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Business Process Management (BPM) Education in Australia: A Critical Review Based on Content Analysis

Houra Delavari
Queensland University of Technology, {h.delavari@qut.edu.au

Wasana Bandara
Queensland University of Technology, w.bandara@qut.edu.au

Olivera Marjanovic
University of Sydney, olivera.marjanovic@sydney.edu.au

Paul Mathiesen
Queensland University of Technology, p.mathiesen@connect.qut.edu.au

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Business Process Management (BPM) education in Australia: a critical review based on content analysis

Houra Delavari[1], Wasana Bandara[1], Olivera Marjanovic[2], Paul Mathiesen[1]

[1]Faculty of Science and Technology
Queensland University of Technology (QUT), Brisbane, Australia
Email: {h.delavari@qut.edu.au/w.bandara@qut.edu.au/p.mathiesen@connect.qut.edu.au}

[2]Discipline of Business Information Systems, University of Sydney, Sydney, Australia
Email: olivera.marjanovic@sydney.edu.au

Abstract

Business Process Management (BPM) is a top priority in organisations and is rapidly proliferating as an emerging discipline in practice. However, the current studies show lack of appropriate BPM skilled professionals in the field and a dearth of opportunities to develop BPM expertise. This paper analyses the gap between available BPM-related education in Australia and required BPM capabilities. BPM courses offered by Australian universities and training institutions have been critically analysed and mapped against leading BPM capability frameworks to determine how well current BPM education and training offerings in Australia actually address the core capabilities required for BPM professionals. The outcomes reported here can be used by Australian universities and training institutions to better align and position their training materials to the BPM required capabilities. It could also be beneficial to individuals looking for a systematic and in-depth understanding of BPM capabilities and trainings.

Keywords

Business Process Management, BPM education, content analysis, BPM capabilities, NVivo analysis

INTRODUCTION

Business Process Management (BPM) is rapidly proliferating as an emerging discipline in practice and in academia. Despite BPM being ranked as a top priority by organizations, recent Gartner studies (McDonald 2010) have identified Business process improvement as the number one business and technology priority of CIOs in 2010. The current status of BPM research and reports from practice suggests major gaps in the field. For example, lack of a consensus of what BPM really entails, lack of appropriate expertise in the field, lack of resources to develop BPM expertise and difficulty in communicating across multiple stakeholders in the field (Bandara et al. 2007).

According to the latest world-wide survey by BPTrends (Harmon and Wolf 2010), companies engaging in BPM activities are growing. Companies with strong financial capacity undertake BPM initiatives to expand their business, enter new markets, and gain competitive advantage through innovation. Even during financial downturns organisations continued to look to BPM to save costs and to refine processes that were developed in better times. All these BPM-related initiatives have resulted in an unmet demand for skilled personnel and BPM education. However, lack of *appropriate* BPM education is still a perennial issue (Bandara et al. 2007).

Because of the importance of BPM in today's business and the increasing scholarly interest in BPM as a relevant topic area for research (Mendling, Reijers and Recker 2010), many Australian universities and industry training institutions have started to teach BPM. They are all facing numerous challenges. For example, they still struggle with defining and interpreting the content and boundaries of this emerging field (Bandara et al. 2007). Other challenges include staying up to date with the dynamic nature of the discipline, developing appropriate teaching resources, and identifying the best teaching practices for preparing graduates for a successful BPM career. These challenges have resulted in slow adoption and diffusion of BPM education in academia, in spite of growing industry demand.

This study aims to find clear justification to the following questions when considering the Australian BPM education context:
- What frameworks can help us to understand the core BPM capabilities?
- What BPM courses are being taught in Australia?

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- How well do the current offerings relate to the core capabilities of BPM professionals?

In order to answer these questions, the paper is structured as follows. First the overall research methodology is presented. It presents the theoretical underpinnings used in this study, explains how BPM courses materials offered in universities and industries within Australia were collected, and provides an overview on the data analysis conducted. Next, the findings are presented, illustrating how BPM education/ training offerings are mapped against key BPM capabilities (based on key frameworks extracted from literature), and discusses where gaps exist. This paper concludes with key findings from the study, perceived limitations and points to opportunities for further research.

