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## **ENRICHING THE UNDERGRADUATE INFORMATION SYSTEMS EXPERIENCE: PROGRAMS IN BUSINESS SYSTEMS ANALYSIS**

*Ted Surynt, Stetson University, [tsurynt@stetson.edu](mailto:tsurynt@stetson.edu)*  
*Gary Oliphant, Stetson University, [goliphan@stetson.edu](mailto:goliphan@stetson.edu)*  
*Fred Augustine, Stetson University, [faugusti@stetson.edu](mailto:faugusti@stetson.edu)*

### **ABSTRACT**

Types and uses of business technology are constantly evolving, causing business schools to constantly play catch-up with what's going on in industry. Interest in Information Systems as an undergraduate business major has waned since the technology bubble burst many years ago. Still, graduates in all disciplines must not only be trained in business technologies but must also embrace these technologies as essential elements of professional success. Leaders in the IT field, both academics and practitioners are re-thinking the rationale behind the traditional IS undergraduate curriculum. For the first time, a variety of career tracks under the business technology umbrella are being proposed. This paper describes a number of the changes taking place and prescribes a new focus for both an undergraduate technology major and supporting technology minors. This new focus is termed business systems analysis.

**Keywords:** Business Systems, Systems Analysis, Information Technology, Undergraduate Programs, Business Technology Professional, IT Skill Sets

### **INTRODUCTION**

It would seem self-evident that any curriculum designed to support business technology professionals must evolve over time. Much of this evolution is due to the nature of the curriculum itself. Mature business technologies ultimately become obsolete. Technical innovation creates new areas of interest and opportunity that define new skills that must be mastered by our graduates. But perhaps an even more compelling reason for this phenomenon is the evolving role of IT professionals within today's organizations [16]. There is still a tremendous need for the technology professionals who enhance and maintain the technical infrastructure that buttresses organizational excellence. But the focus of business technology expertise today is maturing beyond the purely technical. At the business unit level, IT must address the tactical side of solving specific business problems or exploiting specific business opportunities. At the enterprise level, IT is becoming more centered on supporting and being supported by the overall organization strategic plan.

This paper lays out the foundation for a set of undergraduate academic programs – offered out of the Business School – which are designed to both attract students and to provide them with the skill set necessary to succeed in this new corporate technology universe. The programs capitalize on the traditional strength of the business major, i.e. the breadth of business functional coverage. The programs also capitalize on the strengths of the traditional IS curriculum, i.e. in-depth exposure to the technologies in use by businesses today. The programs then extend this business/technology background by utilizing further in-depth conceptual and hands-on technology, critical thinking, and analytic components. Two distinct programs are presented: the Business Systems Analysis (BSA) Major and the discipline-focused BSA minor.

### **RISE OF THE BUSINESS SYSTEMS ANALYST**

In a special report entitled “IT Careers in 2020” [5], a Computerworld analyst notes that the demand for a number of traditional business technology skill sets such as programming and network engineering has fallen significantly. Her report goes on to state that a bifurcation of traditional technology roles within the organization will accelerate: with what are called “Tier 1” roles centering around the “Tech Specialists” while “Tier 2” roles will be focused on

“Business Specialists”. She also noted that, in the future, business functions will be supported and guided by IT professionals who reside in the business units themselves. Her report quotes numerous business executives, all supporting the premise that the role of the business technology professional has moved up the organization’s value chain. It is no longer about acquiring and deploying the technology platform. It’s about how to use that platform to support the organization’s strategic and tactical initiatives.

It appears that two things are happening. As technology platforms become more commoditized, fewer centralized IT dedicated support staff are required within a given organization. Outsourcing everything from infrastructure to mission critical functions; the cloud; Software as a Service; all point to a need for fewer individuals whose job is to keep the lights on in the corporate data center. As businesses increasingly rely on alliance partners to handle the strictly technical pieces of the business technology puzzle, what remains is the mandate to help the business units make better use of the technology that is available.

Also, as sophisticated decision support and knowledge management software becomes easier to deploy and maintain, the need for a centralized group of software support gurus begins to fade. As the previous generation of big system-based statistical modeling, data mining and analytics software migrate to the desktop, the responsibility for utilizing these capabilities becomes more and more decentralized. Knowledge workers with distinct analytic, communication, project management and technology skills will be sprinkled throughout the various departments and business units. The demand for this type of professional can only increase as software becomes more sophisticated and the issues it is designed to address become more complex.

