addressed in another two. Of the subjects that assess writing without teaching only one (Subject6) does this on the informed assumption that writing is taught elsewhere in the curriculum. 'Speaking' is similar, with only three subjects claiming to explicitly teach and encourage the skill (one of these 'incidentally'), while five subjects assess the skill, four with planned assessment. Finally, only two subjects teach and encourage 'teamwork', although five subjects assess the skill, four in a planned way. Of the subjects which assess the skill, only one (Subject3) chooses not to explicitly teach the skill, based on the subject coordinator's knowledge that it is taught in another subject. Since we know that employers are particularly interested in these skills in graduates, our curriculum redesign process is now working on the incorporation of these skills across each of the programmes.

Vertical analysis – graduate capabilities in individual subjects

Looking at the maps vertically (focusing on individual subjects), Subject4 and Subject7 are seen to have curricula designed to address most of the graduate capabilities. At the other extreme, Subject2 and Subject8 show little evidence of embedding graduate capabilities. Other subjects show evidence of teaching a number of these skills, but given the 'hot' and 'cold' areas of the maps it is apparent that the current curriculum does not provide a balanced disciplinary-based approach to the embedding of graduate capabilities. Therefore students receive a concentration of exposure to graduate capabilities in

one or two subjects and little exposure throughout the other subjects in their first year of study. Further, it appears that the teaching of graduate capabilities is not well intertwined with the disciplinary content of individual subjects – a weakness that the process of redesign will seek to strengthen (Bath, 2004, p. 314).

Challenging assumptions

Another focal area is the constructive alignment of graduate capabilities (Biggs & Tang, 2007). The process of developing and analysing the curriculum maps has challenged some of our prior assumptions. By looking at the 'assessed' maps in combination with the 'taught' maps (Figures 2 and 3), it is apparent that certain subjects currently assess graduate capabilities that they do not teach, even though there is no reason for assuming that they are taught in other subjects. These cases are being discussed on a subject-by-subject basis with and between subject coordinators to plan for improved teaching of capabilities in some areas.

Evidence of good teaching practices

Notwithstanding the above, there were some very good teaching and learning practices discovered throughout the C-Ren project. In some discipline areas there is evidence of some excellent teaching and learning practices and the redesign process must be careful not to damage them in any way. In particular, by looking at the maps for all programmes across FLM it appears that the teaching and assessment of research, critical thinking and problem solving skills were reasonably well embedded into the curriculum, with good evidence that subjects were explicitly teaching and assessing these skills. Information literacy and ethical awareness are not far behind, while writing skills are almost always assessed, but sometimes not taught.

Observations on the process

The C-Ren project had two important goals. The first was to develop an approach that would allow us to systematically map the embedding of graduate capabilities in curricula in a way that was robust and applicable to different subject, level and faculty contexts. The second goal related to the outcomes of the FLM curriculum maps. In order to prepare for systematic curriculum redesign for all first-year and then later-year core curricula, it was important to identify evidence of embedded practices relating to graduate capabilities across FLM's programmes.

One important limitation of our approach was the lack of student involvement. As explained above, time constraints limited our ability to collect and analyse data from all interested groups. As a result our curriculum maps may be seen to fall into the trap cautioned against by Bath et al. (2004), in that as snapshots of curriculum they are 'very much a representation of the teachers' perspective and expectations, and may not be aligned with what students both experience and perceive in terms of their development of graduate attributes' (p. 325). However, we believe this limitation might be addressed in future mapping exercises by having students work individually or in focus groups to complete identical SurveyMonkey forms to those of the subject coordinators. Maps produced from student data might then be compared with those produced from subject coordinator data and so address English's declared/taught/learned categorisation. While it is true that students' self-reports of their learning need to be treated

with some caution (Bain, 2004, pp. 13–14), such data would be useful in deciding where further curriculum review is required or where communication concerning learning objectives between teachers and students needs to be clearer (Barrie et al., 2009). It should also be noted that the process was very time-consuming.

