Aligning IS Programs with Industry: Linking Business Analysis Curricula Design with the Professional Body

Full papers

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Abstract

Aligning information systems (IS) solutions with business goals and needs are crucial for IS activities. IS professionals who are able to work closely with both the business and technical staff are key enablers of business and IT alignment. IS programs in higher education (HE) institutions have a long tradition of enabling graduates to develop the appropriate skills needed for their future careers. Yet, organizations are still having difficulty finding graduates who possess both the knowledge and skills that are best suited to their specific requirements. Prior studies suggest that IS curricula are often ill-matched with industry/business needs. This study reports on the business analysis curricula (re) design which was undertaken to align it with a key professional body for the IS industry. This study presents the approaches taken in the (re) design of the module, and provides a discussion of the wider implications for IS curricula design. The results show a positive outcome for the HE and professional body partnership.

Keywords

Business Domain and Requirements Analysis, IS Curricula Design, Business Analysis Practitioner

Introduction

Aligning information system (IS) solutions with business goals and needs are crucial for IS activities. Nevertheless, business and IT/IS alignment is constantly cited as being the key issue in IS developments and it is regarded as a top concern for many IT executives (Luftman et al., 2013).

Scholars have highlighted that IS professionals who are able to work closely with the business staff are key enablers of business and IT alignment (Luftman and Brier, 1999; Braki and Hartwick, 2001). It is also suggested that IS graduates play a vital role in bridging the gap between business needs and IT solutions (Richard et al., 2011).

IS programs in higher education (HE) institutions have trained graduates for many years to develop the appropriate skills needed for their future career. Yet, organizations are still having difficulty finding graduates who possess both the knowledge and skills that are best suited to their specific needs (Groom, 2014; Lee et al., 1995; Lee and Han, 2008; Williams, 2011). Prior studies also suggest that IS curricula are often ill-matched with industry/business needs (Lee et al, 1995; Lee and Han, 2008). Lee et al. (1995) suggested that IS curricula design at universities must be tailored to meet the business needs and also the needs of different IS professionals, offering multi-disciplinary approaches to provide breath, depth, and relevance.

Given the long-standing concern about business-IT alignment and the poor communication between technical and business staff on IS projects (Lochan and Shah, 2010; Mance, 2013), it is important for IS educators to develop graduates that are able to take a holistic view, encompassing both the social and technical aspects of a business system in IS developments.

At the same time, globally, governments, parents and students are increasingly viewing university degrees as an investment, expecting value for money, not only on the tangible benefits such as career opportunity and employability, but also intangible benefits such as student experiences. Furthermore, universities in the UK and the US increasingly have to deal with issues about the quality of their degrees and whether students earning the degrees obtain quality employment with quality employers. The university programs are more likely to pass muster on accountability when they align modules with the industry/professional body as 1) their students are more likely to graduate with relevant professional certifications and 2) the professional certifications they possess are more likely to translate into employment in quality jobs at quality employers. As such it is more crucial than ever for universities to demonstrate that they can offer students curricula that encompass both academic and professional criteria.

This paper reports on an IS curricula (re) design on *Business Domain and Requirements Analysis* (BDRA) (hereafter referred to as Business Analysis) in a UK HE institution which linked them with the professional body, *BCS – The Chartered Institute for IT*. The purpose of this arrangement was twofold (1) to better re-align the IS programs with business needs/practitioners' views, and (2) to provide real added-value to students. We believe that BCS accreditation and professional certification criteria can provide guidance to IS program curricula designers about the content that could/should be included in program modules because they collectively represent IT professionals across industries. There have been numerous instances of job adverts where BCS certifications are required, and there were also cases that employers invest in employees by funding attendance at training courses leading to BCS certifications. For instance, Deloitte put graduates through the BCS certifications and mention BCS on their website[1]. As such, the BCS is an appropriate proxy for employers in terms of IT knowledge and skills.

