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Hunters & gatherers: Strategies for curriculum mapping and data collection for assurance of learning

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Abstract

Assurance of learning is a predominant feature in both quality enhancement and assurance in higher education. Assurance of learning is a process that articulates explicit program outcomes and standards, and systematically gathers evidence to determine the extent to which performance matches expectations. Benefits accrue to the institution through the systematic assessment of whole of program goals. Data may be used for continuous improvement, program development, and to inform external accreditation and evaluation bodies. Recent developments, including the introduction of the Tertiary Education and Quality Standards Agency (TEQSA) will require universities to review the methods they use to assure learning outcomes.

This project investigates two critical elements of assurance of learning: 1. the mapping of graduate attributes throughout a program; and 2. the collection of assurance data. An audit was conducted with twenty five Business Schools in Australian universities to identify current methods of mapping graduate attributes across degree programs and their impact on the curriculum, followed by a review of the systems used to collect and store data.

Our findings indicate that external drivers like professional body accreditation (for example: Chartered Professional Accountants (CPA); Association to Advance Collegiate Schools of Business (AACSB)) and TEQSA are important motivators for assuring learning, and those who were undertaking AACSB accreditation had more robust assurance of learning systems in place. It was reassuring to see that the majority of institutions (96%) had adopted an embedding approach to assuring learning rather than opting for independent standardised testing.

The main challenges that were evident were the development of sustainable processes not considered a burden to academic staff, and obtainment of academic buy in to the benefits of assuring learning rather than assurance being seen as a tick box exercise. This cultural change is the real challenge in assurance of learning practice.

Keywords – Assurance of Learning, Curriculum Mapping, Staff Engagement

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Background

The quality of business education standards in higher education is a matter of international debate and action. In the United States, Martell and Calderon (2009) cite growing public dissatisfaction with the quality of college graduates; while Hall and Kro (2006) believe that the growing number of working managers returning to the classroom is encouraging a push for quality education. In the UK a recent Government White Paper, "Students at the Heart of the System" (2011) sets out the quality challenges of a changing higher education environment, recognising the need to strengthen the processes and to adapt and reinforce systems such as external examining. In Australia, the recently established Tertiary Education Quality and Standards Agency (TEQSA) identified the quality push as in the national interest to ensure the taxpayer achieves value for money invested in higher education. TEQSA recognises industry and higher education institutions as beneficiaries of the quality initiatives, with students benefitting from improved information on what institutions offer, helping them to make informed decisions about what and where they will study (TEQSA, 2011). In an atmosphere of change, tertiary institutions throughout Australia are currently addressing questions of quality assurance in learning and teaching. "Quality assurance" or assurance of learning is defined as the process by which educational institutions measure learning outcomes against a set of specific goals and objectives (Hall & Kro, 2006).

In the field of business education many higher education institutions are assessed by international accrediting bodies for membership to 'elite' associations that advance quality management education worldwide. Increasingly, these accreditation bodies require the monitoring of design, delivery and outcomes of teaching and learning rather than merely the systems and personnel involved. It involves making program expectations and standards explicit, then systematically gathering, and interpreting evidence to determine how well student performance matches those expectations (eg AACSB). Universities use the assurance of learning process to provide both qualitative and quantitative indicators of performance of teaching and learning that they then use in the assessment of the overall quality of programs and courses (Chalmers, 2008). These indicators of performance are used to guide the strategic directions, priorities, quality assurance and enhancement processes for teaching and learning.

In line with TESQA, the Australian Learning and Teaching Council (ALTC) commissioned a Learning and Teaching Academic Standards Project (LTASP) to establish and coordinate discipline specific definitions of academic standards, and to focus on the processes for the assessment of performance against defined standards, ensuring efficient, transparent, and sustainable outcomes including external peer review. The project recognised that the processes for assuring academic standards must not give rise to *perverse consequences* (e.g. standardisation of curricula). Two broad safeguards were recommended against standardisation and loss of autonomy:

1. Threshold or minimum outcomes are core "must haves" as opposed to the totality of learning outcomes. Institutions may, and are encouraged to, differentiate themselves by defining additional learning outcomes according to their own mission.
2. The ways in which these outcomes are taught, learned and assessed are not defined. Curriculum is defined by the institution rather than by the national framework. In this way, academic autonomy may be retained.