RESEARCH METHOD

Figure 1 provides an overview of the research approach. Each step is described in further detail below.
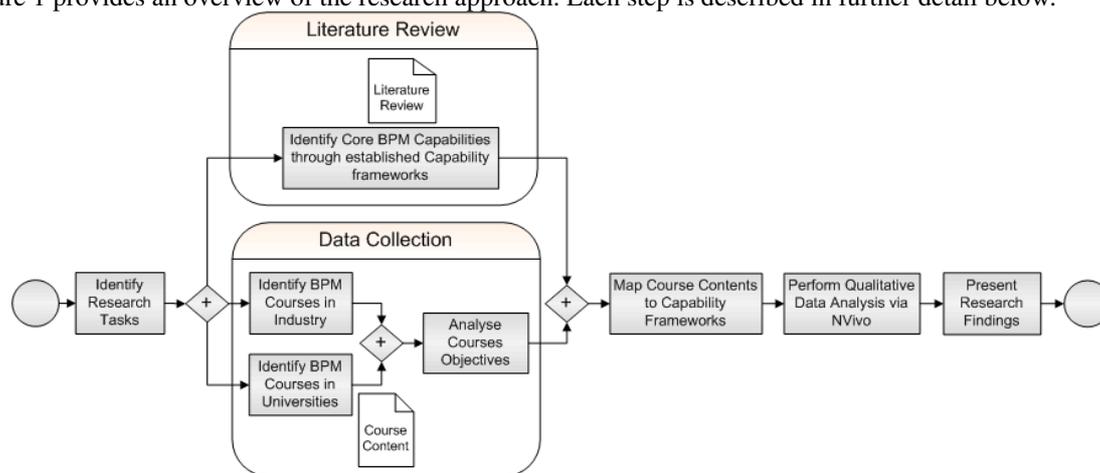

Figure 1: Overview of Research Approach

First, a literature review was conducted; to choose the best BPM frameworks which could help us better understand the core BPM capabilities. This exercise resulted with two well known Business Process Management frameworks; The Rosemann and De Bruin BPM Maturity model (Rosemann, deBruin and Power 2006) and the Harmon business process pyramid(Harmon 2007).

This study is specifically devoted to analysing the current status of BPM education/ training offered in Australia. This was performed as a content analysis approach targeting two main sources which formed the input for the BPM training/ education; courses offered by *universities* and *industry training providers* within Australia. These were extracted mainly from the web. The goal was to clearly capture the contents and learning objectives of BPM courses currently offered.

BPM course materials which were collected from this search and BPM framework capabilities which were identified from the extracted frameworks were entered into NVivo (a qualitative data analysis tool) for data synthesis, codification and analysis. The aim was to identify the status of BPM education/ training and gaps that should be addressed. The following subsections elaborate on each of these steps in more detail.

Theoretical Underpinnings: BPM Capability frameworks

A literature review was also conducted, driven by the research question "*What frameworks can help us to understand the core BPM capabilities?*" An understanding taken in this paper is that BPM is a holistic management practice which recognises business process relationships and their alignment with organisational strategies, with a focus on process improvement activities (De Bruin and Rosemann 2004). The goal was to choose the best BPM frameworks which could help us better understand the core BPM capabilities. The Rosemann and De Bruin BPM Maturity model (Rosemann, deBruin and Power 2006) and the Harmon business process pyramid (Harmon 2007) were selected as the result of this exercise. These models cover different aspects of process work from different angles. Harmon business process pyramid describes different business process activities that occur at different levels within an organisation (Harmon and Wolf 2010) and Rosemann and De Bruin BPM Maturity model describes BPM capabilities and achievements within organisations (De Bruin and Rosemann 2004).

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The Rosemann and De Bruin BPM Maturity framework was selected because it is a multidimensional framework which is based on an established theoretical foundation; it is a globally accepted standard; it has a broad scope; it has high applicability supported by a wide range of industries; and finally the model supports the requirements of a wide range of stakeholders (Rosemann, deBruin and Power 2006).

The Harmon (2007) Harmon business process pyramid was selected because it is a holistic, globaly accepted model and it links between strategy and IT to justify the business value for BPM initiatives (De Bruin et al. 2005; deBruin et al. 2005). We see this as an important aspect as it's been witnessed that BPM is offered in both IT and Business departments among the universities.

These two frameworks were chosen as the theoretical foundations for this study's analysis, as they offer deep insight into the BPM capabilities required to be an effective practitioner. They are described in a bit more detail below.

