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Abstract:

The growing complexity and high rate of change in the technological and business environments, paired with resource constraints faced by educational institutions, make it difficult for IS programs to offer in-depth education across the variety of topics comprising the IS discipline. Specialization may be an effective way for IS educators to provide rigorous education, while incorporating material related to the latest technological and business developments. This opinion essay considers the area of business analysis as one such area of specialization. The essay examines the place of business analysis in IS research and practice, as well as the current state of business analysis coverage in IS curriculum. Recommendations regarding strengthening the area of business analysis are provided, including the creation of a stand-alone business analysis course in IS curriculum, defining business analysis as a specialization area or career track, and strengthening ties with professional associations.

Keywords: business analysis, systems analysis and design, IS curriculum, IS education

I. INTRODUCTION

The end of the twentieth and the beginning of the twenty-first century were characterized by dramatic changes in information technology and how it is used by individuals and organizations around the globe. All facets of human life, from international banking transactions to individual shopping and even dating, have been revolutionized by IT. At the same time, organizations struggle to achieve alignment between business and IT functions [Luftman and Kempiah, 2007] and concerns over the relevance of IT have been raised [Carr, 2003]. In such circumstances, the ability to relate IT solutions to business needs becomes critical to the success of IT professionals. Not surprisingly, attracting and retaining qualified IT professionals with good understanding of business remains an important concern of IT executives [Luftman and Kempiah, 2008].

IS programs in Business Schools have a long tradition of preparing graduates who are well-versed in both technical and business domains and can act as boundary spanners between the technology and business worlds. Yet, maintaining relevance to the ever-changing technological and business environments requires making continuous adjustments to academic curriculum. While significant work has been done in defining the core IS curriculum at both graduate and undergraduate levels [Gorgone et al., 2003; Gorgone, Gray, Stohr, Valacich and Wigand, 2006; Topi et al., 2007; Topi et al., 2010], the focus has been on standardization of the curriculum in order to make it applicable to IS education in a variety of domains. Still, under conditions of increasing environmental complexity and in the presence of resource constraints, specialization of the curriculum may be a more effective approach. This opinion essay explores how specialization of IS programs in business schools on areas related to business analysis can benefit IS programs and help address industry needs. This essay adopts a broad definition of business analysis. *Business analysis* is defined as an amalgamation of activities directed at understanding, documenting, and managing organizational reality with the purpose of identifying, designing, developing, and implementing solutions (often IT-based) to business problems.

The rest of the article is organized as follows. First, arguments for specialization of IS programs with regard to academic curriculum are presented. Next, the importance of business analysis is discussed, with focus on both academic IS research and developments in the industry. The current state of the business analysis coverage in IS curriculum is then examined. Finally, suggestions are presented that may help strengthen the business analysis component in IS curriculum.

II. IS PROGRAMS AND THE NEED FOR SPECIALIZATION

Like the IS discipline in general, IS programs in Business Schools are challenged to maintain the identity of their curriculum vis-à-vis other academic programs while keeping up with the developments of IS practice. While the identity–diversity debate continues in relation to IS scholarship [Benbasat and Weber, 1996; Benbasat and Zmud, 2003; Robey 1996, 2003; Taylor, Dillon, and van Wingen, 2010], empirical evidence suggests that the IS discipline encompasses a wide array of topics [Sidorova, Evangelopoulos, Valacich, and Ramakrishnan, 2008; Vessey, Ramesh, and Glass, 2002] and draws on a number of reference disciplines, from computer science to psychology [Vessey et al., 2002; Wade, Biehl, and Kim, 2006]. Similarly, IS courses cover a variety of diverse topics, including application development, project management, human–computer interactions, IT audit and control, and enterprise architecture [Gorgone et al., 2006; Topi et al., 2010]. Some of these courses have common elements with courses in other business and technology disciplines.[1]

IS programs have to deal with rapidly changing business and technological environments. To illustrate the point, Gartner's website publishes dozens of technology "hype cycles," each referring to a variety of emergent technologies, approaches, or methodologies. For example, the hype cycle for Application Development includes trends from the more established object-oriented analysis and design methodologies to agile development methodologies (ADM), such as project-oriented ADM to service-oriented development of applications such as architected rapid application development (ARAD) [Gartner, 2011]. This leads to the rapid emergence of new "hot" technology skills such as business process management or mobile application development [Chace, 2011; Marsan, 2009].

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[1] See the overview report of the Joint Task Force for Computing Curricula 2005 for distinctions and similarities between IS, IT, computer science, and computer engineering curricula. The report is available at http://www.acm.org/education/education/curric_vols/CC2005-March06Final.pdf.

Individual IS programs have to balance providing students with deep knowledge of fundamental concepts (educational rigor) and incorporating material associated with the most recent technological and business developments (relevance). Incorporating new material into the curriculum is particularly challenging, as educational institutions face a variety of resource constraints. On the one hand, financial constraints translate into faculty shortages and restrictions on faculty development opportunities. On the other hand, as educational institutions are under pressure to ensure timely graduation, academic programs are restrained in the number of credit hours available to students for major courses. Taken together, the environmental developments and resource constraints make it increasingly difficult for IS programs to pursue a generalist strategy and to provide in-depth coverage of a wide variety of IS-related topics. While well-funded schools may be able to offer multiple specializations and thus allow IS students to select from several career tracks, other schools may find it beneficial to focus on providing superior education in a specialized area. Specialization decisions for individual IS programs need to be made based on a careful analysis of the strengths, weaknesses, opportunities, and threats faced by such programs. This essay focuses on the area of business analysis as one such specialization area. Business analysis represents a promising specialization opportunity because of the significant attention to business analysis in the industry and because it is well-aligned with IS research.

III. THE CASE FOR BUSINESS ANALYSIS

Business Analysis and IS Research

Grounded in the structured analysis and design methods [DeMarco, 1978; Yourdon, 1975] and data modeling techniques [Chen, 1976], business analysis has long been an important part of IS scholarship and practice. IS researchers focus on various facets of business analysis, including user involvement [Gallivan and Keil, 2003], requirement elicitation methods [Hickey and Davis, 2004; Grunbacher, Halling, Biffl, Kitapci, and Boehm, 2004; Pitts and Browne, 2004; Schenk, Vitalari, and Davis, 1998], modeling tools and techniques [Hitchman 1999; Parsons 2002], and so on. The role afforded to business analysis by researchers may differ depending on their assumptions regarding the causal agency in IS. Three dominant paradigms related to the causal agency have been identified in IS research: the technological imperative, the organizational imperative, and the emergent perspective [Markus and Robey, 1988]. *Technological imperative,* the dominant paradigm in early IS research, views technology as an exogenous force and examines the impact of technology on individuals and organizations [Markus and Robey, 1988]. Under the assumption of technological imperative, the role of a business analyst is that of a technology specialist: by knowing how various information technologies influence organizational outcomes, business analysts help organizations select and implement technologies that fit organizational goals. Early research of information presentation formats and DSS design exemplifies such a view. Research on the benefits of the various modeling techniques and case tools [Dean, Lee, Pendergast, Hickey, and Nunamaker, 1997] also follows the technological imperative assumptions, as the tools and techniques are assumed to lead to superior performance.

