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A Structured Approach to Determining Appropriate Content for Emerging Information Systems Subjects: An Example for BPM Curricula Design

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Abstract

Business Process Management (BPM) is the term used to encapsulate a process-driven approach to attaining enterprise operational efficiency. Many recent business reports justify that process is perennial and as of recent years there is a significant increase in the demand for graduates with expertise in process modelling and management. Nevertheless, these topic areas are still a relatively novel concept in many university curricula. This paper provides a foundation to educators (both at tertiary and professional levels) who are keen to integrate BPM education into their education/ training offerings. It presents a systematic way on how 'teachable' content has been identified in BPM, a rapidly evolving disciplinary domain, where few course offerings have existed in the past. A comprehensive content analysis of 300 online job vacancies advertised globally across the most prominent online recruitment sites was used as a systematic classification technique. A carefully formulated focus group representing potential BPM recruiters was conducted to further validate and contextualise the findings of the global job analysis. A detailed sample syllabus of a business process modelling unit is presented as an example in the paper. While this syllabus can be adopted by other tertiary institutions planning to deploy BPM curricula within their offerings, the applied methodology for identifying suitable content for novel disciplinary areas can be adapted by all educators in general.

Keywords

Business Process Management, Business Process Modelling, Curricula design, IS education

1. Introduction

The success of model-based Business Process Management (BPM) over the past years (Blechar, 2007; Gartner, 2005) has significantly increased the demand for Process Modelling and Business Process Management graduates. Nevertheless, these two topic areas are still a novel concept in many university curricula. Those institutions which do include Process Modelling related courses often focus only on the modelling of software systems requirements (such as the standard "Systems Analysis and Design" subjects offered), with a focus limited to specified requirements modelling techniques such as UML. Hence, it is fair to state that universities have largely ignored the multitude of other benefits that process modelling can bring to organisations and have hence failed to train their graduates in this rapidly emerging field. This paper describes a project conducted at a leading IT Faculty of Australia, which is to the authors' best knowledge the first attempt to systematically design comprehensive curricula with supporting evidence for Process Modelling and Business Process Management. The authors have used multiple sources of evidence to justify the inclusion of Process Modelling and Business Process Management as the core of their IS curricula and designed the content of these proposed units with supporting evidence from industry and academia.

The resulting syllabus presented here will benefit educators, who wish to integrate these emerging fields into their curricula. Past pedagogical research (e.g. Ball, 2000) has discussed how identifying suitable content in the subjects taught at tertiary level is one of the major challenges that academics face. The methodology presented to justify the content and structure of the proposed syllabus can also be usefully applied within other emerging fields of IS curriculum development. Hence this paper provides both a disciplinary and methodological contribution.

The paper first reports on an overview of the disciplinary areas in which the proposed technique has been used. Then the overall methodology (which consisted of an adapted content analysis and focus group approach) used to identify suited topic areas in arising IS domains is presented in detail. The next section describes how this information has been integrated into a coherent syllabus, depicting the weekly topics, activities and assessment items of the proposed unit. The final section concludes with a brief synopsis of the overall contributions, limitations and extensions of this work.

2. Process Management and Process Modelling: A Disciplinary Overview

Process management is based on the concept that the entire management (strategy, goal setting, controlling and planning) of an organisation be based on its core processes. A process is defined by Green and Rosemann (2000) as *"a self contained, temporal and logical order (parallel or serial) of those activities, that are executed for the transformation of a business object with the goal of accomplishing a given task"*. 'Process Management' is relatively new and is a concept that revolutionized the way organisations conducted business. *"By the beginning of the 1990s process orientation became one of the most important trends in management practice as well as research"* (Johannesson & Perjons, 2001, p.168). Organisations that have embraced the concepts of process management, have experienced how significant gains can be achieved from considering process issues first and technology issues second (Bartholomew, 1999; Evans, 1994; Kueng & Kawalek, 1997). The literature identifies how process modelling is applied for process-oriented management approaches (Becker et al., 1997; Curtis et al., 1988; Okonski & Parker, 2003; Rosemann, 2000; Scheer, 1998) and demonstrates how process modelling has been embraced as an appropriate approach to capturing and describing the behaviour and the mechanism by which businesses function (Green & Rosemann, 2000; Okonski & Parker, 2003). Kueng and Kawalek (1997) describe how process modelling is applied in the analysis, design and implementation phases of an information system's life cycle. With process modelling being used centrally across the lifecycle of a project, it has become an integral aspect that is tied in with generic Business Process Management.