Rosemann and de Bruin (2006) BPM Maturity Framework

De Bruin and Rosemann(Rosemann, deBruin and Power 2006) have developed a Business Process Management maturity framework that supports the evaluation of organisational BPM capabilities. This capability framework is a reflection of an Organisation's BPM development. This model has been designed as a diagnostic tool to compare and evaluate the BPM capabilities of different Organisations as well as highlighting opportunities for organisational learning. Figure 2 shows the factors and capability areas of this framework.
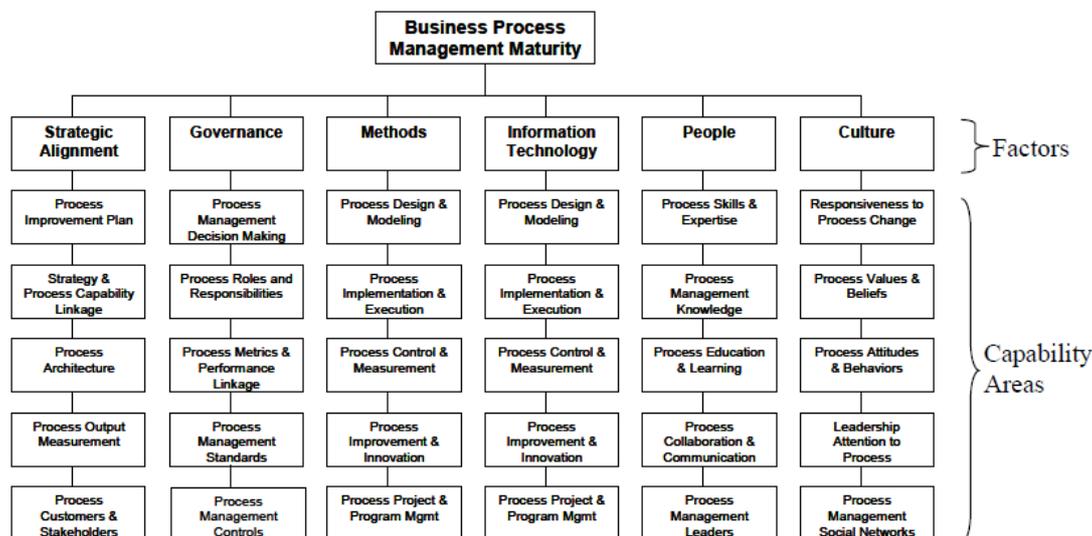

Figure 2: Rosemann and de Bruin BPM Maturity Framework

This organisational capability framework provides a view of the optimum capabilities required to achieve BPM success, namely: Strategic Alignment; Governance; Methods; Information Technology; People; and Culture. The Rosemann and de Bruin (2006) approach offers a more holistic business process maturity model based upon earlier work, developed to better identify and refine BPM requirements and complexities (Rosemann, deBruin and Power 2006).

Harmon Business Process Pyramid

The Harmon (Harmon 2007) Business Process Maturity model has been developed based upon the Capability Maturity Model (CMM) and is presented in Figure 3. This model defines the various levels of BPM activity within an organisation and the type of the activities associated with each level (Harmon and Wolf 2010). Each of the levels requires certain capabilities to support a successful BPM outcome. This framework represents a hierarchical chain view of Enterprise BPM capability with each level
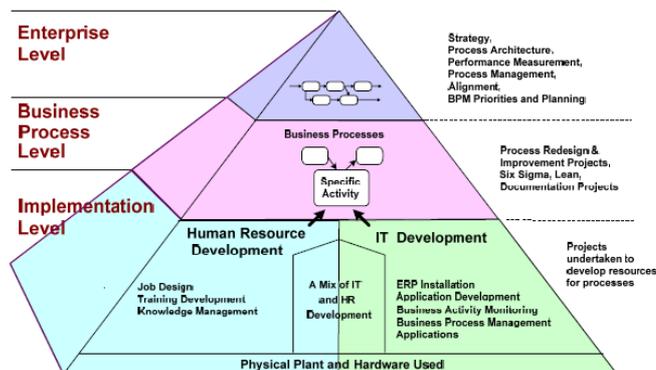

Figure 3: Harmon Business Process Pyramid

supported by the previous. In this manner, each level has a sub set of capabilities required to satisfy the goals of the organisation. Table 1 lists the capabilities based on the Harmon (2007) business process pyramid.

Table 1 - Dimensions of the Harmon Business Process Pyramid

Level	Capabilities
Enterprise Level	Strategy, Process Architecture, Process management, Program/project management
Business Process Level	Process analysis, Process improvement, Methodologies, Process modelling and documentation
Implementation Level	Knowledge Management, Workshop facilitation, Process training, BPMS knowledge, Process monitoring/management

Data Collection

The following sections present how the search for BPM courses and trainings was conducted and what kind of data was collected, in the quest to address "*What BPM courses are being taught in Australia*".

BPM Courses offered by Australian Universities

In order to maintain completeness in the data set, the search commenced by targeting all Australian universities for BPM course offerings. A list of all Australian universities was extracted[1] and each university website was visited. The focus here was to extract all courses and units related to BPM in Australian universities. The searching was done in 2 different ways:

- Search by Unit Description: Some of the universities had search options by unit, so a search using related key terms were conducted. Key terms such as "Business Process", "Process Management", "Process Modelling", "Process Improvement", and "Process Optimization" were used for this.
- Search by Faculties/Schools: Since most BPM offerings sit within Business and/or Information Technology (IT) faculties, courses and units under these two faculties have been reviewed.

When the university web site allowed searching by unit description, search by Unit Description was used. At other times, Search by Faculties/Schools was used.