Organizational imperative assumes "unlimited choice over technological options and almost unlimited control over consequences" [Markus and Robey, 1988, p. 587]. This perspective affords business analysts the role of an intermediary charged with the critical task of correctly understanding organizational and user requirements and communicating such needs to IT designers and developers. Such requirements are then expected to be fully addressed in the resultant IT. The organizational imperative assumption is present in work on user participation and requirements elicitation methods [Moody, Blanton, and Cheney, 1998].

Unlike the technological and organizational imperatives, which take a deterministic view on IT and its consequences, the *emergent perspective* assumes that "the uses and consequences of information technology emerge unpredictably from complex social interactions" [Markus and Robey, 1988, p. 588]. The emergent perspective has gained recognition among scholars and has been adopted in studies using structuration theory [Orlikowski, 1992; Orlikowski and Robey, 1991; Markus and Silver, 2008], actor-network theory [Sarker, Sarker, and Sidorova, 2006; Walsham, 1997], and, more recently, complex adaptive systems theory [Nan, 2011]. The emergent perspective provides unique insights into the role of a business analyst. First, the emergent perspective usually assumes that technology is malleable and its outcomes are unknown. For example, a study of IS implementation in the healthcare settings [Goh, Gao, and Agarwal, 2011] suggests that the outcomes may include changes in technology and organizational processes and structures (routines), as well as the non-use of technology. Such unpredictability of outcomes makes the estimation of benefits associated with future IT implementation (usually considered a part of a business analyst's job) difficult, if not impossible. Second, the emergent perspective assumes that organizational processes and structures, as well as individual actions, change unpredictably in response to IT [Goh et al., 2011; Markus and Robey, 1988]. Moreover, system requirements are socially constructed as a part of complex and often political processes [Sarker, et al., 2006]. Viewed from the emergent perspective, business analysis is no longer a search for objective reality, but rather a complex and politically motivated negotiation process, which in its own right influences organizational structures, as well as technology [Sidorova and Kappelman, 2010]. Under the emergent

perspective, the role of a business analyst is that of a facilitator in the interactions among organizational structures, technology, and individual actions.

In spite of the differences in the underlying assumptions regarding the role of technology and humans in shaping organizational reality, IS researchers generally agree on the importance of achieving alignment between business and technology, which is one of the key objectives of business analysis. Drawing from the diverse theoretical perspectives and backgrounds, the IS scholarship offers a plethora of useful insights into the role of a business analyst who is expected to act, depending on the situation, as a technology expert and advocate, organizational knowledge integrator and synthesizer, or a master negotiator. IS research also offers insights into the process of business analysis and its relationship with other IT-related and business processes. Such research-based insights constitute a solid basis for the development of BA-centered curriculum. In the next section, industry trends and how such trends relate to business analysis are addressed.

Business Analysis and Practice

Business analysis has received increased attention from IS practitioners, due to a variety of trends. The complexity of organizational computing has increased dramatically over the past two decades. Powered by soaring processing speeds and data storage capacities, as well as dramatic improvements in communication infrastructure, organizations move from narrow, functionally focused systems to more complex integrated systems that span functional and organizational boundaries. At the same time, organizations increasingly rely on commercial off-the-shelf (COTS) applications and, more recently, cloud-based services [Gartner, 2010]. While the traditional role of business analysts was to support in-house development, a modern business analyst's job includes the evaluation and selection of a system acquisition strategy. This involves deciding when it is better to buy a COTS application versus building a custom solution, when it is more appropriate to rely on cloud versus on-premise computing, and whether it is more beneficial to outsource business processes or to keep them in house. If decisions are made to rely on COTS applications and third-party services, such applications need to be selected and managed to match organizational needs. This requires a deep understanding of user needs and organizational structures, data requirements, business processes, and organizational roles. Another important trend closely related to business analysis is the persistent focus on business process improvement. Business processes have received continuous attention among academics and practitioners under a variety of organizational initiatives, from business process re-engineering in the 1990s to supply-chain management and business process management in the 2000s [Davenport, 2008; Hammer, 2010]. This led to calls for more business process education [Chircu, Bandara, and Chand, 2009]. Careful business analysis is critical to business process improvement initiatives, which makes it a promising direction for specialization for IS programs [Markus and Grover, 2008].

The recognition of the need for better understanding of the organizational environment by IS practitioners and business managers has resulted in the professionalization of business analysis and the creation of related professional associations. The International Institute of Business Analysis (IIBA) was established with the mission "to develop and maintain standards for the practice of business analysis and for the certification of its practitioners" [IIBA, 2013c]. Other professional associations in related areas include the Association of Business Process Management Professionals International (ABPMP) (http://www.abpmp.org), the Enterprise Architecture Center of Excellence (http://www.eacoe.org/index.shtml), and others. These professional organizations create body-of–knowledge (BOK) compilations and offer certifications in their respective areas. Consistent with the industry trends, the BOK compilations emphasize the importance of holistic understanding of the enterprise and its processes [*BPM CBOK,* 2009]. They also highlight the importance of understanding and communicating the value of IT-based solutions and selecting appropriate solutions to business problems [*BABOK® Guide,* 2009]. With the growing membership in BA-focused professionals associations, the BOK compilations by such associations are bound to influence industry expectations regarding the knowledge possessed by university graduates. The convergence of industry trends and the ongoing professionalization of BA are likely to lead to a heightened demand for IS graduates with a strong background in business analysis.