The Organisation for Economic Co-operation and Development's (OECD) has acknowledged the lack of reliable data on the substantive outcomes of higher learning, internationally. The few studies that do exist are recognised as nationally focused with available rankings of institutions reflecting neither the quality of teaching and learning nor the diversity of institutions (OECD 2011). This council of 34 member countries' new initiative currently being undertaken (between 2010 and 2012) is assessing the feasibility of an Assessment of Higher Education Learning Outcomes (AHELO) including the development and testing of a tool to measure student knowledge. The tool will determine whether students at the end of their tertiary education are equipped with the skills needed for the emerging job market. The proposed tool will provide data on the relevance and quality of teaching and learning in higher education. The focus will be at the level of the institution rather than a national level and participating institutions will be provided with anonymous data to allow them to benchmark their

performance against that of their peer institutions. The tool, envisioned as an exit examination, aims to be internationally valid across diverse cultures, languages and different types of tertiary institutions.

The adoption of a generic test however has the potential to lead to a form of standardisation which is concerning for many in the Australian Higher Education sector. The *B Factor Project* **(**De la Harpe et al., 2009) which considered the implementation of assurance of learning reported that academic staff believed that the most effective method for developing graduate attributes was by integrating them into the curriculum and delivering these attributes through a combination of the discipline teacher and, if possible, a specialist with skill in the relevant attribute. They did however acknowledge that not all academics were confident or willing to teach and assess graduate attributes. In order to adopt this more embedded approach to assuring learning then universities need to acknowledge the experience, expertise and willingness of those academics entrusted with the primary work of teaching and assessing graduate attributes. Attempts to drive the development of graduate attributes as part of a quality agenda focused on compliance and external accountability may alienate academic staff and thus compromise the potential student learning that should be the basis for process change. There is therefore a need to highlight the criticality of focussing on engaging academics' hearts and minds rather than a compliance attitude, to ensure that embedding graduate attributes becomes a self sustaining aspect of the curriculum rather than an add on.

Aims of the Paper

This paper derives from a pilot study of an ALTC Strategic Project. It focuses on two key areas in assurance of learning, namely mapping the learning objectives and collecting the learning outcome data and it addresses the questions:

- What is the current practice of mapping graduate attributes in the curriculum in the Australian higher education sector? and,
- What is the current practice of collecting graduate attribute data in the Australian higher education sector?

The study sought to identify the main challenges faced by the sector in mapping and collecting graduate attribute data; and good practice principles in mapping learning and collecting outcome data that may inform the sector. The outcomes will be of value to those who seek to better understand and implement assurance of learning.

Assurance of Learning

Assessment of learning or assurance of learning (AoL) is becoming one of the most frequently discussed topics in tertiary education today (Martell & Caldron, 2009). Traditionally, indirect measures such as student feedback from specific subjects[1] and course experience questionnaires and reports from courses identified as underperforming for reasons related to enrolment and retention have provided the measures of quality in tertiary education in Australia. Direct measures involve the capturing, monitoring and evaluating of data specific to student achievement related to specific program[2] goals. Developing programs for capturing and monitoring direct measures are providing the new direction for quality in tertiary education. Assurance of learning requires the development of degree program learning goals and measures of learning accomplishment. The program goals need to be defined and operationable and the measures selected need to fit with the goals determined for the program and the pedagogues used as well as the circumstances of the institution (Zhu & McFarland, 2005).

Process based approaches to AoL may be achieved through a series of steps, each one relying on the previous. AACSB suggest the key stages in assuring learning involve:

1. Establishing graduate attributes and measurable learning objectives for the program
2. Mapping learning objectives to suitable units of study in the program (where possible allowing for introduction, further development and then assurance of the objectives)
3. Aligning relevant assessment tasks to assure learning objectives

[1] The term “subject” is used to describe a single unit of study.
[2] The term “program” refers to a whole degree course.

4. Communicating learning objectives to students
5. Collecting data to show student performance for each learning objective
6. Reporting student performance in the learning objectives
7. Reviewing reports to identify areas for program development - Closing the Loop

(AACSB White Paper, 2007)

The research study presented in this paper concentrates on two elements of the assurance of learning process with an emphasis on informing strategy in a way that supports efficient and manageable assurance mechanisms for academic staff. The first is **mapping the learning objectives** which relates to identifying and locating graduate attributes across suitable subjects in the program, and the second is **collecting data** which involves entering student performance outcomes in relation to each learning objective hence our reference to Hunters and Gatherers.

Mapping

Mapping of graduate attributes throughout a program is an initial step in the curriculum design. The process allows program developers to examine how competencies are introduced, further developed and assured throughout the degree program. It provides a method to ensure all the attributes are covered equally over the course of the program, identifying possible overload and gaps. It is important that this stage is conducted rigorously to ensure that graduate attributes are embedded into relevant subjects and that assessment tasks are suitable for collecting assurance of learning data.