The primary source of data extracted from this was the unit outlines. The analysis presented below was based on a content analysis of these outlines. Analysing the content of unit outlines has been practiced in other studies in particular to analyse the status of education in emerging fields i.e. (Premier and Miller 2010). The dependence on unit outlines is acknowledged as a limitation of the study- considering the limitations of information provided in unit outlines. All outlines and their context (currency, content covered etc.) were confirmed after sending emails to the course/ unit coordinators or listed contact persons. Information such as university location, course degree level (e.g. undergraduate or postgraduate), faculty and course prerequisite were captured to be used in the data analysis for descriptive purposes.

Each unit outline was pre-analysed for validity, and the outcome of this step was interesting. We found in some cases, even though a unit was specifically called "Business process management", it did not really cover BPM concepts. During the process of collecting and analysing the course objectives we observed a BPM course offered by one university that talks about business process optimisation, business needs and changes to processes, including model, evaluation and design business processes. But once the course outline was received, it revealed that the course focus is on system analysis design; hence this course was taken out from the dataset.

One of the challenges was to answer '*how universities define BPM course?*' Or, '*what courses should be included as BPM courses?*', and which should be excluded from the dataset? The BPM Common Body of Knowledge by ABPMP (ABPMP 2009) was used as a basis for this. They identify nine BPM knowledge areas which reflect the fundamental knowledge required of a BPM professional, being: Business Process Management; Process Modelling; Process Analysis; Process Design; Process Performance Management; Process Transformation; Process Organisation; Enterprise Process Management; and BPM Technology.

Based on mentioned knowledge areas and mapping university BPM course content, three main categories within the extracted pool of BPM courses emerged (Figure 4 illustrates this categorisation):

- *Core* BPM Courses: the ones which covers core BPM concepts focused on suggested knowledge areas by ABPMP;

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[1] The list extracted from http://www.australian-universities.com/list/,last accessed April 27th 2010.

- *Out of the BPM scope* Courses: even though the course is picked up in the primary search, the course unit outline shows this is not a BPM course; and
- BPM *related* Courses: the ones which do not cover *core* BPM concepts but cover related and/ or peripheral knowledge related to business process management, such as change management, ERP and Information Systems.

This classification was completed in multiple iterations. In the first iteration, the *Out of the BPM scope* courses were checked and removed from the data set, next all extracted relevant and core BPM courses were checked again to confirm if they are grouped correctly. In the next iteration, the summary results from this were confirmed by the second and third author, to make sure which courses should be included in the *core* category and which should stay in the *related* category. Figure 4 depicts the summary of this analysis. The remainder of this paper will discuss only the Core BPM courses.
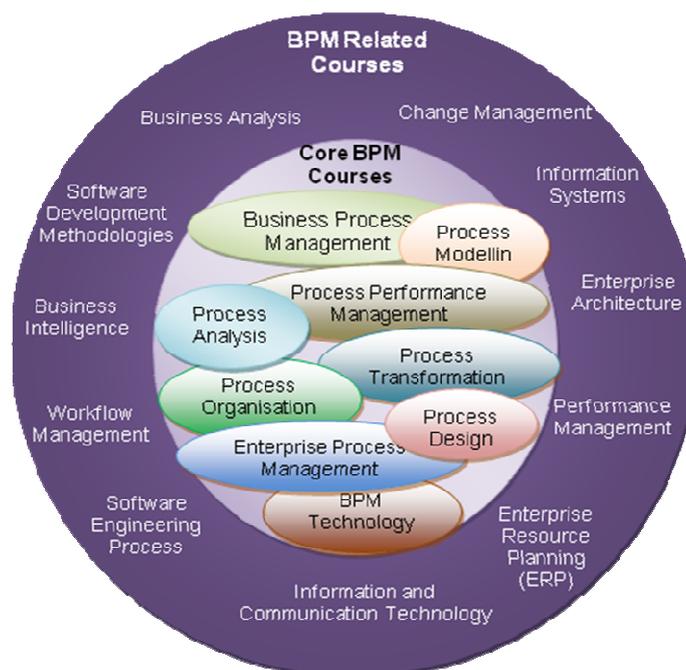

Figure 4: Core BPM Courses and BPM Related Courses

BPM Courses Offered by Australian Industries

Searching for BPM courses offered by Australian Industries was more difficult than searching BPM courses in Australian universities. The main search engine used was Google and the search was based on key terms. Key terms such as "BPM Training", "Business Process Management Training", "BPM Consulting", "BPM Course", "BPMS Training" and "BPMS Course" were used here. Some websites in the BPM area such as BPTrends, OMG and Gartner websites were also looked at, for BPM training related advertisements. Information such as course location, duration, price, pre-requisites and target audience were captured to support the analysis.