Business Analysis as an Opportunity for IS Programs

As discussed in the previous sections, developments in the IS industry point to the importance of business analysis, and indicate business analysis as an important concentration in business education. Business analysis knowledge and skills are technology-independent and are expected to be relevant for implementation of new technologies as they emerge. Much of IS academic research deals with issues that are relevant to business analysis; therefore, focusing on business analysis education is likely to contribute to better alignment between research and teaching demands of IS faculty. Business analysis is rarely taught in business schools outside of IS programs, and relevance of business analysis skills and knowledge is not limited to IS solutions. This presents an opportunity of attracting non-IS students into IS courses. Educating both IT and non-IT professionals in methodologies, tools, and techniques of business analysis may help foster communication between business and IT functions, thus contributing to

business-IT alignment. This suggests that business analysis is a promising specialization area for IS programs. The next section examines the coverage of business analysis in IS curriculum.

IV. BUSINESS ANALYSIS IN IS CURRICULUM

Significant work toward the development and standardization of IS curriculum has been undertaken during the past decades. Early curriculum models were introduced in the 1970s, followed by the development of curriculum models by ACM, AIS, and AITP [Gorgone et al., 2003]. The most notable recent works related to IS curriculum include the *IS 2010: Curriculum Guidelines for Undergraduate Degree Programs in Information Systems* [Topi et al., 2010], which was produced by a joint ACM and AIS task force. Efforts related to the undergraduate curriculum development were mirrored with reports focused on graduate IS curriculum [Gorgone, Gray, Stohr, Wigand, and Valacich, 2005; Gorgone et al., 2006].

Undergraduate IS 2010 Curriculum Guidelines are designed to prepare graduates for a variety of career paths, including Application Developer, Business Analyst, Business Process Analyst, and Database Administrator. Careers of business analysts, business process analysts, database analysts, e-business managers, ERP specialists, information auditors, and compliance specialists are most viable targets for business school graduates, because pursuing such careers requires business domain knowledge in addition to technology knowledge. Graduates pursuing these career paths would particularly benefit from strong business analysis skills and knowledge. The IS 2010 curriculum guidelines recommend seven core courses that should be taken by all IS majors, and eleven recommended elective courses. The core courses include Foundations of Information Systems; Data and Information Management; Enterprise Architecture; IS Project Management; IT Infrastructure; Systems Analysis and Design; and IS Strategy, Management, and Acquisition. Suggested elective courses include Application Development, Business Process Management, Collaborative Computing, Data Mining/Business Intelligence, Enterprise Systems, Human–Computer Interactions, Information Search and Retrieval, IT Audit and Controls, IT Security and Risk Management, Knowledge Management, and Social Informatics [Topi et al., 2010]. The graduate MSIS 2006 curriculum guidelines [Gorgone et al., 2006] suggest that the graduate curriculum includes the two IS foundation courses, two or three business foundation courses, eight core IS technology and IS management courses, as well as a capstone course and career tracks. The core IS technology courses include IT infrastructure; Analysis, Modeling, and Design (including HCI and Data Management); Enterprise Models; and Emerging Technologies and Issues. The IS management courses include Project and Change Management, Strategy and Policy, Integrated Capstone, and Implications of Digitization.

The undergraduate and graduate IS curriculum guidelines [Topi et al., 2010; Gorgone et al., 2006] outline the topics that need to be covered in each of the IS 2010 and MSIS 2006 courses, and such topic lists were analyzed for the coverage of material most relevant for business analysis. The analysis was informed by the definition of business analysis adopted here, as well as by the three views of the causal agency in IS research. Therefore, in analyzing course content, the focus is on topics that either (1) provide background knowledge on organizational processes, information flows, and structures, (2) help develop skills necessary for eliciting, documenting, and analyzing information about such organizational processes, information flows, and structures, (3) provide technical knowledge necessary for making a selection decision among a variety of solutions, or (4) change management skills that allow the person to manage organizational and technological change associated with the design and implementation of IT solutions. The results of the analysis for the undergraduate curriculum guidelines, IS 2010, suggest that that a number of courses, particularly Systems Analysis and Design and Project Management, offer skills and knowledge necessary for conducting business analysis (see Table A-1, Appendix A).

Graduate IS curriculum, MSIS 2006, offers a more extensive coverage of business analysis topics, with almost all the courses providing at least some coverage of BA-relevant material. The majority of material relevant to understanding organizational processes, structures, and individual actions is presented in such courses as Analysis, Modeling, and Design; Enterprise Models; and Project and Change Management; and, to a lesser degree, Strategy and Policy; and Data Management (see Table A-2, Appendix A).

BA in IS Curriculum vs. IS Research

Comparison of the BA coverage in IS curriculum with the view of BA in IS research offers insights useful for both IS research and IS curriculum development. As discussed earlier, the IS research view of what constitutes business analysis is informed by one of the three perspectives: the technological imperative, the organizational imperative, and the emergent perspective. The present coverage of BA in IS curriculum is biased toward technological and organizational imperatives. According to the technological imperative perspective, which suggests that technology drives organizational change, the role of the business analyst is to understand the consequences of different technologies and to select technologies that will help organizations achieve their goals. This view of business

analysis is reflected in the more technical IS courses, such as IT infrastructure or HCI. These technical courses equip future business analysts with the knowledge about capabilities of specific technologies, and thus help them evaluate future technology benefits and make recommendations regarding IT solutions. Similarly, in line with the technological imperative perspective, some managerial courses, such as IT strategy and policy, teach how to assess the benefits associated with IT, thus assuming that organizational benefits of IT are determined by the IT itself.

The organizational imperative assumes the precedence of human decisions and organizational design over technological choices. Technological choices are expected to follow from top-down strategic decisions. The role of a business analyst is to adequately capture organizational and business requirements and to relate them to technology developers. The organizational imperative view of business analysis is dominant in the Systems Analysis and Design and Application Development courses, which assume that IS can be developed to fully address organizational requirements. Such courses tend to be centered around the system development lifecycle and place significant emphasis on developing requirement elicitation skills, as well as skills necessary for modeling user requirements, translating them into design documents, and communicating them to IT developers.

The emergent perspective suggests that IT use and consequences emerge unpredictably from complex interactions between social and technological factors. According to this perspective, technology *per se* does not determine organizational change as assumed by the proponents of the technological imperative. Nor is it always as malleable as is assumed by the organizational imperative advocates, and as taught in analysis and design courses. Instead, organizational and technological factors interact, and such interactions result in organizational and technological changes. The mutual shaping of organization and technology is likely to be characterized by conflicts and compromises [Sarker et al., 2006; Goh et al., 2011]; therefore, the role of a business analyst is associated with managing such conflict and helping forge agreement based on compromise. The emergent perspective implies that business analysts should be able to foresee potential uses and consequences of IT-related initiatives based on an understanding of existing technology properties, organizational structures, and individual motivations. Successful business analysts should also help reduce negative uses and consequences through facilitating negotiations among organizational stakeholders. This requires significant negotiation and conflict resolution skills. Unlike the technological and organizational imperative perspectives, the emergent perspective is not as well represented in the current IS curriculum guidelines, perhaps with the exception of the project and change management courses. Although individual instructors may already incorporate the emergent perspective into their teaching, adding more explicit references to the emergent perspectives in the course topic descriptions would encourage more instructors to articulate such perspectives in the classroom.