First, we will give an overview of the 'business analysis' in IS discipline and the role of the *Business Analyst* (BA). We then review current IS graduate business analysis curricula, and also business analysis from the perspective of a professional body, with a focus on BCS, and present the course redesign by aligning it with the professional body. Finally, we will discuss the outcomes and conclude the paper with a discussion of the wider implication for IS curricula design.

Business Analysis in IS Discipline

The section first gives a definition and the role of BA in IS developments. It then reviews the 'business analysis' course based on the MSIS 2006 model.

Business Analysis and the Role of Business Analysts

The notion of business analysis in IS discipline has developed since the late 80s /early 90s. Jakob (1986) advocated that business analysis should play a crucial role in the design and specification on IS projects. They define business analysis as a methodology that provides a clear structure and rigorous approach to the understanding of the business by involving the users during the lifetime of the project –both in the provision of the information and in the validation of the analyst's understanding, and in the use of a set of tools that provide a common language for the users, analysts and designers to communicate their understanding. They also stress that users play the most important role in the IS design process and that they are the only people who know what functions they perform and what that entails in terms of information. However, users are not generally trained in system analysis or the design of information/computer systems. Business Analysts thus play a key role in bridging the gap between users and IS designers by eliciting requirements and conveying the information to IS designers in terms that both sides can understand and agree.

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[1] https://www2.deloitte.com/uk/en/pages/careers/articles/brightstart-business-apprenticeship.html

The International Institute of Business Analysis (IIBA) offers the definition: '*Business analysis is the practice of enabling change in an enterprise by defining needs and recommending solutions that deliver value to stakeholders. Business analysis enables an enterprise to articulate needs and the rationale for change, and to design and describe solutions that can deliver value*' (IIBA, 2015).

The BCS recognizes business analysis as a distinct IS discipline, and awards certifications in business analysis at different levels. It provides the following definition '*Business Analysts provide the bridge between the business and IT systems, and are pivotal to organizational success*' (BCS, 2013).

Similarly, the Australian Computer Society (ACS) defines the role of a business analyst is to '*assess the overall business and information needs of an organization. They co-ordinate the design of new IT solutions to improve business efficiency and productivity*' (Richard et al., 2011).

'*Business Analysis' in IS Graduate Programs*

Apigian and Gambill (2014) conducted a review of courses currently offered in IS graduate programs across the US and compared courses offered to the MSIS 2006 Curriculum model. Out of the top 15 required courses that they identified, we found that none of them focused on business analysis. Similarly, of the top 15 elective courses, none related to business analysis.

The MSIS 2006 model (Gorgone et al., 2006; Topi et al, 2014; Topi 2014) highlights the importance of incorporating business skills/knowledge and social aspects of the business systems in IS curricula design e.g. change management (albeit under project management), strategy policy, human computer interaction, and integrated Capstone as required courses. However, according to the findings of Apigian and Gambil (2014) these were not taught at all as full courses at any university they reviewed.

Furthermore, "analysis, modeling, design" is listed in the MSIS model (albeit this could be interpreted as business or system analysis), however, the majority of the courses offered are on "systems analysis and design" rather than "business (requirements) analysis/modeling". A study by Vongsavanh and Campbell (2008) shows that there are distinctions between the roles performed by Business Analysts (BA) and System Analysts (SA), and also the knowledge/skill set that they possess. They highlighted that BA is concerned with the business and how to use IT/IS to achieve business goals whilst SA is more concerned with software development and implementation. The BA tasks as identified by them include business problem analysis, IS strategy evaluation, requirements elicitation, business systems/processes modelling, and solution designer. Whilst the SA tasks include requirements elicitation, system function/process modelling, systems implementer, systems maintenance, and IS standards maintenance. As such, the role of SA is more a mediator than a technical specialist. Interestingly, "Business Analyst" and "Liaison between IT and Business Functions" are listed in typical job objectives of MSIS graduates (Gorgone et al., 2006).