There is no definitive list available for non tertiary training institutions in Australia, and of the ones that were found that did offer BPM training, not all of them had their course details available online. Industry institutions do not display their course information in a consistent way. For example, some don't list their course content, target outcomes by completing the course (i.e. learning objectives) or specify their courses locations. This is acknowledged as a limitation of this paper, as it can impact the completeness and accuracy of the findings. However, while these limitations existed about the information available about the commercial BPM training offerings in Australia, they were still included in the analysis to provide the most complete analysis that was possible with the available data.

Preparing for Analysis

NVIVO 8.0 was used as a qualitative data management and analysis tool. NVivo allows us to systematically code and analyse the data within a single repository. It can be used to explore trends; build and test theories; manage code, interpret and analyse qualitative data by eliminating the need for many of the manual tasks traditionally associated with qualitative analysis (Sorensen 2008). NVivo allows one to import and code textual

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data, edit the text; retrieve, review and recode coded data; search for combinations of words in the text or patterns in the coding; and import or export data to other quantitative analysis software (Bandara 2006).

Once the BPM course outlines had been collected, these were captured within NVivo as source documents that were to be analysed, and tagged with their respective attributes.

The BPM capability frameworks were used to derive a classification scheme. Tree level nodes[2] were created for each BPM capability framework. A new 'tree' (a folder) was created within NVivo to represent each of the two frameworks and separate tree nodes (sub folders within the main folder) were created to capture the different capability factors[3]/ levels[4]. Figure 5 and 6 depict how each framework was captured as tree level nodes.
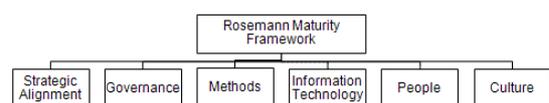

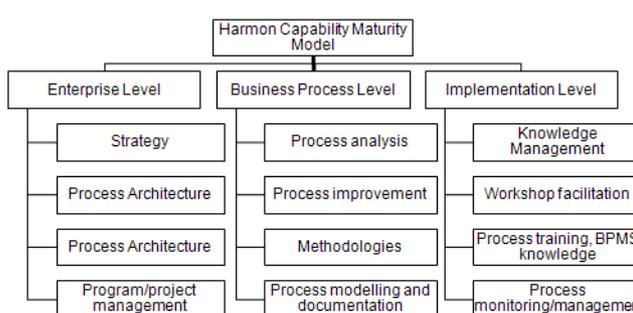Figure 5: Rosemann Model Tree Level Nodes

Figure 6: Harmon Model Tree Level Nodes

The course content and learning objectives available from unit/ course outlines were then mapped to the related capability nodes of both frameworks. The overall research findings and the analytical activities that supported these findings are presented in detail in the next section.

RESEARCH FINDINGS

This section presents the results of the data analysis guided by the research questions, as presented previously.

What BPM courses are being taught in Australia?

The high-level summary of current BPM offerings in Australia is shown in Table 2 and 3. 11 universities are offering BPM core courses in Australia. The offerings are quite diverse in terms of approach, major and department/school.

Table 2 - BPM courses offered by Australian universities

University	Department	Degree Level	Prerequisite	Location
The Australian National University	Business	Post Graduate	No	ACT
Bond University	Business	Post Graduate	Yes, IT/Business base	QLD
Curtin University	Business	Post Graduate	No	WA
Macquarie University	Science	Undergraduate	Yes, IT base	NSW
Monash University	IT	Undergraduate/ Post Graduate	Yes, IT base	VIC
Queensland University of Technology	Science & Technology	Undergraduate/ Post Graduate	No	QLD
Swinburne University of Technology	IT	Postgraduate	Yes, IT Base	VIC
University of South Australia	IT	Post Graduate	Yes, IT Base	SA
University of Sydney	Business	Undergraduate/ Post Graduate	Yes, Business base	NSW
University of Tasmania	IT	Post Graduate	No	TAS
University of Western Australia	Business	Post Graduate	No	WA

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[2] A tree level node is a physical location, like a folder which is catalogued in a hieratical structure.

[3] See the factors and its components listed in Figure 2 of the Rosemann De Bruin (2006) framework

[4] See the levels and related capabilities listed in Figure 3 of the Harmon (2007) framework

As it is clear from Table 2, three departments in the listed universities are offering BPM courses; IT, Business and Science. Universities which offer BPM courses under Faculty of Science had a merged Science and Technology faculty. To simplify the results, the researchers considered these courses also under a Faculty of IT. The data shows courses more often required prerequisite when they are offered in a faculty of IT, and that the prerequisites requested for were more often IT based.

Once the course is offered in an IT context it is more IT driven, and the course contents focus more on IT aspects of BPM. Similar results can be seen when a course is offered in Business departments: the content emphasises more on the business perspectives of BPM.