In sum, an analysis of IS curriculum suggests extensive coverage of important business analysis topics. Yet such coverage is not fully in line with the findings of IS research. Incorporating the emergent perspective on IT use and consequences will strengthen IS curriculum and the business analysis profession in general. The next section discusses the extent to which IS curriculum is related to business analysis knowledge standards developed by professional associations, such as the IIBA *Guide to Business Analysis Body of Knowledge* (*BABOK Guide).*

IS Curriculum and BABOK

The *BABOK Guide* defines *business analysis* as "a set of tasks and techniques used to work as a liaison among stakeholders in order to understand the processes, structure, policies, and operations of an organization, and to recommend solutions that enable the organization to achieve its goals" [*BABOK Guide,* 2009, p. 3]. This is similar to the definition of *business analysis* adopted in this essay. The *BABOK Guide* defines key knowledge areas of business analysis and lists most important tasks for each area, as well as existing methodologies and techniques associated with such tasks. While the *BABOK Guide* is just a one-association view of what business analysis entails, there are significant benefits to aligning IS business analysis curriculum with such a body of knowledge compilation for the following reasons. First, the IIBA (the collective author of the *BABOK Guide*) is primarily a practitioner organization. With IIBA membership growing, the *BABOK Guide* is likely to represent the industry view of BA and industry expectations regarding the BA skills of IS graduates. Therefore, achieving alignment between BA curriculum and the *BABOK Guide*, is likely to contribute to ensuring the relevance of IS education. Second, the IIBA offers professional certifications, and aligning IS curriculum with the *BABOK Guide* topics will help IS graduates obtain such certification in the future. A detailed comparison of the IS curriculum and the *BABOK Guide* is presented in Appendix B, which suggests that the existing IS curriculum offers at least some coverage of most BA knowledge areas. Specifically, significant coverage is provided for such BA knowlege areas as enterprise analysis, requirements elicitation, and requirements analysis. Less represented areas include requirements planning and management, requirements communication, and solutions assesment and validation.

BABOK Knowledge Areas Well Covered in IS Curriculum

Enterprise analysis is defined as an area of business analysis, comprising "activities necessary to identify a business need, problem, or opportunity, define the nature of a solution that meets that need, and justify the investment necessary to deliver that solution" [*BABOK Guide,* 2009, p. 81]. Many aspects of enterprise analysis, such as problem identification and project selection, estimation of costs and benefits associated with a project, as well as development of a business case for a project are covered in systems analysis and design (SA&D) and project management courses. There is also sufficient coverage of these topics in major SA&D textbooks (see a detailed comparison in Appendix B). Because identification of a business need requires understanding of enterprise architecture, the inclusion of a core course on enterprise architecture in IS 2010 helps better prepare students for conducting enterprise analysis. Thus IS programs are already well-positioned to teach material related to the enterprise analysis knowledge area, and it is up to individual instructors to allocate sufficient time for this topic in their course syllabi.

Requirements elicitation is a set of business analysis activities that are directed at getting system requirements from a variety of system stakeholders. The requirements elicitation subject is included as an important topic in systems analysis and design courses, with all major textbooks devoting at least one chapter to its discussion. Interestingly, compared to the *BABOK Guide*, most SA&D textbooks focus on a relatively small subset of elicitation techniques, such as interviews, surveys, document analysis, and JAD sessions. Therefore, instructors are encouraged to make students aware of additional elicitation techniques, such as brainstorming or focus groups.

Requirements analysis is the BA knowledge area most adequately covered in the IS curriculum, with a significant number of topics in systems analysis and design courses focusing on requirements analysis. SA&D books provide detailed coverage of a variety of modeling techniques for representing process, data, and other user requirements. One potential improvement area is the development of textbooks that would offer an equally in-depth coverage of both structured and object-oriented modeling techniques. Another direction for improvement is related to business process modeling and analysis. While business process modeling, including BPMN, is taught as a part of business process management courses, such courses are considered electives and may not be offered by all IS programs. Thus, business process modeling is identified as a direction for strengthening the BA coverage in the IS curriculum.

BABOK Knowledge Areas Insufficiently Covered in IS Curriculum

Less sufficient coverage in the IS curriculum is afforded to the process aspects of business analysis as a whole, as well as to such knowledge areas as requirements planning and management, requirements communication, and solution assessment and validation. In addition, many important BA tasks and techniques are discussed superficially and, judging by the number of pages devoted to them in textbooks, are expected to be covered in a relatively short time. While traditional SA&D courses teach many techniques used in business analysis, including project scheduling techniques, requirements elicitation techniques, and data and process modeling techniques, such courses often do not discuss business analysis as a process. This may lead to the lack of awareness of certain important tasks that need to be performed as a part of business analysis, such as structuring requirements packages or validating requirements. The process view of BA adopted by the *BABOK Guide* shows the inter-relationships among tasks via the flow of inputs and outputs and, thus, can help students gain a more holistic perspective on business analysis.

Although the topic of collecting user requirements has long been an integral part of SA&D courses, in undergraduate IS curriculum little attention is paid to *planning* the requirements elicitation activities, including stakeholder analysis and work division. While some of the material relevant to planning and stakeholder analysis is covered in project management courses, strengthening such components of BA education would be useful. Requirements communication is a vital area of business analysis that is least covered in traditional IS courses. Although students are often required to communicate system requirements in the form of proposals, project reports, and presentations as a part of their course projects, SA&D textbooks provide little guidance regarding the format and content of such presentations, and instructors may fail to allocate sufficient time to the discussion of such vital issues.

Solution assessment and validation occurs during and after the implementation stage. While some aspects of solution assessment, such as quality assurance and testing, are usually discussed in implementation chapters in SA&D books, some other important aspects tend to be overlooked, including communicating solution impacts and conducting post-implementation reviews. As the industry practices switch from in-house development (where quality assurance and software testing is of very high importance), to the integration of multiple applications and services, systems selection and vendor management become increasingly important. While these aspects of solution validation are covered in several IS courses, offering a more complete and integrated coverage of this area will add value to IS education.