It is common for curriculum mapping to be achieved using a matrix approach which involves process managers and academics responsible for subjects to identify where graduate attributes fit into the program (Oliver, 2010). This can be done to map to suitable places to assure graduate attributes or can be conducted throughout the program to identify where attributes are introduced, developed and assured (Oliver, Jones & Ferns, 2008; Oliver & Tucker, 2004; Sumsion & Goodfellow, 2004). This latter scaffolded approach to curriculum mapping leads to the whole program design being proactive rather than a series of disjointed subjects that do not meet the needs of industry or the students themselves (Uchiyama & Radin, 2009). This enabled meta-view is more effective than focusing on what occurs in individual units, subjects or modules (Yorke & Knight, 2006).

There are three considerations that have been identified in the literature for effective curriculum mapping practice (Britton, Letassy, Medina & Er, 2008; Harden & Hart, 2002; Uchiyama & Radin, 2009). Firstly what Oliver (2010) describes as the *tool*. This is an instrument that allows you to view the program as a whole. Next is the *process*, which outlines how the tool is used by academics to map effectively. Lastly there is the *purpose* which provides the rationale for the mapping. Curriculum mapping can be flawed however, as Martell (2007a; 2007b) discusses the mapping uses the 'intended' curriculum, that is what the academic has included in their subject plan but rarely examines what actually occurs in practice, the 'enacted'. The implication is that mapping is undertaken with the intended curriculum but the available data is from the enacted curriculum and these may not align.

Previous research, (Barrie, Hughes & Smith, 2009; Taylor et al, 2009) found that although the teaching and assessment of graduate attributes are often mentioned in curriculum documentation, the effective integration of these into developmental approaches in the classroom has proven to be somewhat elusive. Findings show that graduate attributes need to be specifically related to student learning to be **valued** and recognised by both academics and students. This can be achieved by aligning the attributes with the curriculum when discussing assessment requirements in the unit of study or by incorporating the business employer perspectives in relation to the graduate attributes.

The curriculum mapping process is an important initial part of assurance of learning but in order to optimise on this approach a systematic method to collect data to explore the achievement levels of students in each of the selected attributes is essential in order to inform further development of educational programs.

Data Collection

The challenges of collecting and providing evidence of student achievement highlighting the need for efficiency and streamlining in the assurance of learning process have been recognised (Freeman, 2010). Radloff et al. (2009) identified that clarity and support regarding assessment of graduate attributes were important enablers in terms of both the 'what' and the 'how' and greater management support in taking a whole of program approach was required. Carew et al. (2009) however found that rigorous evaluation of impact on student learning of graduate attributes is rare.

The use of assessment rubrics (formative as well as summative) has been identified as key in collecting data on students' capability (Yorke, 1998). Rubrics articulate explicit levels of criteria aligned with assessment outcomes and are intended to make expectations transparent and motivate students to extend their learning (Mansilla, Duraisingh, Wolfe & Haynes, 2009). The approach taken is important, but so is the process, as sound university education cannot be easily reduced to a 'tick list' of skills or competencies, many of which are often ill-defined, overlapping, and difficult to measure (Hager, 2006). The issue of *standardisation* is also a complex one that arises from the use of rubrics. There is a requirement to tease out a distinction between standardisation defined as homogenisation, or as the pursuit of common goals. In the context of assurance of learning, the use of assessment rubrics has extended beyond the determination of student grades to benchmarking and comparison against standards and between universities and rubrics are being used as a tool for the assurance of content, process and outcomes across courses, particularly within accredited disciplines (Tractenberg, Umans & McCarter, 2010).

O'Donnovan, Price and Rust (2001) identified a number of problems using rubrics in assessment. These included: multiple interpretations of criteria meaning that different assessors may mark to their own interpretation; explicit articulation of knowledge and skills and attributes; and the regular application of the same criteria and levels to different academic levels. We argue that a social constructivist approach of communicating the meaning of the criteria and the expected standards is crucial for effective assurance of learning data collection with academics could assist in alleviating these issues.

Methodology

Data was collected via semi-structured telephone interviews. The interviews were conducted by an experienced interviewer and lasted approximately forty five minutes. Each interview was recorded digitally and transcribed for analysis.