Figure 7 depicts that most of the BPM courses are offered in postgraduate level. The reason for this could be the fact that BPM is both a management discipline and a set of technologies that supports managing processes (ABPMP 2009) and to be an effective BPM practitioner, a broad range of skills such as subject domain knowledge, workshop facilitation, change management and even creativity are required (Rosemann 2008), which most likely postgraduate students are more equipped with than undergraduate students.
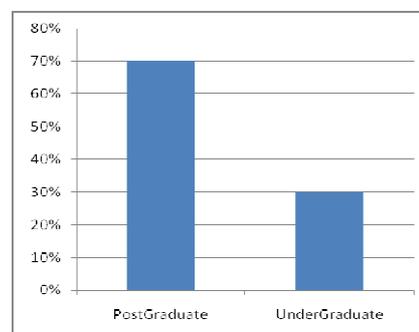

Figure 7: Degree Levels of BPM university courses

The web search result show 11 institutions in Australia provide commercial BPM courses. A summary is shown in Table 3.

Table 3 - BPM courses offered by Australian Institutaions

Institute	Duration	Pre-requisite	Targeting Specific Audience	Location	Fees
Leonardo Consulting	1-4 days	Yes	N/A5	NSW, QLD, VIC, WA, ACT	$750-$2100
QUT BPM Training	1-2 days	N/A	N/A	QLD	$600-$1200
Object Training	1-3 days	Yes	Modellers, Business Analysts	NSW, QLD, VIC, WA, ACT, SA	N/A
Promendo	2 days	N/A	Modellers, Business Analysts, Managers	NSW, QLD , VIC, WA, ACT	N/A
Software Education	3 days	Yes	Business Analysts, Managers	NSW, QLD, VIC, ACT, SA	$2200
Software AG	1/2 -4 days	Yes	Developers, Analysts	NSW, VIC, ACT	N/A
IBM	5 days	No	Modellers, Business Analysts, Managers	NSW, VIC, ACT	$4,250
Prime Process Management Group	1-3 days	N/A	Modellers, Business Analysts, Managers	QLD	N/A
Ind-iOctane	5 days	Yes	Business Analysts	VIC	$4500
Process Mapping	1-3 days	Yes	Business Analysts, Managers, Developers	N/A	$2000-$10500
SAI Global	2-10days	Yes	Business Analysts, Managers, Developer	NSW, QLD, VIC, ACT	$930-$11500

Institutional BPM program offerings range from a ½ day workshop to 5 days with a diversity in the fees. Most of the courses target Modellers, Business Analysts and Managers. The data analysis in Table 2 and 3 shows Queensland has the highest coverage in both university and industry training. New South Wales, Victoria and ACT come second after Queensland, and have the same coverage. In Tasmania, BPM courses are only offered by the University of Tasmania, and not by any industry educator.

How do BPM courses align with BPM capabilities?

In terms of our research, the selected frameworks have enabled us to answer the question; "How well do the current offerings relate to the core capabilities of BPM professionals?" by mapping the current offerings to the extracted capabilities of the identified frameworks.

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5 N/A means the required data was not provided in the institution website

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As mentioned previously, most of the BPM offerings are postgraduate courses. As Figure 8 depicts, the undergraduate courses don't provide a lot of skills to the students. There is a significant lack of providing knowledge in Process Training and Workshop Facilitation which are suggested as important capabilities of the Harmon (2007) framework. As the graph illustrates the least coverage is at the implementation level in the Harmon (2007) framework and Governance and Culture in the Rosemann (2006) framework. The most emphasis in undergraduate courses is in Process Modelling and Documentation.

The frameworks' capabilities are better covered in postgraduate courses than in undergraduate courses. However, it is observed that again, there is less emphasis on Process Training and Workshop Facilitations in the general implementation level of the Harmon (2007) framework, and Culture and Governance in the Rosemann (2006) framework. Again, in postgraduate courses we can see the most coverage is in Process Modelling and Documentation. Study of the unit outlines has shown that universities mostly teach BPMN, EPC and UML as modelling languages and use ARIS and WebSphere as modelling tool.