V. DIRECTIONS FOR STRENGTHENING BUSINESS ANALYSIS CURRICULUM

As evident from the analysis presented here, the IS curriculum already offers significant coverage of many of the topics related to business analysis. Yet, further strengthening of some areas would be beneficial for IS programs seeking specialization in Business Analysis.

Offering a Separate Course in Business Analysis

While IS curriculum covers many important aspects of business analysis, such coverage is spread across multiple courses. Offering a single integrated business analysis course will help strengthen business analysis as part of the IS curriculum and will also help communicate the importance of business analysis to students and external stakeholders. From the point of view of a standard curriculum, a Business Analysis course can be viewed as an elective. However, for schools choosing to offer a specialization in business analysis, such a course should form the cornerstone of the business analysis concentration.

A stand-alone course could combine such topics as business strategy analysis, stakeholder analysis and management, requirements planning, elicitation and analysis, requirementts communication and solution assessment. Such a course would incorporate hands-on individual and group assignments related to specific requirement elicitation techniques, and students would be asked to conduct focus groups, JAD sessions, interviews, etc. Students could be asked to develop "as-is" business process and data models of an existing organization. Such skills will help students appreciate the complexity of existing organizational processes and structures without references to specific technological solutions. The BA course should also increase student awareness of emergent processes associated with implementing IT-based solutions and build skills necessary for managing such consequences. Such skills should range from critical thinking to negotiation and conflict management skills. As a part of the course, the students should be asked to identify potential unintended consequences of implementing a solution and propose mitigation strategies and contingency plans. Offering a separate business analysis course would free up time in other courses for more in-depth coverage of new technological and methodological developments. For example, SA&D courses currently offer the most in-depth coverage of the business analysis topics. With such topics covered extensively in a business analysis course, the extra time in SA&D courses can be allocated to emergent topics: OO SA&D, agile development methodologies, development methodologies for SOA environment, and so on [Satzinger, 2007; Topi et al., 2010].

Defining Business Analysis Specialization Area

Specialization in business analysis should not be limited to offering a stand-alone business analysis course. At the undergraduate level, some of the core courses, such as Enterprise Architecture, Systems Analysis and Design, and IS strategy, along with IT Project Management, already provide some of the BA-related knowledge [Topi et al., 2010]. Thus, programs pursuing business analysis specialization, in addition to offering a stand-alone Business Analysis course, should highlight BA-related topics in core courses and identify interdependencies between BA and material taught in these courses. Among the electives, Business Process Management and Enterprise Systems can be recommended as electives most appropriate for the BA concentration. At the graduate level, BA specialization can be viewed as a career track [Gorgone et al., 2006], which would include a stand-alone course in BA, as well as a course in Process Management (BPM) and Enterprise Resource Planning.

Table 1: Defining BA Specialization Area			
Number	Course name	IS 2010 equivalent	MSIS 2006 equivalent
BA Elective 1	Business Analysis	N/A	N/A
BA Elective 2	Business Process Management	IS 2010 Elective: Business Process Management	Process Management (BPM)—Mobile computing career track
BA elective 3	Enterprise Systems	IS 2010 Elective: Enterprise Systems	Enterprise resource planning—e-Commerce career track

Establishing Closer Ties with Professional Organizations

IS programs can strengthen their business analysis curriculum by establishing closer ties with professional associations, such as the IIBA and the ABPMP; by encouraging their students to obtain professional certifications; and by aligning IS curriculum in the related areas with the knowledge standards promoted by such professional organizations. The analysis of commonalities and discrepancies between IS curriculum and the *BABOK Guide* highlight how both the IS curriculum and the BABOK can benefit from such alignment. While the current IS curriculum will benefit from deeper coverage of such topics as enterprise analysis, requirements planning, requirements communication, and solution assessment and validation, such coverage can be ensured by offering a separate course in business analysis. In the absence of a stand-alone business analysis course, individual

instructors teaching SA&D, enterprise architecture, and other related courses can take several simple steps that can help foster such alignment.

1. Make students aware of the IIBA, the ABPMP, and other professional organizations in the area of business analysis. This will help students be more cognizant of career paths directly related to business analysis and may encourage them to pay more attention to related course material.

2. Include the *BABOK Guide* and *ABPMP CBOK* as additional recommended readings for such courses as Systems Analysis and Design, Enterprise Architecture, and Business Process Management. While the body of knowledge compilations do not include sufficient details on how to use specific techniques, they are useful reference materials for topics that are not extensively covered in existing textbooks.

3. Incorporate discussions on the process of business analysis, key tasks involved, and the inter-dependency among those tasks. Although any prescribed sequence may not be applicable to a specific project, representing business analysis as a process will help students integrate the acquired knowledge. This is especially true if the BA process is represented graphically. Process orientation also helps attracting attention to important business analysis tasks that are frequently overlooked because there may be little "how-to" knowledge related to these tasks.

4. Discuss aspects of requirements planning as a part of the traditional requirements elicitation coverage. This may include emphasizing stakeholder analysis, tasks identification, works assignment strategies, and so on. As a bonus, the *BABOK Guide* offers a rather comprehensive discussion of requirements elicitation techniques with process description and key strength and weaknesses for each of those techniques. Although traditional textbooks usually cover selected elicitation techniques in greater detail, the structured description of a wide variety of techniques offered by the *BABOK Guide* is rather useful.

5. Discuss issues of requirements communication, solution assessment and verification throughout the Systems Analysis and Design course. Discuss the role of requirements at design and development stages, as well as the importance of requirements traceability throughout the systems implementation stage. A discussion of systems implementation and testing is an excellent time to revisit the issue of requirements communication and verification.

While IS curriculum may benefit from a better alignment with industry knowledge standards, such as the *BABOK Guide*, IS academics should assume a more active role in shaping such professional knowledge standards. For example, the current definition of business analysis by the IIBA as "activities necessary to identify a business need, problem, or opportunity, define the nature of a solution that meets that need, and justify the investment necessary to deliver that solution" [*BABOK Guide,* 2009, p. 81] incorporates both the technological imperative and organizational imperative assumptions, but not the emergent perspective. Yet, the field of business analysis can also be enriched through the incorporation of the emergent perspective on IT use and consequences. As a result, the theoretical and methodological tools associated with such emergent perspectives from soft systems methodologies [Checkland and Poulter, 2006] to complex adaptive systems theory [Nan, 2011] will become available to business analysis professionals.