Despite this, the C-Ren project produced many important benefits for FLM, both in its process and outcomes. The use of an online, editable tool for collecting data proved extremely useful, as it allowed staff to reflect individually on their subjects and to edit those reflections during discussion, rather than having to complete separate surveys. The collection of qualitative and quantitative data was also important for FLM: quantitative data allowed us to address the 'declared' curriculum, while qualitative data allowed us to create evidence-based maps and to see how the 'taught' curriculum was envisaged and 'lived' by the academics who designed their subjects.

One extremely positive aspect of the process was that which has been indicated by others such as Sumsion and Goodfellow (2004) and Uchiyama and Radin (2008). Coffee chats formed a key stage of the mapping process, for a number of reasons. In addition to the rich data source they provided for the C-Ren project, discussions gave subject coordinators a space to reflect on their teaching and during discussions many academics identified good practices they had not recognised previously and at the same time identified areas for change, without prompting. The process of consultation also prompted conversations between coordinators and returned ownership of the project to those who will be most affected by its outcomes. It gave the project team insights into staff perspectives concerning their processes and affective responses to the subjects they teach. We learned a lot about how FLM teaching staff feel about their teaching and their students and we had many comments of a positive nature about the coffee meetings being an opportunity to reflect. This was, overall, an extremely positive experience for the project team and has generated confidence that developing the curriculum will prove a positive collegial experience.

Subject maps that can be combined in different ways to reflect core first-year combinations for different degree programmes have been a fruitful outcome. Rather than seeing subjects in isolation, we are able to see the curriculum as a student might experience it and identify areas of strength in our first-year programmes as well as areas where further development is required. We can also identify areas where particular graduate capabilities are overloaded so that students are taught the same skills in the same way repeatedly (for example where preliminary library skills were taught to the same students in four subjects). These maps offer a strong base from which to begin discussions with first-year staff about designing curricula which will address student needs and create an engaging context in which students can learn.

Conclusion: next steps

The first-year curriculum maps produced through the C-Ren project have provided an important starting point for a larger process, but it is only a starting point. *Design for Learning* has set an agenda of complete curriculum change over three years, beginning with a new first-year curriculum for 2011. In April 2010 all core first-year subject coordinators came together to discuss the renewal process and to consider the outcomes of the mapping process. Following from this, we conducted 'carousel' meetings, bringing together subject coordinators to talk with one another about the teaching and assessment of graduate capabilities across their programmes. In these meetings first-year coordinators produced a series of new 'aspirational' programme heat maps designed

to communicate their envisaged curriculum and to guide curriculum redesign. To achieve the redesign, subject coordinators will work together in small teams, reviewing their intended learning outcomes, assessment, teaching and learning activities, and 'constructive alignment' (Biggs & Tang, 2007), supported by seminars and individual consultations.

Once the new first-year curriculum has been implemented it will be mapped in the same way, to allow a direct comparison – a before-and-after 'snapshot' of the ways in which graduate capabilities are embedded in curriculum. At the same time mapping of second- and third-year graduate capabilities is also under way. Descriptors recognising differences in developmental standards of these capabilities have been completed. But differences in the mapping of the more advanced levels will not be limited to the descriptors. It is planned to include a set of student maps, which will allow us to address English's 'learned' curriculum. This will allow a more complete picture and, we hope, allow more stakeholder voices into the process, as Barrie et al. (2009) recommend.

With the right tools and the right support, curriculum mapping has proved to be an effective tool for beginning a change process, even on this large faculty-wide scale. The process has allowed staff not only to see where they, their colleagues and their students are positioned, but to begin to formulate aspirations for where they would like to be. These maps have the potential to be not so much the end of a conversation, but rather the beginning of a dialogue, one with the power to effect powerful change at an individual, subject, faculty and institutional level.

Future work will address the curriculum redesign process that follows directly on from the curriculum mapping approach described in this paper, including a series of activities focused on alignment, learning outcomes, assessment, learning activities and tutor needs in each of the core first year subjects, as well as a coordinated programme view of renewal.

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