A possible reason for these observations could be due to students (particularly true for undergraduate students) not having enough background knowledge in areas not covered (like Culture and Governance). These capabilities are also intangible skills and difficult to teach (De Corte 2003) (Rossheim 2002). While modelling is often covered at both levels - this may be due to the fact that modelling is a structural and tangible concept. Modelling is a diagrammatic technique which improves the ability to communicate (Gemino 2004), this is why it is easier to teach. Furthermore, the content covered (or chosen to be covered) can depend on the degree of available educational resources to support the teaching. A basic environmental scan on available BPM educational resources depict (Chircu et al. 2009) that there is more available that cover modelling concepts and very few that support the teaching of topics like BPM governance, culture and Workshop Facilitation.
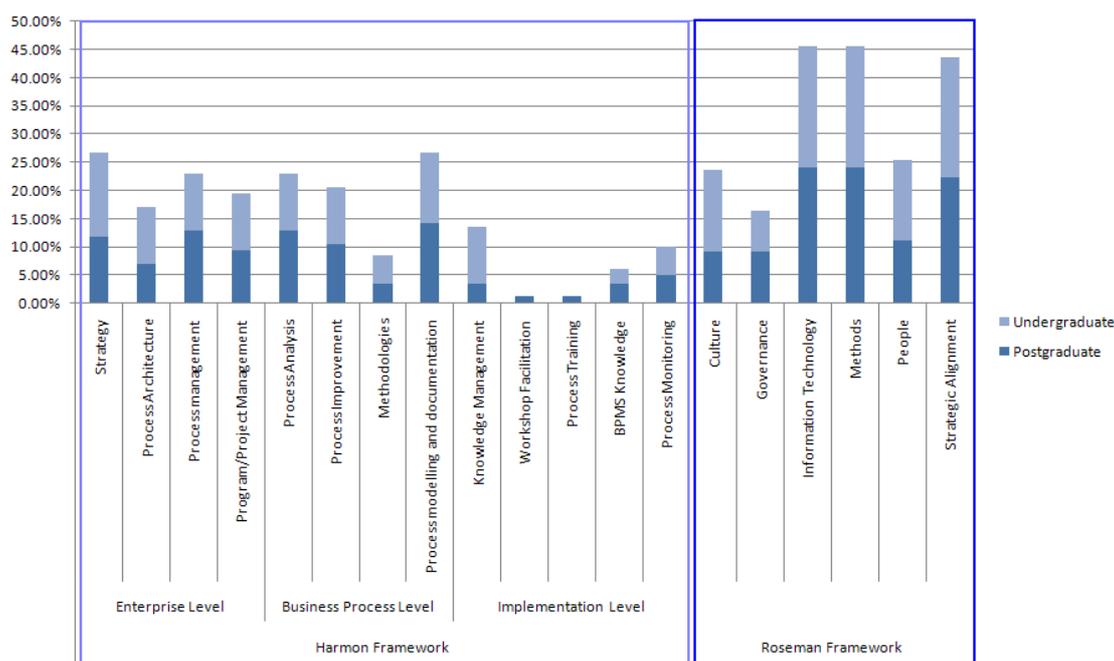

Figure 8: Mapping frameworks capabilities by course degree level

It is also noted that universities may cover these capabilities at some other point- outside the core BPM units. The unit of analysis of this study were units (a.k.a subjects) teaching BPM. These skills might be covered by other units that form the courses (i.e. within majors/ minors) for BPM. In other words, this analysis should be also conducted at the course (or minor/ major) level of BPM offerings. However, as many universities in Australia still do not have clear specialisations dedicated to BPM, there is not enough data available to run such analysis.

Figure 9 depicts the result of mapping BPM commercial offerings in Australia with BPM capabilities, and indicates how they stand in comparison to university offerings. The outcomes (resulting after analysing the data from available course details) indicate that commercial offerings focus more on Business Process Management Systems (BPMS) Knowledge training than universities do. The reason could be the target audience. Industry trainings often targets operational staff and developers who have to use a certain business process management

system, while universities provide BPMS conceptual knowledge, using only exemplars and do not delve into detail on any specific system.

Universities seemingly cover more on the topics of Strategy, Program/Project Management. These skills are discussed as broad concept within other BPM topics. This is an example of how Australian BPM university offerings emphasise more on generic process concepts.

It is fair to say that university and industry offerings both do not cover Culture and People capabilities; however they both do cover a lot under Information Technology and Method. Furthermore, it is possible to confirm that the offered trainings are more focused on technical capabilities such as Modelling, process analysis, process management and process improvement. The reason as mentioned earlier, could be that technical capabilities are easier to teach (Rossheim 2002) and there are more educational resources available in these areas.