Similarly, BA practice may benefit from the knowledge of both quantitative and qualitative research methodologies. The process of business analysis is akin to the academic research process: like IS researchers, business analysts need to have ways to analyze vast amounts of data collected as a part of requirements elicitation. Academic toolkits for conducting positivist and interpretive research may be of use to the business analysis community. Finally, because the area of business analysis is related to business process management and enterprise architecture, IS programs may benefit from partnering with business process management and enterprise architecture professionals in shaping both IS curriculum in related areas and body of knowledge compilations such as the *ABPMP CBOK*.

VI. CONCLUSION

As the complexities of business and technological environments, coupled with resource constraints, make it more challenging for IS programs to provide high-quality education in a diverse variety of topics, some programs may consider specializing their academic curriculum. Business analysis is one such specialization opportunity. The importance on business analysis is becoming more recognized in the industry due to such trends as focus on system integration, attention to business processes, and the need for managing heterogeneous COTS applications and cloud services. The growing recognition of business analysis as an important organizational function and the ongoing professionalization of business analysis championed by the IIBA make business analysis a promising specialization direction for IS departments. IS faculty have a long tradition in research related to business analysis, and many aspects of business analysis are already taught as a part of IS courses. The business analysis coverage of the IS curriculum can be further strengthened through the creation of devoted business analysis courses, designation of BA as a specialization area, and better alignment of IS curriculum with professional knowledge

standards. Finally, it is important to note that, while business analysis is a promising specialization area, it is not the only one. Therefore, this essay needs to be viewed as a call for a discourse on benefits of specialization in specific areas of IS, rather than a prescription to be taken for granted. In addition, empirical studies validating arguments presented here would greatly contribute to the discourse on specialization and the IS curriculum in general.

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1. These links existed as of the date of publication but are not guaranteed to be working thereafter.
2. The contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.
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APPENDIX A: BA COVERAGE IN INFORMATION SYSTEMS CURRICULUM

Table A-1: IS 2010 Courses and Business Analysis			
IS 2010 course	Course name	Business analysis coverage	Specific topics related to business analysis (based on course descriptions in Topi et al., 2010)
IS 2010.1	Foundations of Information Systems	Covers some BA topics, although coverage is superficial due to the survey nature of the course	Relevant topics include: Information systems in organizations; valuing information systems; organizational decision making, functions, and levels; information and knowledge discovery; application systems; enterprise-wide information systems; application systems.
IS 2010.2	Data and Information Management	Significant coverage of some BA topics related to organizational information and data requirements	Relevant topics include: Conceptual data model; using a database management system from an application development environment; use of database management systems in an enterprise system context.
IS 2010.3	Enterprise Architecture	Significant coverage of BA topics	Relevant topics include: Enterprise architecture frameworks; systems integration; enterprise resource software; monitoring and metrics for infrastructure and business processes; risk management; total cost of ownership and return on investment; software as a service; enterprise data models; data/information architecture and data integration.
IS 2010.4	IT Infrastructure	Some coverage of BA topics	Relevant topics include: Role of IT infrastructure in a modern organization; organizing storage on organizational networks; the role of IT control and service management frameworks (COBIT, ITIL, etc.) in managing the organizational IT infrastructure.
IS 2010.5	IT Project Management	Most PM topics are relevant to BA, as BA is often performed as a part of independent or IS development projects. In addition, stakeholder analysis and communication, which is critical to BA, is well-covered in PM courses	All PM management topics are relevant to managing BA projects.
IS 2010.6	Systems Analysis and Design	Extensive coverage of many BA topics	Relevant topics include: Identification of opportunities for IT-enabled organizational change; business process management; analysis of business requirements; structuring of IT-based opportunities into projects; project specification; project prioritization; analysis of project feasibility; fundamentals of IS project management in the global context; using globally distributed communication and collaboration platforms; different approaches to implementing information systems to support business requirements.
IS 2010.7	IS Strategy, Management, and Acquisition	Significant coverage of some BA topics	Relevant topics include: Impact of IS on organizational structure and processes; financing and evaluating the performance of information technology investments and operations.
IS 2010 Elective	Application Development	Limited coverage of BA topics	Relevant topics include: Program development lifecycle; requirements determinants and analysis.
IS 2010 Elective	Business Process Management	Significant coverage of BA topics related to analyzing business processes	Relevant topics include: Challenges in managing business processes; approaches to business process management and improvement; understanding organizational processes; process assessment; process improvement; using IT for process management and improvement; organizational issues in business process management.
IS 2010 Elective	Collaborative Computing	Some coverage of BA topics	Topics are not available in Topi et al., 2010; however, the use of collaborative computing can be useful in conducting BA projects.

Table A-1: IS 2010 Courses and Business Analysis – Continued			
IS 2010 course	Course name	Business analysis coverage	Specific topics related to business analysis (based on course descriptions in Topi et al., 2010)
IS 2010 Elective	Data Mining/ Business Intelligence	Some coverage of BA topics	Topics are not available in Topi et al., 2010; however; understanding of data-analytical needs of organizations is relevant to business analysis.
IS 2010 Elective	Enterprise Systems	Significant coverage of related topics	All topics are relevant to the extent that they cover key business processes supported by enterprise systems.
IS 2010 Elective	Human–Computer Interactions	Coverage of BA topics related to user psychology, which can be helpful in business analysis and in understanding the needs of business users	Relevant topics include: Users (capabilities, individual differences, learning, errors, training).
IS 2010 Elective	IT Audit and Controls	Significant coverage of controls, which is a major part of organizational processes	Relevant topics include: Information technology risks; business process and business continuity; controls over information and processes; controls assessment.
IS 2010 Elective	IT Security and Risk Management	Some coverage of BA topics	Topics are not available in Topi et al., 2010; however, understanding of organizational risk management and security practices is an important aspect of business analysis.
IS 2010 Elective	Knowledge Management	Some coverage of BA topics	Most topics build awareness of emerging technologies, which is critical in the process of identifying solutions to business problems.