'*Business Analysis' in Professional Body*

The IIBA, BCS, ACS, PMI are all providing training and awarding professional certifications in 'business analysis'; in this paper, we focus only on those offered by BCS.

As stated earlier, BCS recognizes business analysis as a distinct IS discipline and awards certifications at different levels, namely *foundation, practitioner, professional, consultant and expert levels*. Each certificate is mapped to the internationally applied Skills Framework for the Information Age (SFIA/SFIA plus). The BCS certification is developed with industry experts ensuring relevance to today's IT professional, and it is internationally recognized. Thus, by aligning modules to professional accreditation/certification criteria, we believe that it will enhance the accountability of our program where 1) students are more likely to graduate with relevant professional certifications and 2) the professional certification(s) they possess are more likely to translate into being hired into quality jobs and quality employers.

Among all the different levels of certification, we believe the business analysis practice (BAP – part of the BCS International Diploma in Business Analysis) certification is deemed most appropriate and will provide added value to our IS graduates as 1) it is concerned with the fundamental aspects of business analysis, and 2) the focus is on using a holistic approach to the investigation and improvement of business situations with a view to developing effective, feasible business solutions.

Our postgraduate students come from a wide range of background e.g. linguistics, law, economics, electrical engineering, and the majority of them do not have an IT/IS as a first degree. Hence, the fundamental aspects – knowledge and understanding of the business analysis principles and techniques – offered by the BAP certification are appropriate, as, having already acquired a specialism in their first degree, this certificate would enhance their employability and credibility, especially for those with no/little working experience. The BAP certification would also help those who want to change their career paths to a more business oriented role than a technical one. The certification would also provide the graduates exposure to industry/experts in the profession as students who were awarded the certificate will gain a year free membership of BCS.   The syllabus of the BCS BAP is presented in Appendix A.

The next section presents the "Business Domain and Requirements Analysis" (BDRA) (re) design and links it with the BCS professional body. The aim was to obtain BCS accreditation for the module to contribute to the Professional Certificate in Business Analysis Practice.

Linking Business Analysis Curricula (Re) Design with the Professional Body

This section first introduces the BDRA module and then outlines the approaches taken for the (re) design, including the review of the theory of Teaching and Learning (T&L) in HE. This is followed by the (re) design of the module, including the content and associated assessment.

The "Business Domain and Requirements Analysis" Module

It is noted that the issue of building academic content based on a professional certification is not non-controversial. The BDRA module was first offered in 2008/9. It was initially designed by focusing on the upper part of the V-model (lower part was for Systems Analysis and Design - SAD) and identifying the necessary knowledge and skills for the execution. The content identified for the learning outcome of the module appeared to align well with the BCS syllabus, so we adopted a similar structure and later applied for the accreditation. So while the issue of building academic content based on a professional certification is controversial, in this case, the professional certification aligned well with the academic content.

The module is a mandatory module for all of the MSc Programs within the Business Informatics area, i.e. MSc Business Information Management (BIM), MSc Business Technology Consulting (BTC), MSc Information Management and Systems (IMS), as well as Doctor of Engineering (EngD) students for Technologies for Sustainable Built Environments at the School of Construction Management and Engineering. In addition, there are three taught modules that have a direct dependency from this module (albeit this is not explicitly stated as a pre-requisite), namely the "Systems Analysis and Design" (mandatory for IMS students), "Organisation Design and Performance Management" (mandatory for BIM students), and "Business Architecture" (mandatory for BTC students). It thus plays an important role in the curriculum design and development in the taught Business Informatics programs.

The (re)alignment of the module with the practitioners' viewpoints is important, nevertheless, the re-design also needs to take into consideration theory of Teaching and Learning (T&L) in HE, so as to ensure that all the T&L elements are constructively aligned. The next section presents the conceptual model of T&L in HE in guiding the re-design.