This approach to business improvement, with its potential to achieve dramatic improvements in business performance has proved to be critical to the survival of contemporary firms (Larsen and Myers, 1998). Past BPM success studies have directly stated the importance of appropriately skilled personnel and BPM education for successful proliferation (Grover et al., 1998; Larsen and Myers, 1998; Murphy and Staples, 1998; Ketinger and Teng, 1997). However, many years after identifying this need, lack of appropriate BPM education is still a topic that is raised as a perennial issue. Bandara et al. (2007) report on a recent study on Business Process Management Issues as perceived by BPM experts globally and further justifies this fact. Expert quotes cited in this paper state *"If you take an MBA in a school in the US, you don't hear 'process'. I mean it's not being taught at Harvard, it's not being taught at Stanford. They have marketing and they have finance etc. If they hear about process at all, it's operations under manufacturing somewhere"*. *"There is a brand new area that I believe …the university ought to jump into …, teach it and research it"*.

More recently, a recurring theme which emerged from the 5th International Conference on Business Process Management (BPM'07) (Jansen-Vullers et al., 2007), held in Brisbane in September (which included a Practitioners track and a BPM in Government track), was that more and more organisations are wanting to adopt a process-based approach to management, however don't have the competencies required to undertake this successfully without the assistance of external specialists. This issue was reflected in the experiences reported by organisations that have embarked on recent process improvement initiatives. While still achieving relative success, there were many testimonies alluding to a difficult journey. This common issue seemed to be attributed to: a general lack of understanding of BPM principles throughout the organisations (from executive level, through line management, and operational staff); additional effort required to educate the many stakeholders to ensure acceptance & support for improvement initiatives; expectation that existing Business Analyst would have the required BPM knowledge; and dealing with trial and error due to a lack of this knowledge.

From a curriculum design perspective, we argue that both these domains: Business Process Management (which is at a more strategic level) and Business Process Modelling (which is at a more operational level) must be embedded in a comprehensive and integrated manner within IS curricula.

3. Research Methodology

The discussion above establishes that BPM and Process Modelling are emerging areas within the IS discipline and that courses addressing these topic areas will be useful to provide graduates who can fill the knowledge gap that industry has been facing for years. However, designing courses for such emerging fields holds a series of challenges. Given the breadth of the area, deciding on what topics/themes to include in the course and how to integrate these themes; lack of available teaching resources, and no prior teaching expertise in the discipline are some critical challenges to overcome when attempting to implement courses in new areas (Ball, 2000). This paper presents a systematic approach that was designed and applied to address the first issue:

How to determine the topics/themes to include in a new course that is from an emerging field?

The rest of this paper presents how this question has been addressed using the design of a new course to introduce process management related content at a leading IT faculty in an Australian University. A qualitative, multi-method approach, using content analysis of online data (on recent BPM related jobs) and focus groups employing local industry experts in BPM, was applied in the attempt to identify the required topics. The online data analysis enabled the researcher to capture both local and global requirements sought by BPM recruiters.

The focus group with local industry enabled a synopsis of what the local industries (those recruiters in proximity to the university that the students would most likely have initial contact with in the job placement process) mainly sought in their applicants.