The practitioner world is driving this change. Another recent Computerworld article [11] proclaims that today’s need is for people who have the ability to ask the right questions; who understand how to capture, manage, and analyze data relevant to these questions; who can handle the software to get the analysis done; and who can present conclusions and implement strategies based on this analysis. An even more recent InformationWeek article [10] appropriately titled “Rise of the Analyst” confirms that another skill in very high demand is business analytics. Professionals with this skill set are able to combine business and industry knowledge with both a technical and a statistical modelling background. While it can be argued that this type of business/technology savvy individual has always been in demand, the author states that this demand is growing due to the rise of “big data” and the dispersion of technical prowess into business operations. Finally, in an article designed to alert today’s technology professionals to what skills they might want to nurture for their future [6], the authors site the following as the future of IT: smaller, decentralized IT departments embedded in the business units; fewer purely technical jobs; job descriptions that cross different functional silos; increased levels of technical outsourcing; increased demand for professionals who exhibit familiarity with and ability to use multiple technologies; increased demand for individuals having well-honed analytic and communications skills.

The academic world is responding. A number of authors point out the need for more conceptual skills that emphasize the general role of IS, IS valuation, tactics and strategy [7, 15]. Badua [2] makes the point that even though the knowledge of specific software and hardware platforms may become obsolete, the ability to model and value business processes, and to correctly determine requirements for new systems and applications will never become obsolete.

### **NEED FOR UNDEGRADUATE CURRICULAR CHANGE**

Apigian and Gambill aptly sum up what motivates the move to business systems analysis as a set of academic programs in their research findings in 2010 [1]. They make the case that business technology professionals can no longer focus on methods traditionally used in the design and implementation of IT based solutions. Focus has shifted to improving organizational performance and the business processes that enable that performance. This organizational shift to a more business integrated approach requires a parallel shift in academic programs designed to provide industry with the next generation of technology professionals.

The IS undergraduate degree and the underlying curriculum that supports it have been under constant revision since the day information systems was recognized as a valid academic business discipline in the early 70’s [2]. While this revision scenario is arguably true for any business discipline, it is undeniably true for business technology. If a curriculum is going to remain relevant, frequent updates are the name of the game [7, 14]. Frequent change does

have a down side. There are studies bemoaning the lack of coherence in IS curriculum [4, 17]. Formal guidelines have been developed for this discipline since the early '70's, going through multiple iterations with the latest iteration happening in 2010 [16]. While previous revisions to the guidelines have essentially been relatively minor tweaks, this latest revision makes a significant departure from the norm by not only suggesting core requirements for the major but also allowing for a number of different tracks within the major. These tracks consist of a core set of courses combined with a variable number of electives that focus on a specific aspect of business technology. It seems logical that as technology use becomes more pervasive and more esoteric at the same time, the skills needed (both technical and non-technical) to support these technologies become more specific as well. Academic institutions will pursue the track(s) that make most sense given their mission, their resources and their target placement market. In this latest [16] set of guidelines, the two tracks of interest here are the business analyst and business process analyst tracks. These are the tracks which form the foundation for what we have termed business systems analysis.

### **PROGRAM PHILOSOPHY**

One career advantage that students graduating from a school of business with a traditional technology (IS, MIS, CIS, etc.) degree have always had is that these students were exposed to a broad spectrum of business concepts simply because they were business school majors. Foundation course requirements ensured that every business major would be introduced to Accounting, Economics, Finance, Marketing, Management, etc. Exposure to these business fundamentals by new technology graduates has always been something desirable from the standpoint of the corporate recruiter. The key issue for technology programs within the business school continues to be, in an ever-changing technology environment, how do we effectively build on this business foundation to produce graduates with the technical skills desired by these same recruiters. As shown above, this goal has become even more convoluted given that these recruiters will no longer be recruiting necessarily for a centralized IT function but rather for decentralized and possibly cross-functional business units. As the IS2010 Model Curriculum suggests [16], the only solution is to fine tune the academic institution's business technology program and focus on specific outcomes.

After a great deal of discussion with recruiters, students, and other IS faculty, it was determined that student interest in business technology is focused in three distinct areas. The first area concerned the student whose career plans were centered around technology primarily and business functions only marginally. It was felt that this type of student would be better served in a computer science program with possibly the addition of a general business academic minor.

The second area concerned students whose primary interest was a specific business discipline (other than information systems), but who had a strong desire to build a career around the technology which supports that function. It was felt that this type of student would be best served with a traditional major, e.g. marketing, finance, but with the addition of a well-tailored technology minor targeted to that discipline – hence the discipline specific BSA minor.

The third area of focus was the student who did not wish to concentrate on a specific business discipline but who wanted to be more of a generalist, an entrepreneur within the organization. This student was more interested in being part of project teams that worked across disciplines, utilizing technical, analytical and problem solving skills throughout the enterprise. Here was the student target market for the new major - BSA.

Our challenge was to create a set of courses/components that could be taught by our existing faculty, and could be combined to create programs appealing to both the second and third type of student. This led to the creation of the business systems analysis (BSA) programs described below.