The sample comprised Associate Deans Teaching and Learning (ADTL) (or equivalent) from Business Schools in all Australian Universities. The participants were recruited through the *Australian Business Dean's Council Teaching & Learning Network.* All participation was voluntary and responses were treated as anonymous. The sampling frame was all 41 Australian Business Schools ADT&Ls of which 25 volunteered to be interviewed for this study. Therefore, the response rate was 61%.

Findings

Respondent Profile

Type of University

GO8	Technical	Regional	Other	Total
6	4	6	9	25

Location of University

ACT	NSW	Victoria	QLD	SA	WA	Tasmania	Total
2	5	6	7	1	3	1	25

Primary motivators for assuring learning

External accreditation agencies were seen as the primary motivators for AoL in the majority of surveyed universities (92%) with AACSB providing the strongest motivation (64%), followed by

professional bodies, for example CPA (20%) and thirdly TEQSA (12%). The drive for consistent quality was the primary motivator reported by those ADTLs that were not accreditation focused (8%).

Approaches to Curriculum Mapping

All the respondent institutions had a mapping process in place to identify where graduate attributes were being assured in a degree program. The responsibility for mapping the graduate attributes into the curriculum varied; teaching staff took responsibility for identifying which subjects were most suitable to assure graduate attributes (64%) with faculty management taking the role in 36% of cases (for example ADTLs, Program Directors). The level of mapping was also found to vary, with 40% considering mapping to subject only as sufficient and the remaining 60% mapping to specific assessment tasks within a subject. Of those respondents who mapped to assessments tasks, all but one were pursuing or already in possession of AACSB accreditation.

In order to achieve mapping a variety of tools were being used. These fell into two categories: excel based spreadsheet instruments; and online course management systems.

The Use of Rubrics in Assuring Learning

Twenty of the 25 business faculties (80%) used rubrics in their AoL process. The remaining five respondents stated that it was their intention to develop rubrics in the future. When asked about standardisation, that is, were the same rubrics used across programs to ensure consistency of criteria and standards, 11 of the 20 institutions did use standardised rubrics. Of the five business faculties who had not yet developed rubrics, three stated it was their intention to standardise these across programs. The development of the rubrics varied across institutions with the majority (48%) developed by the teaching staff; 16% by educational experts, and 16% developed by faculty management. One institution offers a monetary incentive for teams of academics to write rubrics for their program.

Data Collection

Although mapping and the use of rubrics was common practice across the sample, 60% of respondent institutions had not yet collected AoL data. Of the ten institutions that were collecting data different approaches were taken. Capstones were commonly used to collect AoL data, with 20% of respondents adopting this approach, others collected data across the whole program to obtain measures of students' achievement throughout their degree. One institution had chosen to use a standardised testing method where students sit an exam that is independent of their individual subjects. There were different practices used in marking with some assessment pieces being marked by the academics responsible for teaching the subject (24% of the total population), and others using independent markers to assess the graduate attribute elements of the assessment task (16% of the total population). It was also evident that the type of data being collected varied with some institutions collecting overall marks for the specific mapped assignment (12%) and others (28%) were using the marks for the criteria that related to the graduate attribute only.

Again tools were being used to streamline this marking process, the most popular being online marking systems which collated the assurance data and a tool for capturing groupwork ability.

Main Challenges

The main challenges identified by the interview participants (labelled A-Y) through this audit process were:

- Staff Workload

The majority of the ADTLs interviewed cited that academic staff considered AoL to be extra work making it difficult to get greater support for the process other than basic compliance.

> "staff looked upon AoL as extra burden" (D)
>
> "time consuming, academic staff see it as imposition on their time" (B)

- Staff Engagement

Many of the ADTLs reported difficulties in getting staff buy in and engagement. They commented on academics viewing the process as a box ticking exercise for external bodies rather than sound educational practice.

> "challenge to get beyond that this is more than ticking box, it's about improving student learning outcomes" (B)
> "it took me six years to get staff buy-in" (F)
> "we have achieved staff acceptance, not buy-in" (Q)
> "the ones that are really hung up on the content are the ones that the most difficulty accepting a different way of thinking about their course and their assessment" (O)

- Scale

The size of the challenge to curriculum map and data collect over a number of programs in a faculty was seen to be daunting by a number of the respondents, especially those universities with large student populations, for example, universities with intakes of over 1000 students in undergraduate programs.

> "the enormity of it" (Q)
> "challenge to lock in assessment tasks – a negotiation process – for example, we had to reduce class sizes so that every student could do a presentation and we had to make an exam question compulsory instead of choice" (G)

- Technical

All the universities wanted to have a streamlined, efficient system to assure learning but achieving this provided some technical problems.