3.1 Job Advertisement Analysis

Job Skill ID	[1]Specific Skills / Experience Required	US	UK	Australia	Total
JS-1	Communication (verbal) and presentation skills	33	20	43	96
JS-2	Analytical skill (/Business Process Analysis)	28	28	22	78
JS-3	Project management skill (Project Work Bench, MS Project, Team Work Bench and EPIC)	22	17	34	73
JS-4	Process Modelling / design / mapping	12	24	32	68
JS-5	Process Reengineering / development / BPR	12	18	25	55
JS-6	Business Intelligence	10	9	25	44
JS-7	Change management skill / Business Process Change	8	12	22	42
JS-8	Technical / specifications Writing / documentation (Written skill)	24	10	6	40
JS-9	Business Analysis	12	7	18	37
JS-10	Negotiation skills	8	2	25	35
JS-11	Process Improvement	4	5	24	33
JS-12	Context specific knowledge	3	0	29	32
JS-13	Problem solving (tools such as : scatter diagrams, improve, etc) skills	17	6	9	32
JS-14	SAP related product skills	9	9	14	32
JS-15	Client Management / stakeholder management Skill	7	8	16	31
JS-16	Internet technologies (HTML, java Script)	25	1	5	31
JS-17	MS office (Visio, word, excel, MS project etc)	20	7	1	28
JS-18	Consulting	6	3	18	27
JS-19	Interpersonal, team and stakeholder management skill	1	21	4	26
JS-20	Six Sigma	12	10	4	26
JS-21	How to run training / workshops	3	2	19	24
JS-22	Process Management (BPM)	6	11	6	23
JS-23	Requirements gathering methods and analysis knowledge	6	4	11	21
JS-24	Planning & Organisational skills	7	9	4	20
JS-25	SDLC knowledge (RUP, Agile, etc.)	10	2	7	19
JS-26	Facilitation skills	4	0	13	17
JS-27	Leadership skill	11	5	1	17
JS-28	Lean Process Management (Improvement Methodology)	5	4	8	17
JS-29	ITIL reference model knowledge	2	9	4	15

Table 1: Summary Skills Extracted from the Job Content Analysis

"Process" related jobs were searched for[2] and extracted across a 6 week period in 2007. The purpose was to conduct a detailed analysis on the skills required by positions that were 'process management' related. In order to support the notion of producing 'globally portable' graduates, the scope of this search was extended not only to the country of origin (in this case Australia), but also included the USA and the UK (to represent the respective markets).

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[1] Individual definitions/ descriptions of these skills have not been provided here for space constraints, but can be obtained by the author upon request.
[2] The key words "Process, Process + Model, and Business + Process" was used as a search term to identify the target sample

Seek.com[3] and Monster.com of Australia, the USA and the UK were used as the main sources for identifying advertised jobs. 100 related job advertisements from each sample group (Australia, UK and USA - a total of 300) were extracted and analysed. Each sample was analysed separately in excel, maintaining a workbook with two main spreadsheets. The first one maintained the job ID, date of advertisement, link to original saved advertisement, source of origin, key word used to extract the advertisement, and job title; for all 100 jobs of the sample. The second sheet extracted the skills and responsibilities (maintaining the Job ID and Job title – to support the researcher to link the results with the original source) listed in the separate job vacancies. The skills and responsibilities were identified based on a manual key word search. The final result of these three separate summaries were consolidated, which pointed to over 200 different skills and responsibilities that were requested from the extracted process management related job vacancies. Only those skills that were mentioned at least by 5% of the sample[4] were considered for inclusion in the syllabus. Table 1 depicts the summary results of this analysis. It is interesting to notice that the top three skills sets across the samples; (a) Communication (verbal) and presentation skills, (b) Analytical skill (Business Process Analysis) and (c) Project management skills, pertained to non-disciplinary, generic skills. This observation adheres to the recent pedagogical studies that have emphasised the criticality of generic skills in graduates in general (e.g. Barrie, 2006) and in IS graduates in particular (e.g. Snoke and Underwood, 2001).

3.2 Focus Group Conduct

To further validate the findings of this global job search, a focus group discussion with 5 local industry representatives was conducted. These five representatives were from public (2) and private (3) sectors, and have been involved in the process of recruiting process related graduates for (at least) the past 3 years. The focus group lasted for 1.5 hours and was open ended in nature. Exhibit 1 depicts the high-level protocol that was applied here.

Q1: What skills do you seek in the graduate(s) that you hire for Process Management/ Modelling related jobs?

Q2: Why did you seek for this/ these skill(s)?

Q3: How often did you find these skills in the graduate(s) you hired?