It should also be noted that in our discussion with a number of corporate recruiters, it became apparent that the importance of professional/industry certifications is on the rise. While it is debatable whether or not a focus on these certifications is appropriate in academia, there is no downside to making them available to the students as a by-product of a course or set of courses. There is no question that an undergraduate student possessing these credentials will have a competitive advantage in the job market at graduation. Currently we are considering structuring the curriculum to accommodate the following certifications: the Certified Associate in Project Management – offered by

the Project Management Institute (<http://www.pmi.org/>); the SAP Student Recognition Award – offered by the SAP University Alliance (<http://www.sap.com/corporate-en/our-company/university-alliances/index.epx>); the Microsoft Dynamics Student Certificate offered by Microsoft Dynamics Academic Alliance (<http://www.microsoft.com/education/ww/leadership/Pages/dynamics-academic-alliance.aspx>); the SAS Certified Base Programmer Certificate offered by the SAS Global Academic Program (<http://support.sas.com/certify/index.html>); the Certification of Competency in Business Analysis offered by the International Institute for Business Analysis (<http://www.iiba.org/>); numerous specific certifications offered by the IBM Academic Initiative ([http://www-03.ibm.com/ibm/university/academic/pub/page/academic\\_initiative](http://www-03.ibm.com/ibm/university/academic/pub/page/academic_initiative)).

To the extent possible, courses and course topics in the new programs were mapped to the current IS2010 model curriculum [16]. Due to the nature of these new programs however, not all model curriculum suggestions are relevant. Scarce faculty resources coupled with the downward trend in traditional MIS/IS major headcounts [16, 15, 1] require programs to utilize a more inclusive student model if they are to be viable. Also, the business systems analyst phenomenon as we know it today did not exist just a few short years ago and much of the body of knowledge is still in flux. The context and philosophy of the tools and techniques required to support decentralized technology today is necessarily different from that of the past.

A search of various sources revealed that a number of academic institutions have already implemented or are in the process of implementing programs somewhat similar to our BSA major. Interestingly enough however most of these programs are positioned as a concentration within either the traditional MIS major or MBA, a master of science program, or as a non-degree certificate program. The emphasis is still on technology, not necessarily on the ways technology can be used to define problems and implement business solutions. While certainly a step in the right direction, none of these approaches allows an in-depth focus on the specific skill sets requested by industry. The BSA major as described below is an attempt to address very specific skill requirements but present them in an integrated context. Also, nowhere did we see any mention of what we are calling discipline-specific BSA academic minors. Our feeling is that the need and demand for these minors will increase tremendously in the not-to-distant future. As domain specific analysis methodologies become increasingly available, the content of these minors will inevitably migrate to the traditional majors and be replaced by even more cutting edge tools and techniques.

### **THE BSA MAJOR**

The BSA major, (consisting of eight courses) is designed for those students who want to become the go-to, technology-fluent project team members and cross-functional problem solvers. They will obtain their academic business exposure in the required business core courses. This is then followed by courses that give them the ability to analyze scenarios, understand circumstances, and recommend technology-based solutions. They are application developers, although not in the traditional, technical meaning of the term. They do not write code or create low level technical designs. Their focus is on creating the right solution for the problem at hand. It is envisioned that these professionals will become future team leaders and project managers who are charged with understanding the needs of the corporate client and ensuring that the technical solution addresses these needs. The major coursework that prepares these students for this vocation is not function or discipline-based. The focus is on the different kinds of technical tools and techniques used in business today to analyze and prescribe actions across functions. There is emphasis on traditional technology topics in order to create the bedrock technical knowledge that is required. The focus is not on the technology itself, however. Focus is on how to use that technology in an analytic and problem solving context. Building on this technical background are courses designed to complete the skill set necessary for the future business systems analyst.

### **DISCIPLINED-BASED BSA MINORS**

Both inside and outside business academia, the advantage of academic minors has been debated [13, 9]. Academic minors are seen as a way to get a competitive advantage in the student's search for a career position at graduation. Even as early as 1978 [8], it was determined that students were enrolling in academic minors as a means of "career insurance." Recently, much has been written about the efficacy of a technical academic minor for undergraduate business students [16, 7, 3, 12].

The hype surrounding commercial technologies used to add value to business functions today is certainly a boon to the attractiveness of a technology minor that supports traditional business disciplines. The downside is that the sheer number of these technologies makes it extremely difficult to determine what applications should be taught in the classroom. It also becomes problematic to find the faculty resources, funding and technical support to teach them. Team teaching of courses [2] becomes a necessity. Not only the technology itself is important, but in a discipline-focused course, the context of the technology becomes paramount.