> "struggling to find appropriate software for AOL" (T)
> "how to capture data that interfaces with what we do now" (O)

Discussion

The clear driving force for developing an AoL process is of the requirements of external accreditation bodies. While a positive influence as it has prompted AoL processes to be adopted in a large number of Australian Business Schools, it also has provoked negative reactions. The process is seen by many academics as a box ticking process to meet external requirements rather than as a basic education principle of assuring students have an effective learning experience. Many academics do not see the value of reviewing graduate attribute achievements to enhance the quality of the programs offered in universities.

There is an obvious challenge in trying to get academic staff to buy in to the benefits of the AoL process rather than seeing it as an extra burden. A change management process is required to promote the necessary cultural change. The data from this study identified two main approaches to implementing the AoL process: a "top down" approach, with conduction the mapping at the faculty management level, employing experts to develop rubrics, using independent markers to generate the data and in one case running independent standardised testing outside of the subjects; and secondly, a "bottom up" approach to the process, asking subject coordinators to identify which graduate attributes map to their subjects, encouraging academics to develop assessment rubrics, getting lecturers to mark assessment for subject specific and generic attributes.

The top down approach allows for the meta view that Yorke and Knight (2006) discuss in that the whole program is considered rather than individual subjects but does not allow for subject coordinators to engage with the graduate attributes and integrate them within the subjects (Barrie, Hughes & Smith, 2009). The bottom up approach allows for teaching staff to start to take ownership of the process by developing their own rubrics but this can result in a lack of consistency where benchmarking across subjects and programs is problematic. Notably, when AoL is not aligned to assessment, students and academics struggle to see the value of the attribute, and therefore do not engage with it from a teaching, learning or quality development perspective, this is particularly evident in the adoption of independent testing which does not embed graduate attributes into the curriculum (Taylor et al, 2009).

In considering the three major elements of curriculum mapping (Britton, Letassy, Medina & Er, 2008; Harden & Hart, 2002; Uchiyama & Radin, 2009) in light of these audit findings we find that the majority of institutions have a formal *tool* to review the assurance of graduate attributes throughout a program, and these are generally in the form of an excel spreadsheet or course management system. These do vary in sophistication with some allowing very basic data management within a subject to others that collate data across programs, to some that then feed into other university documentation and systems. The second element, the *process* relates to how the tools are being implemented. It was found that the tools were often a useful mechanism in making the curriculum mapping process more explicit to both staff and students and that some were used in an interactive manner to engage academics in the curriculum mapping process to encourage value and ownership. Critically, the *purpose* for which curriculum mapping is adopted is important and as discussed earlier the perceived motivation for AoL can impact on staff engagement with the process.

In reviewing the data collection methods used it is evident that this is one area that is less developed in many Business Schools. The fact that a number of universities do not map to actual assessment tasks and/or collect overall marks for assignments rather than the specific marks associated with the graduate attribute means that the data collection can be very general and not provide an accurate picture of student performance (Martell, 2007b). The alignment of the mapping to the actual data must also be considered, as Porter (2004) discusses, there can often be a gap between what is intended in a curriculum and what is actually enacted and an even bigger gap to what the student actually experiences.

It is therefore recommended that data collections should be undertaken with appropriate checking mechanisms for full alignment, using sampling of tasks and student work to ensure the mapping is valid. The timing of data collection is also of import with half of those institutions engaged in data collection using capstone subjects to assure learning. Capstones are designed to consolidate learning over a whole program and so appear to be an excellent vehicle to assure graduate attributes, however, if academics and students do not get an opportunity to measure achievement and receive developmental feedback prior to these final subjects then there is a danger that learning does not develop as envisaged.

All these factors show the complexities of curriculum mapping and data collection for AoL and stress the importance of academic staff engagement in these processes. Universities should be focusing on facilitating the cultural change required to create developmental quality enhancement environments rather than the current perception of compliance through quality assurance.

Future Developments

This initial pilot in the business discipline will be followed up by a series of focus groups to further explore these approaches with institutions self or comparatively identified as demonstrating *best practice*. On completion of the interviews and focus groups, the audit tool will be refined. The revised audit tool will then be used with other discipline groups beyond business faculties, again with follow up focus groups with representative stakeholders from academe, and professional and industry associations, as well as students and academic leaders.

The results of these audits and focus groups will be considered and compared against LTASP recommendations and with professional body accreditation requirements. Data will also be analysed against international agencies that are responsible for assuring learning. The significant outcomes of this project will be the development of an online resource kit to support educators with effective practice in mapping learning outcomes and collecting assurance of learning data.

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