Exhibit 1: Protocol used within the focus group

Table 2: Summary Skills Extracted from the Focus Groups

Job Skill ID	**Specific Skills / Experience Required
FG-1	Systems analysis skills
Fg-2	Ability to see the bigger picture of BPM
Fg-3	Ability to conduct the finer details within BPM projects
Fg-4	Knowledge on methodology and frameworks
Fg-5	Understand what the business problem is
Fg-6	Ability to communicate with the client
Fg-7	Ability to run workshops and training
Fg-8	Negotiation and leadership skills
Fg-9	Scope management
Fg-10	Team management
Fg-11	Creative ability
Fg-12	Basic statistical skills

**Please note that the skills presented here are not in any particular order

During the conduct and analysis of the focus group, it was observed that the participants confidently discussed the responses to Question 1 and Question 2. In response to Question 3, a general consensus that most graduates lacked the critical required skills mentioned in Questions 1 and 2 was agreed upon, and all participants also raised the difficulties in 'measuring' these skills during the recruitment process. The summary insights derived from this focus group (in particular, in response to Question 1) complemented the results from the detailed

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[3] These online recruitment sites were chosen as they have been known to dominate the online job marketplace
[4] A total of 15 counts across the overall sample of 300

online job analysis and was useful to structure the content of the proposed unit(s). The core skills mentioned are presented in Table 2.

The industry representatives also differentiated the expected skills based upon Bachelors and Masters level graduates. "Our expectation for our graduate recruits is different from those we hire with a Masters. For our fresh graduate recruits, we expect them to have more modelling and analytical skills and they will often work on the operational flows of the organisation, gathering the data and documenting them. We expect them to learn about the business processes on the floor itself ... in addition to this of course we have intense graduate training sessions where they will be trained about the business". "With the Masters recruits, we seek for prior knowledge and skills in the business domain. They should understand the corporate strategy and be able to translate this to action ..." "... they need to see and control the bigger picture of a process oriented organisation, and design the paths towards being a process oriented organisation, if it is not yet at that stage" (quotes from focus group participants, focus group notes database).

Based on this analysis, two units; one under-graduate (to train graduates on the operational level process management tasks) and one post graduate unit (to train post graduates on the strategic level process management tasks) has been proposed when aiming to integrate Business Process Management curricula at tertiary level in IS departments. The remainder of this paper will describe the content and structure of the undergraduate component of this proposal.

4. Unit Content and Unit Structure Design

The proposed subject is designed to be a second year core unit of an IS Bachelors degree within a leading IT faculty of an Australian University[5]. While it would have been useful to describe the interrelationships between the overall units and their overall flow, this is not the focus here. However, it is important to mention that some of the skills identified in the above analysis (such as basic communication skills and project management skills) will be transferred to the students in detail in different units of the degree program, hence is integrated in this proposed unit only for re-enforcement purposes. Table 3 depicts the detailed weekly outline (columns 1 and 2) with a summary view on how the proposed content was designed (see related skills in column 3) based on the skills identified as discussed earlier. Luca, Oliver, Omari and Dunbar (2001) mention overall teaching goals, the unit content and assessment have to interrelate. Table 4 introduces the assessments of the unit (columns 1-5) and describes how they were designed to test the different content covered (see column 5) and how they thus supported the skills that were identified earlier in this paper (column 6). The following section briefly describes these in further detail.

Overview of Unit content delivered each week

Week 1 was designed to give a high-level introduction to process modelling and business process management in general. A range of different process modelling techniques is briefly introduced with an awareness of how the purpose of modelling influences the use of the different techniques. The role of process modelling as an enabler of business improvement initiatives across different contexts is highly emphasized here.

Week 2, 3 and 4 were designed to give an introductory training on the world's leading process modelling tool ARIS[6] (Blechar, 2007; Gartner, 2005) and its underlying methodology EPCs (Event Driven Process Chains). As Bandara (2007) reports in her doctoral study on process modelling success factors and measures, while modelling tools and techniques are important for process modelling success they are not the most critical success factors. Modellers' intuitive ability to; translate company process details into diagrams (i.e. process models), identify the right information sources, and the interpersonal skills to access the relevant information, play a more significant role. Hence, while training the students on process modelling (even though we do so with the leading tools and technique), more emphasis is given in the unit content on training the students to simply derive models (independent from the tool and technique that they use). This ARIS/ EPC module starts with an introduction to the EPC modelling technique, independent of the tool and then, proceeds to an introduction to the actual tool ARIS. The last week of this module (week 4) depicts more advanced features of the tool ARIS and how they can be used to support model based business process improvement.

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[5] It is assumed that the reader of this paper is familiar with the Australian University practices. This unit design adheres to the generic 13 week Semester deliver, with summative and formative assessments due throughout the semester. The average IS degree is three years in Australia.