Teaching and Learning in HE: Constructive Alignment

A number of scholars have examined the planning and teaching and learning in HE (e.g. Ramsden, 2006; Light and Cox, 2001; Stafani, 2009; Biggs and Tang, 2011). Most emphasize the importance of outcome-based teaching and learning, that is the outcomes of the total university of experience, referred to as 'graduate outcome' or 'graduate attributes', such as problem-solving skills, team work, communication skills, creativity, critical thinking and lifelong learning. The focus is on what outcomes students are supposed to achieve rather than on what topics to teach, and these should be contextualized in the course and programmes that students undertake.

In this context, Briggs' Constructive Alignment Framework (2011) is well-regarded by academics in HE pedagogy design as it provides a conceptual framework for reflecting on key questions (e.g. what do I want my students to learn? What are the available resources for getting them to learn? And how do I know how well they have learned?) that need to be answered at all crucial stages of teaching and learning. As depicted in Figure 1, the contextualization of the module (re) design considers not merely the assessment tasks but also the accompanying T&L activities.

The conceptual framework is thus useful in guiding the re-design and T&L activities for the module which will be presented in the next section.
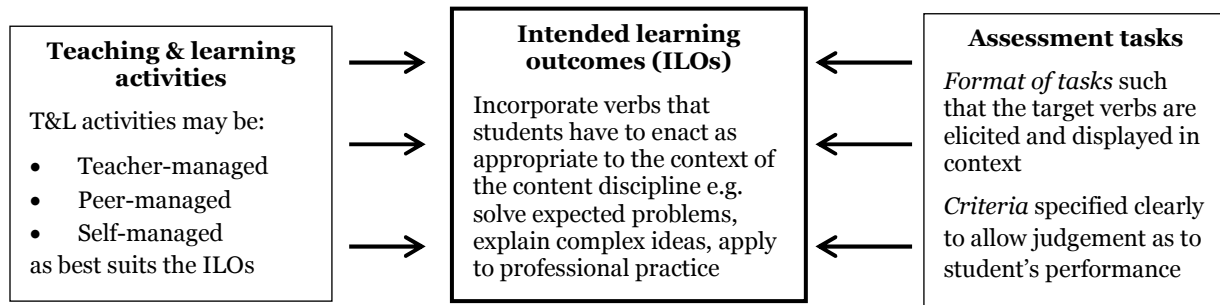

Figure 1: An overview of Constructive Alignment Framework: aligning intended learning outcomes, teaching and assessment tasks (source: Biggs and Tang, 2011, p. 105).

The Translation of the Conceptual Mode to the Curriculum Redesign Project

Figure 2 translates the conceptual model in Figure 1 to the curriculum re-design project.
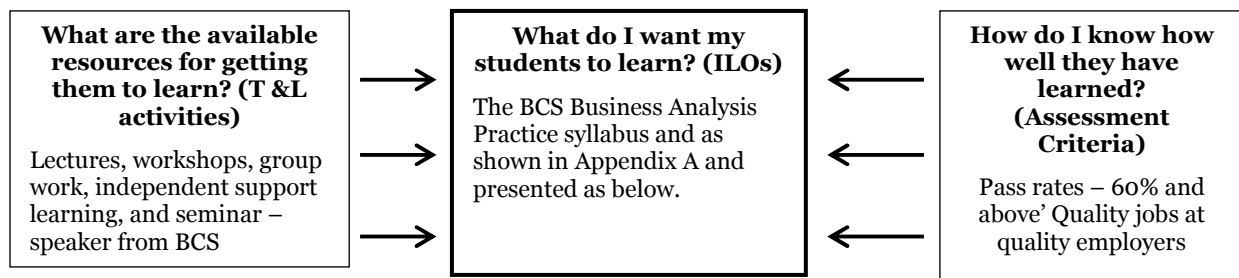

Figure 2: The translation of the conceptual model to the curriculum redesign

What do I want my students to learn – the Intended Learning Outcomes (ILOs)

Biggs and Tang (2011) stress that three key points need to be considered when designing outcomes: (1) decide what kind of knowledge is to be involved, (2) select the topics to teach, considering breath vs depth of understanding, and (3) decide the levels of understanding intended.