This four upper-division course set would consist of a three-course core that would be required of all minors. The student is then free to pick one additional course from a select list of courses that would focus on the technology currently used in a specific discipline. This would differentiate the Marketing BSA minor from say the Finance BSA minor, etc. Although it is envisioned that the BSA minor will be targeted initially to business students, there is no reason to think that only business students would have an interest in it. It is quite possible that many Arts and Sciences disciplines would find the course work valuable to their students. Elective courses could then be developed in conjunction with Arts and Sciences faculty.

## **COURSE ROADMAP**

### **The BSA Major**

- BSA360: Project Management
- BSA383: Business Intelligence
- BSA397: Data and Information Management
- BSA402: Knowledge Management
- BSA450: Predictive Analytics
- BSA461: Business Process Integration
- BSA475: Enterprise Systems
- BSA494: Business Systems Analysis

### **The Discipline-based BSA Minor**

- BSA360: Project Management
- BSA461: Business Process Integration
- BSA494: Business Systems Analysis
- ??????: Discipline-specific informatics/business intelligence course

## **CONCLUSION**

It is interesting to note that although our new Business Systems Analysis major will not officially begin until the fall of 2013, we have already developed a set of industry alliance partners who are looking for both interns and ultimately graduates of this program. Industries advisory boards have been created to help us fine tune the curriculum and mentor our students. The consensus seems to be that these new technology programs (the BSA major, the discipline-specific BSA minor) will help address the current shortcomings of traditional business technology majors in a number of different ways. First, the programs are designed to support the currently evolving role of the business technologist and his/her role within the organization. Graduates of these programs then become more attractive to recruiters, addressing their need for entry-level professionals with both a business and a technology background. Second, the programs are designed to be more attractive to today's students by moving away from the purely technical topics of the past. The technology becomes relevant only within the context of its use. Finally, the multi-disciplined approach to the programs allows for far more creativity and flexibility on the part of the faculty. Cross-discipline collaboration within the school and across the university would certainly be a by-product of program implementation

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## APPENDIX

**BSA 360 Project Management (3Cr.).** This course focuses on the fundamental knowledge essential to manage, plan, schedule and control projects in the enterprise. Emphasis is placed upon the understanding of the project environment, the phased approach to managing projects, critical path analysis, and the tools used to manage projects. The concepts and techniques covered are appropriate for all types of projects, ranging from small to large, and from highly technical to administrative in nature.

**BSA 383 Business Intelligence (3 Cr.).** This course introduces the concept of Business Intelligence (BI). Students will learn how BI is used by organizations to make better business decisions, use fewer resources, and improve the bottom line. This course provides an overview of business intelligence topics as well as hands-on experience. Topics include business analytics, data visualization, data mining, data warehousing and business performance management.

**BSA 397 Data and Information Management (3 Cr.).** This course provides in-depth coverage of the concepts of enterprise level database technology and data management. Topics include data modeling, logical and physical table

design, and implementation in a relational DBMS environment. Students gain hands-on experience in the use of enterprise-level development techniques such as CASE tools, Entity-Relationship diagrams and advanced SQL.

**BSA402: Knowledge Management (3 Cr.).** Tools, technologies and best practices are used to guide students through the analysis, design, implementation and deployment process of enterprise knowledge management systems. In addition, performance analysis techniques and strategic use of these systems is discussed. Hands-on projects are used to show how these systems can be used to leverage existing company resources for competitive advantage.

**BSA450: Predictive Analytics (3 Cr.).** Using case analyses and practical business examples this course presents various statistical techniques to teach students how to predict long-term forecasts. Building on the core statistics background this course focuses on the practical uses of these techniques and their applicability to specific business scenarios. While primarily a tools course, topics include both the need for a particular technique as well as the context in which the technique may be successfully employed.

**BSA 461 Business Process Integration (3 Cr.).** This course provides an extensive investigation of a company's core business processes and the interactions within and between them. The primary focus of this course is the application of information technologies to transform organizations and improve their performance. Students will gain in-depth knowledge of enterprise systems, to include hands-on experience and the role they play in transforming organizations.

**BSA475: Enterprise Systems (3 Cr.).** This course is designed to provide the student a thorough understanding of the role ERP systems play in today's organizations. Traditional ERP components as well as extended ERP subsystems are identified and discussed. Focus is on the strategic role of these systems as both a platform for organizational efficiency and as a foundation on which to create innovation and competitive advantage.

**BSA 494 Business Systems Analysis (3 Cr.).** This course is designed to provide the student with a thorough understanding of the concepts, skills and techniques needed to become an effective business systems analyst. Topics include: the importance of systems development within the enterprise; elements of the system development life cycle; rules and principles of system analysis, design, and implementation; graphic representations of system requirements utilizing various diagramming techniques.