[6] ARIS (Architecture of Integrated Information Systems) is a business process management and process modeling tool developed by the company named IDS Sheer. For more details see http://www.ids-scheer.com/ , last accessed May 20th, 2007.

Table 3: Weekly Content of Unit

Week	Col 2 Proposed Content	Col 3 Related Skill[7]
1	Introduction to Business Process Management and Process Modelling	FG-1, Fg-2, Fg-5 JS-4, JS-5, JS-11, JS-22
2	Introduction to Even Driven Process Chains	FG-1, Fg-2, Fg-3 JS-1, JS-2, JS-4, JS-8
3	The Architecture of Integrated Information Systems (ARIS)	FG-1, Fg-3, Fg-4 JS-1, JS-2, JS-4, JS-8, JS-17, JS-22
4	ARIS Modelling (Cont) Model based process management - What does it mean …?	FG-1, Fg-3 JS-1, JS-2, JS-4, JS-8, JS-9, JS-11, JS-13, JS-22, JS-28
5	Further Applications of Business Process Modelling	Fg-11, Fg-2 JS-4, JS-11, JS-12
6	Process Modelling with the Business Process Modelling Notation (BPMN) - Part 1	FG-1, Fg-3 JS-1, JS-2, JS-4, JS-8,
7	Process Modelling with the Business Process Modelling Notation (BPMN) - Part 2	FG-1, Fg-3 JS-1, JS-2, JS-4, JS-8,
8	Process Modelling in the landscape of Large systems	FG-1, Fg-2 JS-4, JS-14, JS-16, JS-25
9	Meta models and Reference Process Models	FG-1, Fg-2 JS-2, JS-4, JS-6, JS-8, JS-14, JS-28
10	Creating Process Patterns: Case study example	Fg-11, Fg-3, Fg-4 JS-1, JS-2, JS-3, JS-4, JS-5, JS-6, JS-7, JS-9, JS-12, JS-15, JS-17, JS-19, JS-23, JS-28, JS-29
11	The Process of Process Modelling Management	FG-1,Fg-2, Fg-4 JS-2, JS-3, JS-4, JS-7, JS-8, JS-10, JS-11, JS-13, JS-15, JS-18, JS-20, JS-21, JS-22, JS-23, JS-24, JS-26, JS-27
12	Closing the loop - Model based process design to process execution	FG-1, FG-2 JS-2, JS-4, JS-5, JS-9, JS-25
13	Process Modelling case studies - modelling power and impacts	FG-2, Fg-11, Fg-5 JS-2, JS-3, JS-4, JS-5, JS-6, JS-7, JS-10, JS-11, JS-12, JS-17, JS-19, JS-20, JS-22, JS-23, JS-24, JS-26, JS-27, JS-28

Week 5 presents a detailed overview of advanced process modelling practices, such as the use of process modelling for knowledge management, Enterprise Systems implementations and maintenance, compliance management, supply chain management and customer relationship management etc. This topic also relates to the second assessment (see further details below) and hence is scheduled early in the semester to assist the students in getting a head start with their assessment preparation.

Week 6 and 7 are dedicated to training the students on the BPMN modelling technique which is supposedly expected to evolve to the world's first process modelling standard (Recker et al., 2006). As for the EPC module discussed above, more emphasis is given on teaching the modelling technique than applying it within a modelling tool. Teaching a second process modelling technique also allows discussions on how to compare techniques and how to select an appropriate technique for a specific organisational setting.

Large scale modelling projects are becoming more and more popular and have been a topic under study (e.g. Raduescu et al., 2006). Common issues in these large scale modelling projects are discussed in **Week 8,** with possible means to address these issues, especially in relation to the role that large scale modelling plays within large scale IS implementations. The importance of Reference models and Meta models have been discussed in the literature (Rosemann, 2000), especially as a means of managing large scaled modelling projects. **Week 9**

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[7] This column depicts how the proposed topic(s) for each week related to the skills identified in the analysis presented in Section 3.0. The codes used within here relate to those listed in Table 1 and 2 above.

introduces the fundamental concept of Reference and Meta models and provides some detailed examples of industry specific, application, and procedural references models (Rosemann, 2000) where process models play a significant role within the underlying reference model or its implementation.