The module has the following learning outcomes:
- apply the key concepts of organizational context, business strategy, stakeholder analysis, business systems and process thinking, and change management for business requirements analysis;
- articulate information systems solutions for the business as a whole based on business practices and management at operational and strategic levels, and formally represent the analysis results in terms of business requirements;
- examine the role of information systems in achieving corporate objectives, supporting operations, and managing business intelligence and knowledge;
- facilitate a transformation of the business requirements for both IT project management and information systems analysis and design;
- use suitable methods and techniques for analyzing the business domain and producing business requirements, and
- make a business case.

As for the knowledge of the module concerned, there is a focus on functional (i.e. put knowledge to work, to make it function) rather than declarative knowledge (i.e. second hand knowledge); the level of understanding (of subjects) is more towards the relational (i.e. to integrate different aspects into a coherent whole) and extended abstract (to generalize that whole as yet untaught applications) in terms of the SOLO (Structure of Observed Learning Outcome) taxonomy (Biggs and Tang, 2011). The emphasis is thus on the higher order cognitive process dimensions of Bloom's revised taxonomy. The course content and its associated learning objectives are outlined in the next section.

Course Content/Teaching Materials

The learning content and the associated learning objectives are as follows:

1. Rationale for Business Analysis - be able to explain what business domain and requirements analysis is; be able to justify why we should carry out business domain and requirements analysis; be able to identify tasks in business and requirements analysis.
2. Strategy Analysis – understand what strategy is and its importance in business domain and requirements; be able to describe and use methods and techniques on developing strategies; and be able to explain the importance of aligning organizational strategy and information systems strategy.
3. Organisational Aspects of Business Analysis – be able to explain factors that influence an organisation's structure, culture, and members; be able to apply concepts in organizational design and management to analyse organizational settings.
4. Stakeholder Analysis and Requirements Elicitation – be able to explain what stakeholder analysis is and why it is important for the success of IS projects; be able to describe and apply methods of stakeholder analysis; be able to apply the methods and techniques of requirements elicitation.
5. Business Systems and Function Modeling – be able to understand concepts of systems thinking in business requirement analysis; be able to apply systems thinking approaches to business systems modelling; be able to articulate business requirements with use case models; understand the principles and style guide of UML Use Case Diagrams for business function modeling
6. Business Process Modeling - be able to model the business solution from a process perspective; understand the methodology and techniques for business process modelling e.g. BPMN and UML; to detail the behavior in terms of business process using Activity Diagrams in UML; to understand the principles and style guide of activity diagrams for business process modeling
7. Enterprise Architecture Modeling – understand the concept of enterprise architecture and its strategic impact on information systems; identify elements of the ArchiMate model for enterprise architecture; apply ArchiMate modeling concepts to model architecture examples
8. Managing Change – be able to explain why managing change is relevant to business domain and requirements analysis; understand the importance and need for managing technology introduction and change; be able to assess the potential problems in introducing new technology and systems into the workplace; be able to describe the concepts and models of change management and discuss issues to consider when expecting change
9. Making a Business Case – be able to explain what is involved in making a business case; be able to assess the nature of a business case, and the role it plays in IS projects.

The challenge of the module, however, is the wide coverage of the topics, which might encourage surface learning if the assessment tasks and T&L activities are not constructively aligned with the ILOs.

How do I know how well they have learned - Coursework & Assessment Criteria

The aim of the coursework is to enable students to apply the concepts and techniques covered to a case scenario and assess their understanding and ability to perform the tasks in business domain and requirements analysis. Students can choose to carry out the task based on a given scenario (option 1 – designing a system to support the collection of environmental data) or on an actual case scenario that they are or have been involved in (option 2- designing a system to improve an existing business process in an actual organization). Option 2 is recommended for EngD (Doctor of Engineering) and part-time students working in industry.