Despite the fact that culture and people are core aspects in organisations for BPM maturity (Rosemann, deBruin and Power 2006) and that these factors are known as BPM success factors (Alibabaei, Bandara and Aghdasi 2009) (Alibabaei, Bandara and Aghdasi 2009) , there are not enough training resources available on these topics within commercial trainings. One reason for this might be the fact that only organisations with matured BPM initiatives are ready and in need of these capabilities and the fact that only 5% of the organisations are in a matured BPM state (Harmon and Wolf 2010), there might not be enough demand for training in these capability areas. Another reason could be the fact that culture and people, even though is a core capability required for successful BPM, sit more under change management concepts (Todnem 2005) (Lovea and Gunasekaran 1997). Hence organisations may source training for these needs, from specialised change management and human resources trainings that does not necessarily fall under the BPM training banner.
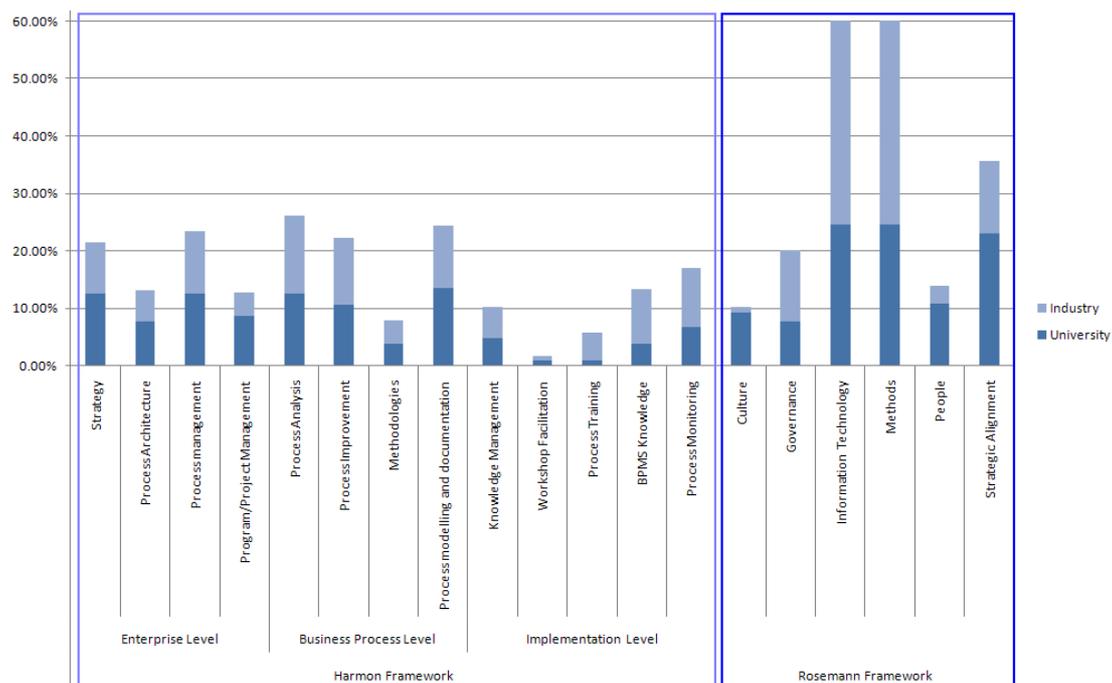

Figure 9: Mapping of BPM training context to BPM capabilities

A lack of commercial training offered is observed also in the Implementation Level of the Harmon (2007) framework. The Implementation level capabilities provide the resources to implement process change projects (Harmon and Wolf 2010). Implementation of process change and improvement are complex tasks that are highly integrated and embedded with the context of the organisation and its surrounding environment. There is a large demand for external consultant support for BPM project implementations (Adams and Zanzi 2004) - which might reduce the demand for trainings that focus on building in-house capabilities for implementation, thus potentially explaining why commercial trainings that support implementation is scarce.

CONCLUSION

The main purpose of this paper was to analyse the current state of BPM education in Australia and to identify the gaps between BPM course contents and BPM capabilities. The paper commenced with an introductory

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background, depicting the need for this kind of study. It then presented the overall research method, illustrating the theoretical underpinnings, how the data was collected, coded and analysed. The research findings were then presented.

The research methodology was designed to ensure rigour and process repeatability. However, as acknowledged earlier in the paper, the study findings was based on unit outlines of BPM university offerings (at a unit level) and commercial BPM training details, that were extracted from a web search. While analysis based on publically available unit outlines (through the web) has been practiced before. This approach of data collection can have limitations. For example, which outlines are extracted can depend on the effectiveness of the search terms used, the unit outlines at times are not detailed enough, they lack a standard template and comes with inconsistencies with the terms used to illustrate concepts. The authors did contact the relevant contact persons to confirm the content presented in the unit outlines to minimise the impact of these limitations. The sheer volume of data available was also limited.

Like all qualitative analysis procedures, the analysis that took place in this study also has its limitations. The mapping was done predominantly by the primary author, where the other authors randomly checked and validated the coding. The text based coding applied in the study could have been influenced by the coder's perceptions and interpretations of the data (influenced by their prior experience and view of BPM education), hence potentially introducing research bias.

Nevertheless, this is first detailed attempt that captures all BPM university and commercial training available in Australia and systematically map these again core BPM capabilities, to empirically justify the status of BPM education in Australia. The outcomes reported here can be used by Australian universities and training institutions to better align and position their training materials to required BPM capabilities. It could also be beneficial to individuals looking for a systematic and in-depth understanding of BPM capabilities and trainings.

While this study addresses the current state of BPM deducation in Australia, the method applied and described here can be later extended to analyse the status of BPM education at other nations and to conduct a global analysis of the supply of BPM education/ training offerings. The findings of this paper (De Bruin et al. 2005)also be combined with another study that can focus on the BPM job market to confirm if the current offerings (the supply of BPM education) are aligned with the job market requirements (the demand for BPM).

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