Table A-2: MSIS 2006 Courses and Business Analysis			
MSIS 2006 course	Course name	Business analysis coverage	Specific topics related to business analysis (based on course descriptions in Gorgone et al., 2006)
MSIS 2006.1	IT Infra-structure	The course provides important technical background against which business analysis can be performed.	The most relevant topics are: Network, data and application architectures; enterprise application integration; enterprise systems and enterprise system architectures.
MSIS 2006.2	Analysis, Modeling, and Design	Significant coverage of many BA topics	Relevant topics include: Techniques for requirements determination, collection, and organization; team organization and communication; interviewing, presentation design, and delivery; group dynamics and leadership; project feasibility assessment and risk analysis; design reviews and structured walkthroughs; core UML diagrams; principles underlying the widely used object-oriented process models; data organization and design: conceptual data modeling; software package evaluation and acquisition; managing external relationships and procurement.
MSIS 2006.3	Enterprise Models	Focuses primarily on business processes Provides in-depth coverage of enterprise models relevant to conducting business analysis Provides background information on organizational processes and practices	Relevant topics include: A strategic view of processes; concepts of organizational efficiency and effectiveness; integrating the functional areas of the organization; relating processes to the financial, customer, and product-oriented goals of the firm; process innovation: analysis, modeling, and simulation; business process automation; using activity diagrams and business process modeling notation (BPMN) for business process modeling; business process modeling tools; job redesign: impacts of automation on work practices; achieving security and process compliance; monitoring and controlling processes; supply chain management (SCM); customer relationship management CRM); enterprise management systems (ERP); the process continuum: from structured to unstructured processes; processes that span the world: global virtual markets.

Table A-2: MSIS 2006 Courses and Business Analysis – Continued			
MSIS 2006 course	Course name	Business analysis coverage	Specific topics related to business analysis (based on course descriptions in Gorgone et al., 2006)
MSIS 2006.5	Project and Change Management	Provides coverage of stakeholder relations and change management	Relevant topics include: Project stakeholders; project management skills (leading, communicating, negotiating, influencing, and presenting); project planning (definition, scope, schedule, costs, quality, resources, and risks); the role of IS specialists as change agents; envisioning change and the change process; diagnosing and conceptualizing change; dealing with the challenges of implementation and understanding and coping with resistance; dealing with issues of motivation, interpersonal relations, group/team dynamics, and leadership in the change process; implications of cross-organization and international teams; managing organizational politics; the limitations of projects as organizational change initiatives; organizational influences on project success (culture, organizational structure, rewards, and measures); managing sourcing partners as well as defining contract and relationships.
MSIS 2006.6	Strategy and Policy	Offers skills and knowledge necessary to understanding organizational strategy	Relevant topics include: Aligning IT with the core competencies and strategies of the firm and assessing the impacts on organizational competitive position; translating strategic and IT objectives into operating principles for IS planning.
MSIS 2000.1	Data Management	Offers skills and knowledge related to understanding business data requirements	Relevant topics include: The entity relationship model; enterprise data architecture components and data requirements.

APPENDIX B: IIBA BOK AND IS CURRICULUM

The International Institute of Business Analysis

The International Institute of Business Analysis (IIBA), a not-for-profit professional organization, was originally established in 2003 in Canada (IIBA 2013a). On its official website, the IIBA lists increasing awareness of the value and contribution of business analysis professionals, continual development of *A Guide to the Business Analysis Body of Knowledge* (*BABOK Guide*), and advancing business analysis, among its strategic goals (IIBA 2013c). The IIBA offers professional certifications, including Certification of Competency in Business Analysis (CCBA) and Certified Business Analysis Professional (CBAP) (IIBA 2013b). The IIBA strives to establish the recognition of business analysis as a valuable profession and provides a forum for knowledge sharing among BA professionals. For example, individual IIBA chapters organize study groups to help prepare for the IIBA CCBA and CBAP examination. The creation of the CCBA and CBAP is a significant step toward establishing Business Analysis as a recognized profession, as it creates common standards of knowledge which should be possessed by business analysis professionals.

Business Analysis Body of Knowledge

As a part of its mission, the IIBA compiles and releases *A Guide to the Business Analysis Body of Knowledge® (BABOK Guide),* which codifies knowledge needed by business analysis professionals and is the recommended study guide for the CCBA and CBAP professional certifications.[2] The *BABOK Guide* focuses on the description of the body of knowledge without providing specific methodological guidance and detailed "how-to" advice. To ensure broad applicability, the guide strives to remain methodologically neutral and to offer equal coverage of different methodologies and techniques. Nevertheless, the guide offers a detailed process-oriented view of business analysis and a comprehensive inventory of business analysis techniques used at various stages of business analysis.

The *Guide* defines business analysis as "set of tasks and techniques used to work as a liaison among stakeholders in order to understand the structure, policies, and operations of an organization, and to recommend solutions that enable the organization to achieve its goals" [*BABOK Guide,* 2009, p. 3]. The business needs represent the requirements for a business solution; therefore, the six core business analysis knowledge areas are defined in relation to such requirements. The six areas are:

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[2]   At the time of the writing of this essay, version 2.0 of *BABOK® Guide* is the most updated version.

- Requirements planning and monitoring
- Elicitation
- Requirements management and communication
- Enterprise analysis
- Requirements analysis
- Solution assessment and validation

The knowledge areas are not intended to be viewed as stages of a project, as "business analysts are likely to perform tasks from all knowledge areas in rapid succession, iteratively, or simultaneously" [*BABOK Guide,* 2009, p. 6]. The guide describes key tasks related to each of the knowledge areas in terms of the input, process, and output, as well as most widely used techniques for performing these tasks. The guide also discusses the underlying competencies and techniques that can be used to perform such tasks. Table B–1 presents each of the knowledge areas and associated tasks. Table B–2 shows the use of various techniques to complete the tasks associated with the BA knowledge areas. Although the IIBA does not restrict the goal of business analysis to developing IT-based solutions, a review of tasks and techniques presented in Tables B–1 and B–2 suggests that there is a significant overlap between the BA knowledge areas defined by the IIBA and the material traditionally taught in systems analysis and design courses as a part of IS curriculum. Tables B–4 and B–5 show the extent to which specific BABOK knowledge areas and techniques are covered in four widely adopted textbooks on Systems Analysis and Design.