The learning objectives include the acquisition of critical thinking analysis and writing skills. Students who opt for option 2 must submit a title and a 500-word summary of the problem domain/scenario to the module convener and obtain agreement prior to the start of the work.

Assessment Criteria: A criteria-based assessment is used (Ramsden, 2006). The assessment criteria are outlined in Table 1. Students are required to submit a written report of approx. 5,000 words or not more than 25 pages, including all diagrams/figures but excluding references, appendices. The report contains two parts: an executive summary (10 marks) and the detailed business analysis report (80 marks). A total of 10 marks is also allocated to the overall structure and presentation of the report.

Assessment Criteria	Description
Executive Summary (10%)	Background, problem or opportunity, options available and considered, cost/benefit analysis, impacts and risks, and recommendations.
Introduction (10%)	Terms of reference, i.e. problem to be addressed, motivation, scope, and assumptions. Methods and techniques and report structure.
Business Domain Analysis (20%)	Includes strategy analysis, organization analysis, and stakeholder analysis
Business Requirements Analysis (20%)	Includes requirements specifications, business systems modeling and business process modelling
Managing Changes (10%)	Analysis of issues involved and discussion of change management strategies for sustainability.
Conclusion, Critical Evaluation and Future Improvements (20%)	Summary of the outcomes, discussion of limitations and issues, and suggestions for future improvements.
Structure and Presentation (10%)	Clarity of organization and structure, fluency of written style and appropriateness and consistency of referencing.

Table 1. Coursework Assessment Criteria

Results and Discussion

It was observed that students were keen and motivated to obtain the BCS BAP certificate. This section first gives a summary of the results based on summative assessment and the evaluation of the module. It then discusses how the curricula design addresses findings from scholars in the area.

Results and Module Evaluation

Table 2 shows grade distributions for the coursework over the past three years.

Grade	2012/13 (1st year of BCS accreditation)	2013/14 (2nd year of BCS accreditation	2014/15 (3rd year of BCS accreditation
A (70% and above)	11 (15%)	11 (19%)	16 (23%)
B (60% to 69%))	31 (44%)	27 (46%)	33 (47%)
C (50% to 59%)	23 (32%)	14 (24%)	17 (24%)
F (< 50%)	6 (9%)	7 (12%)	4 (6%)
No of students	71	59	70

Table 2. Grade Distributions for the Coursework

The results reveal a positive outcome for the accreditation with 59% of the students obtaining the BCS Professional Certificate in Business Analysis Practice in 2012/13; 65% in 2013/14, and 70% in 2014/15. A number of Graduates are now working as Business Analysts from evidence shown in their LinkedIn profiles. The use of LinkedIn profiles to address program accountability questions such as quality jobs at quality employers was evidence in Case et al. (2016). There were also students moving to BA roles shortly after completion of the module. Some of the students who were unsure about their career paths initially were considering BA as a professional career after taking the module.

Regarding the module evaluation:

- For the 2012/13 cohort, 97% of the responses expressed that they were satisfied with the quality of the module, with a response rate of 65%.
- For the 2013/14 cohort, 71% of the responses felt that the module had been worthwhile, and 19% neither agreed nor disagreed. The total response rate was 35% which is considered low.
- For the 2014/15 cohort, 94% of the responses felt that the module had been worthwhile with a response rate of 81%.
- With regard to the current cohort of 2015/16 (the results have yet to finalized), 95% of the responses have expressed that overall they are satisfied with the module and that their knowledge of this subject has increased. The total response rate is 58%.

Discussion

As presented earlier, the module was designed to develop each student's analytical/critical/logical thinking and business problem solving skills. It also aimed to develop each student's business skills by incorporating the organizational, culture aspects of the business analysis, and also strategies for stakeholder management and change management. Where the technical skills were concerned, techniques/methods for requirements elicitation, documenting business requirements, business systems and process modelling, and making a business case were introduced, as these skills were considered important for business analysts.