Week 10 provides insights into designing best practice models in the form of process patterns. A pattern in general is an abstraction from a concrete form which keeps recurring in specific non-arbitrary contexts, and they have been usefully applied across different disciplines in the past. Within a BPM context, a pattern is *"an idea that has been useful in one practical context and will probably be useful in others"* (Stephenson and Bandara, 2007). The basic benefit of a process pattern is that the fundamental elements can be reused and hence better knowledge management, efficiency and effectiveness reached, when they are applied within modelling projects. The overall process pattern derivation and application process is discussed in class with a detailed case example.

Week 11 provides a detail overview on the 'process' of managing a process modelling project; from small to large scale projects. Many project management concepts are tied into this week's content to present the students with a more holistic approach to the conduct and management of process modelling projects.

While the above sections discuss the overall role of process modelling, in particular within large projects that involved large systems, there is still lack of clarity on how to connect the process models which are often designed for requirement gathering, with executable models (van der Aalst et al., 2003). **Week 12** content discusses the different means of how generic business process models (often derived for requirements gathering purposes, can be converted to executable models and presents a status quo of such initiatives, with specific examples.

In **Week 13** a series of real life case studies demonstrate the successful application of process modelling. Teaching cases are widely recognised as appropriate means for providing students with an authentic learning experience (e.g. Zimmerman 2002). When appropriate and feasible, the students are connected to the actual stakeholders involved with the case studies, either via guest presentations, discussion forums or video conferencing. These cases are bought into the class room at this phase of the unit as a means of "wrapping up" the content. The detailed discussions and relative demonstrations and exercises are expected to induce 'Affective Benefits' to students (student motivation; student interest in material; development of confidence), 'Skill Development' of students (oral communication skills; written communication skills; group interaction skills), and 'Cognitive Benefits' to students (development of problem solving skills; development of judgment skills; development of ability to solve problems addressing multiple issues; development of ability to deal with ambiguity; development of an understanding of the real world; comprehension of material by students), which have been identified as core benefits of case study related teaching (Libby, 1991, p. 195).

Overview of Assessment

As Table 4 depicts, the unit consists of 3 assessment items.

For **Assignment 1**, students are asked to form groups of 4-5 and produce a report to support a case study[8] scenario that describes a business process that needs improvement. These case studies are documentations of real life examples; rich in detail (~ 5000 words in length), and from a context that the students have some form of familiarity. The types of tasks the students are required to complete are as follows:

- Explain how process modelling is used within Business Process Management initiatives.

- Derive a detailed set of company-specific modelling conventions that can be applied for process modelling projects at (the case organisation).

- Create an as-is-process model of this process using the set of ARIS solutions. Identify an appropriate process hierarchy by using a high level Value Added Chain and Event-driven Process Chains (EPCs) on the sub-levels.

- Use the as-is models to analyse core issues within the selected processes. Explain and categorize the identified shortcomings and their consequences in detail.

- Describe (using to-be models) how one may alter the as-is processes to address these issues/ concerns.

- Produce a short report addressing the above.

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[8] A series of these case studies have been written to fit the flow and content of this unit. They can be provided upon request from the contact author.

Table 4: Unit Assessment Details

Col 1	Col 2	Col 3	Col 4	Col 5	Col 5	Col 6
Item No.	Type	Individual or Group	Title & Brief Description	Weight	Related weekly content	Related skill[9]
1	Assignment	Group	***Process Improvement Report:*** This involves the documentation and analysis (as-is analysis) of a complex business situation and the application of modelling based business process improvement concepts to provide justifiable recommendations (to-be analysis)	30% Due in Week 7	Week 1,2,3,4.5 **Extra workshop** on process modelling conduct	Fg-6, Fg-7, Fg-8, Fg-10 JS-1, JS-2 JS-3, JS-4, JS-5, JS-6, JS-7, JS-8, JS-9 JS-10, JS-11, JS-12, JS-13, JS-18, JS-19, JS-22, JS-23, JS-24, JS-26, JS-27, JS-28, JS-29
2	Assignment	Group	***Researched essay:*** This is a group assignment involving the search and documentation of current trends on a selected advanced application of process modelling.	30% Due in Week 13	Week 1,2,5,6,8,9 **Extra workshop** on Advanced Information literacy skills	Fg-6, Fg-7, Fg-8, Fg-9, Fg-10 JS-1, JS-2, JS-3, JS-4, JS-5,JS-6, JS-8, JS-9, JS-10, JS-12, JS-19, JS-23, JS-24, JS-26, JS-27, JS-28
3	Exam	Individual	***Final Exam:*** The exam will assess the principles, relevant theory and mastery of the practical elements covered in the unit.	40% End of Semester	Weeks 1-13 (all)	JS-1, JS-2, JS-3, JS-8, JS-11, JS-24