Table B–1: Business Analysis Knowledge Areas and Related Activities [*BABOK Guide,* 2009]	
Knowledge area	Key activities
Requirements planning and monitoring	• Plan business analysis approach • Conduct stakeholder analysis • Plan business analysis activities • Plan business requirements communication • Plan requirements management process • Manage business analysis performance
Elicitation	• Prepare for elicitation • Conduct elicitation activities • Document elicitation results • Confirm elicitation results
Requirements management and communication	• Manage solution scope and requirements • Manage requirements traceability • Maintain requirements for reuse • Prepare requirements package • Communicate requirements
Enterprise analysis	• Define business need • Assess capability gap • Determine solution approach • Define solution scope • Define business case
Requirements analysis	• Prioritize requirements • Organize requirements • Specify and model requirements • Define assumptions and constraints • Verify requirements • Validate requirements
Solution assessment and validation	• Assess proposed solution • Allocate requirements • Assess organizational readiness • Define transition requirements • Validate solution • Evaluate solution performance

Table B–2: Business Analysis Knowledge Areas and Related Techniques [*BABOK Guide,* 2009]

Business analysis technique	Requirements planning and monitoring	Elicitation	Enterprise analysis	Requirements analysis	Solution assessment and validation	Requirements communication and management
Acceptance and evaluation criteria definition	X			X	X	
Benchmarking			X			
Brainstorming	X	X	X			
Business rules analysis			X	X	X	
Data dictionary and glossary			X	X		
Data flow diagrams				X	X	
Data modeling				X	X	
Decision analysis	X		X	X	X	
Document analysis		X	X			
Estimation	X			X		
Focus groups		X	X		X	
Functional decomposition	X		X	X	X	
Interviews	X	X			X	
Interface analysis		X	X	X		
Lessons learned process	X					
Metrics and key performance indicators	X		X	X		
Nonfunctional requirements analysis				X		
Observation		X			X	
Organization modeling	X			X	X	
Problem tracking	X	X		X	X	X
Process modeling	X			X	X	
Prototyping		X		X		
Requirements workshops	X	X				X
Risk analysis	X		X	X	X	
Root cause analysis	X		X		X	
Scenarios and use cases	X			X	X	
Scope modeling	X		X	X		
Sequence diagrams				X		
State diagrams				X		
Structured walkthrough	X			X		X
Survey/questionnaire	X	X			X	
SWOT analysis			X		X	
User stories	X		X	X		
Vendor ssessment			X		X	

Table B–3: IS 2010 Courses and *BABOK Guide* Knowledge Areas

IS 2010 courses (Topi et al., 2010)		Requirements planning and monitoring	Elicitation	Requirements communication and management	Enterprise analysis	Requirements analysis	Solution assessment and validation
IS 2010.1	Foundations of Information Systems		S		S	S	S
IS 2010.2	Data and Information Management		S			S	
IS 2010.3	Enterprise Architecture				S		
IS 2010.4	IS Project Management	S		S	S		
IS 2010.5	IT Infrastructure						S
IS 2010.6	Systems Analysis and Design	S	Y	S	Y	Y	S
IS 2010.7	IS Strategy, Management, and Acquisition				S		S

Table B–3: IS 2010 Courses and *BABOK Guide* Knowledge Areas – Continued								
IS 2010 Elective	Application Development						S	S
IS 2010 Elective	Business Process Management			S		S	S	
IS 2010 Elective	Collaborative Computing							
IS 2010 Elective	Data Mining/Business Intelligence			S			S	S
IS 2010 Elective	Enterprise Systems			S	S			S
IS 2010 Elective	Human–Computer Interactions		S				S	S
IS 2010 Elective	Information Search and Retrieval							
IS 2010 Elective	IT Audit and Controls			S		S	S	S
IS 2010 Elective	IT Security and Risk Management					S		S
IS 2010 Elective	Knowledge Management		S	S		S	S	S
Y—significant coverage, S—some coverage								

Table B–4: Coverage of BABOK Topics in System Analysis and Design Courses					
BA knowledge areas and related tasks and techniques (IIBA 2006)		Hoffer, George, and Valacich, 2014	Kendall and Kendall, 2014	Dennis, Wixom, and Roth, 2012	Dennis, Wixom, and Tegarden 2012 (OO SA&D)
Requirements planning and monitoring	Plan business analysis approach	S	S	S	S
	Conduct stakeholder analysis				
	Plan business analysis activities	S	S	S	S
	Plan business requirements communication				
	Plan requirements management process				
	Manage business analysis performance				
Elicitation	Prepare for elicitation	Y	Y	Y	Y
	Conduct elicitation activities	Y	Y	Y	Y
	Document elicitation results	Y	Y	Y	Y
	Confirm elicitation results				
Requirements management and communication	Manage solution scope and requirements				
	Manage requirements traceability				
	Maintain requirements for reuse				
	Prepare requirements package	S	S	S	
	Communicate requirements				
Enterprise analysis	Define business need	S	S	S	S
	Assess capability gap				
	Determine solution approach	S	S	S	S
	Define solution scope	S	S	S	S
	Define business case	S	S	S	S
Requirements analysis	Prioritize requirements				
	Organize requirements	S	S	S	S
	Specify and model requirements	Y	Y	Y	Y
	Define assumptions and constraints	S	S	S	S
	Verify requirements				
	Validate requirements				
Solution assessment and validation	Assess proposed solution	S	S	S	S
	Allocate requirements				
	Asses organizational readiness				
	Define transition requirements	S	S	S	S
	Validate solution	S	S	S	S
	Evaluate solution performance	S	S	S	S
Y—significant coverage, S—some coverage					

Table B–5: Coverage of BABOK Techniques in System Analysis and Design Courses				
Business analysis technique	Hoffer, George, and Valacich, 2014	Kendall and Kendall, 2014	Dennis, Wixom, and Roth, 2012	Dennis, Wixom, and Tegarden, 2012 (OO SA&D)
Acceptance and evaluation criteria definition		S		
Benchmarking				
Brainstorming				
Business rules analysis	Y	Y	S	
Data dictionary and glossary		Y		
Data flow diagrams	Y	Y	Y	
Data modeling	Y	Y	Y	Y
Decision analysis	Y	Y	Y	S
Document analysis	Y	Y	Y	Y
Estimation	Y	S	Y	Y
Focus groups				
Functional decomposition	S	S	S	
Interviews	Y	Y	Y	Y
Interface analysis	S	S	S	S
Lessons learned process				
Metrics and key performance indicators				
Nonfunctional requirements analysis	S	S	S	S
Observation	Y	Y	Y	Y
Organization modeling				
Problem tracking				
Process modeling	S	S	S	Y
Prototyping	Y	Y	Y	S
Requirements workshops	S	S	S	S
Risk analysis	Y	S	Y	Y
Root cause analysis			Y	Y
Scenarios and use cases	Y	Y	Y	Y
Scope modeling	Y	Y	Y	Y
Sequence diagrams	Y	Y	Y	Y
State diagrams		Y	Y	Y
Structured walkthrough	Y	Y	Y	Y
Survey/questionnaire	Y	Y	Y	Y
SWOT analysis				
User stories	S			S
Vendor assessment		S		
Y—significant coverage, S—some coverage				

ABOUT THE AUTHORS

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