The majority of the skill set covered are consistent with the MSIS Model 2006, and the findings by Richards et al. (2011) in which they investigated what knowledge and skills are needed by a BA for IS graduates. Using the SFIA framework, their results show that soft skills/knowledge were perceived to be the most important, followed by business skills/knowledge, technical skills/knowledge and green skills/knowledge. Within the soft skills categories, analytical/critical/logical and business problem solving were considered to be of high importance, requirements specification/elicitation and applying IT to business were ranked the most important in technical skills categories, and stakeholder relationship management, organization skills and business process implementation were ranked high in the business categories.

Yet, making a business case is not addressed in Richard et al.'s study, and is regarded as important from a practitioner's point of view. One of the key roles of BA is to be able to evaluate business solutions/options relevant to the problem domain and make recommendations based on the assessment of cost and benefits, risks and impacts. So, this element should be covered in the curricula design.

Conclusion

The study has reported on a curricula (re) design for a IS postgraduate taught module in business analysis. Business analysis is a discipline that applies socio-technical principles to the understanding of business problems, defining requirements and evaluating relevant solutions. The Business and IT alignment on IS projects has long been cited as a key issue for many CIOs; it is suggested that BAs play a crucial role in bridging the gap between business needs and technical solutions. There are an increasing number of BAs, and professional bodies such as BCS, ACS, and IIBA offering training and awarding certifications in business analysis. However, this is not the case in HE IS programs. The emphasis is on 'system design and analysis', and there is little focus on 'business analysis'.

This study addresses the gap by introducing a module called 'business domain and requirements analysis.' It aims to develop IS graduates/professionals who are able to take a holistic view, and encompass both

social and technical aspects of a business system on IS developments. This study also shows how IS curricula could be better (re) designed and (re) aligned with the business needs by linking it with a certification offered by a professional body and at the same time fulfilling the T&L in HE. This paper provides a detailed description of a process for mapping module content to professional certification criteria and it can be replicated by IS educators at other universities. The process also helps ensure that module content aligns with desired practitioner knowledge and skills and also adds value to students by helping them earn a professional certification prior to graduating.

It is important to note that the issues of building academic content based on a professional certification is not non-controversial. However, in this case, the professional certification happened to align well with the academic content. It is also important to note that agile software development has, in the main, failed to recognise the BA role, although Amber and Lines (2012) noted that business analysis 'is important to the success of an agile team' and identified that BAs would be good candidates to take on the product owner role in an agile project. However, due to page limitation, we have not been able to address the issues relating to Agile development in this paper.

Acknowledgements

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Appendix A – BCS Syallabus (BCS, 2016)

1. Rationale for business analysis: lifecycle for business change, the role of the BA and other roles (e.g. Project manager, developer, and tester) within the lifecycle for business change, and the framework for business analysis activities (including relation of business analysis to strategic analysis and to system analysis, and the holistic approach to business analysis).

2. Understanding the strategic context: internal and external environment analysis, and SWOT analysis; critical success factors, key performance indicators and performance targets; the Balanced Business Scorecard as a framework for identifying Critical Success Factors and Key Performance Indicators;

3. Project discipline for business analysis studies: terms of reference/project initiation, business objectives (define what the business wishes to achieve as a result of the project) and project objectives (define what the project is required to deliver)

4. Understanding the situation/issues: stakeholder identification, techniques to investigate the current business situation (e.g. interviews, observation, workshops, document analysis, focus groups, and questionnaires/surveys), and representing a holistic view of the business situation (e.g. mind maps, fishbone diagrams)

5. Analysing stakeholder perspectives: stakeholder analysis and management, identifying different perspectives, and contrasting different perspectives

6. Analysing and modelling business activities: developing a conceptual business activity model, identifying business events, analyzing business rules, and building the consensus activity model

7. Identifying potential solutions: comparing the ideal and existing systems, identifying IS/IT requirements to support the new business model

8. Making the business case: identifying and shortlisting options for business change, identifying costs and benefits, risk and impacts.