Detailed guidelines and support in the form of structured templates and sample reports are provided. An additional workshop is also designed, one week in advance of the submission date, for the students to 'pre-present' their analysis, methodology and recommendations to peers and discuss possible improvements within a collegial context.

For **Assignment 2** the students, in groups of 3-4, are asked to produce a research white paper on any of the leading trends of process modelling applications. These topics are identified by the unit coordinator in advanced and is advertised at the beginning of the semester. The white paper is requested to consist of two main sections that need to be addressed: (a) how process modelling is applied or can be applied for the selected application, and (b) what modelling language would be most appropriate for this purpose and why (with evidence of a detailed comparison of at least three modelling languages). Sample templates are provided with specific word and presentation guidelines (i.e. can not exceed 5000 words or 25 pages, including all figures). Every group has to send information regarding the selected topic, an abstract and an overview of the contents of their paper to the unit coordinator by Week 4, where preliminary feedback is provided. All groups have to present the group's findings in week 12 and 13 tutorial time where the best paper(s) will be selected and published in the University's e-prints[10] collection. An optional workshop is held in week 8 to support the students with the required skills to complete this assessment effectively and efficiently.

The **Exam** is held at the end of the course and consists of short and long answer questions. A mock exam is discussed in class in week 12 to assist the students with the revision of the unit, and preparation for the exam.

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[9] This column depicts how the proposed topic(s) for each week related to the skills identified in the analysis presented in Section 3.0. The codes used within here relate to those listed in Table 1 and 2 above.

[10] This is a solicited online information dissemination facility that exists within the institution discussed in this paper. Further details including links to sample student white papers can be provided upon request.

5. Contributions, Limitations and Future Work

This paper provides a foundation to educators (both at tertiary-institutional and professional levels) who are interested in integrating BPM education into their education/ training offerings. It presents a systematic way of how 'teachable' and relevant content has been identified in a rapidly emerging field of Information Systems; namely BPM, where few offerings have existed in the past, particularly within the Australasian context. A comprehensive content analysis of 300 online job vacancies advertised globally across the most prominent online recruitment sites were analysed with a systematic coding/ classification technique. A carefully formulated focus group representing potential BPM recruiters from the researcher's locality was conducted to further validate and contextualise the findings of the global job analysis. A detailed sample syllabus that has been implemented by the researchers over a 13 week semester is presented in the paper, which can be adopted by other tertiary institutions planning to deploy BPM curricula within their offerings.

However, this paper has its inherent limitations. Knowing the content to teach in a rapidly evolving discipline is only one of the challenges. An equally critical aspect of successful teaching is knowing how to make use of this content to help all students learn effectively. *"This fragmentation of practice leaves teachers on their own with the challenge of integrating subject matter knowledge and pedagogy in the contexts of their work"* (Ball, 2000). This paper contributed to addressing the problem concerning the identification of the content knowledge that matters for teaching. Much more can be discussed with regards to understanding how such knowledge needs to be held, and on what it takes to learn to use such knowledge in practice.

The analysis of the qualitative data gathered to form the foundation for the content presented was conducted by a single researcher, and thus, is prone to limitations and possible bias. Furthermore, one of the findings presented in this paper was the demand of having BPM related units both at under-graduate and post-graduate levels. This paper was limited to the discussion of the content design of only the proposed under-graduate unit.

Work is currently in progress to conduct a similar synthesis on the proposed post-graduate unit's content design. Further validations on the suitability of the proposed syllabus has been designed where data will be gathered from the participating students, teaching team members, academic peers within the faculty, and academic peers external to the faculty. Provision will also be made to follow the graduates (through the university's alumni) to trace employability in the next 2-5 years.

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