

# MIS Program Review

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## ABSTRACT

This paper presents a report based on the Management Information Systems (MIS) program review undertaken by business faculty in a small regional university. The program review was initiated based on a continuous improvement effort in program planning and assessment. The results of the program review are: 1) an increased understanding in the technical-business orientation of Information Systems curriculum, and 2) program alignment with job market for IS skills leading to identification of software resources needed by MIS faculty in existing courses, and 3) new courses focusing on enterprise applications.

**Keywords:** management information systems, curriculum, program orientation, information systems skills

## 1. INTRODUCTION

In an article by Noll and Wilkins (2002), a survey study was conducted on employer perception of the most critical knowledge and skills for IS professionals in the next three years. A total of 300 employers were asked to rate the importance of critical skill factors for three staffing groups: programmers, analysts and end-user personnel. The result of their study reported that relative importance for these skill factors in terms of mean values for all staffing groups: Business Knowledge (4.08), User Support (3.82), Programming (3.50), Systems Planning (3.29) and Advanced IS Applications (3.11). The Business Knowledge factor ranked the highest in importance for the analyst staffing group, and the Programming factor the least important for the end-user staffing group. For the programmer staffing group, Web-related languages such as Perl, CGI, Java Script, and HTML was the most important, followed by SQL, Java, Visual Basic, C++, C and COBOL. Their recommendations for core skills for IS curriculum is listed as follows:

- Knowledge of business functional areas
- Ability to interpret business problems and develop appropriate technical solution
- Ability to understand the business environment
- Knowledge of a specific industry
- Ability to work collaboratively in a team project environment
- Ability to develop and deliver effective, informative and persuasive presentations
- Ability to plan, organize and lead projects
- Ability to plan, organize and write technical manuals, documents and reports

In addition to evaluating market demand for critical skills in the IT industry, a broader look at general trends is also important for shaping IS curriculum and to provide a better understanding on the changing profile of IT workforce. Shao and David (2007) perspective on the current trend towards offshore outsourcing provides useful information about the impact of this trend and the implications for market demand for IT skills. In their article, jobs that required specialized IT skills such as global project management, large scale integration,

system architecture and IT liaison, and localized activities that require face-to-face interactions with clients such as security expertise, preliminary requirement analysis, logic design, system testing/deployment and user training, are predicted to stay onshore. In addition, IT jobs that are related to core business process functions such as supply chain management, logistics and inventory management are projected to be less vulnerable to job losses due to its strategic importance to US firms in a competitive global market. These core business processes are described to be evolving, and have a direct impact on firm's bottom-line. IT positions that meet these specialized skills include Project Managers, System Integrators, and IT Liaisons offering expertise in locating offshore resources for clients in outsourcing agreements. However, jobs related to routine labor-intensive IT tasks that require little or no interactions with clients such as application development, detailed design, program coding and testing, and systems maintenance and support are expected to move offshore. This offshore outsourcing scenario also applies to system administration, network and infrastructure management, help desk and back office support. Moreover, IT workers that support non-core business processes such as human resources, accounting and financial reporting are also at risk of being outsourced to offshore providers.

Ehie (2002) focused on industry expectations of MIS graduates in the initial design of a new MIS program. The design of a new MIS program involved two phases; in the first phase, an extensive review of literature and phone interviews with randomly selected chairs of MIS programs from different colleges was conducted. A draft of MIS program was then prepared, which was further revised based on inputs from faculty within the school of business, computer science faculty, and university administrative staff members. The second phase of the study involved sending out the draft proposal of the program to 24 MIS professionals from 14 employers of MIS graduates. Participants from employers were interviewed on company-site about the strengths and weakness of the proposal of the new MIS program, and the top ten skills and knowledge areas for the program. A

brainstorming session with participants from industry on the revised proposal resulted in further refinement of the proposal for the program. From the detailed information gathering process, Ehie (2002) noted that, "employers are looking for individuals with a strong systems orientation and a good understanding of an integrative business value-chain." A shortcoming of business programs as viewed from business world is the lack of an integrative framework or a systems orientation in business education. Business analytical skills are considered to be important and should include an inter-functional perspective. Such inter-functional perspective should reflect an understanding of the business value chain in the evaluation of a specific business operation. Other important skills noted are people and communication skills that are critical for working relationship with clients from diverse backgrounds and needs. This is consistent with David and Shao (2007) observation on trends on valued onshore IT jobs or positions. Ehie (2002) findings on skills and knowledge areas for MIS program are also consistent with Nolls and Wilkins (2002) study. Appendix A is a table extracted from the Ehie (2002) article that summarizes the literature review of results of various undergraduate MIS program reviews.

## 2. IT JOB OUTLOOK

The Bureau of Labor Statistics provided the following projection for IT job market:

Figure 1: Projected Employment 2004-2014  
(in thousands)

	2004	2014	% change
Computer and information systems managers	280	353	+26.1%
Computer specialists	3,046	4,003	+31.4%
Computer hardware engineers	77	84	+10.1%
Total, all professional-level IT occupations	3,403	4,440	+30.15%
Total, all occupations	145,612	184,540	+13.0%

According to the Department of Commerce, "By 2009, almost half of the U.S. workforce will be employed by industries that are either major producers or intensive users of information technology (IT) products and services. IT innovation has increased

demand for high paid "core IT workers", created new IT occupations, and changed skill requirements for some non-IT occupations, raising minimum IT skill requirements for these jobs.

The 2004 Annual Workforce Development survey report by the Information Technology Association of America, classified IT jobs into the following categories: Technical Support, Database Developers, Programmers and Software Engineers, Web Site Developers, Network Design and Administration, Enterprise Systems Integration, Digital Media and Technical Writers. In their survey study of 500 people in organizations who oversee hiring of IT staff, the following factors were indicated by hiring managers to be important in preparation for attainment of job:

[Figure 2]

### 3. IS PROGRAM ORIENTATION

The effort to review the MIS program in this regional southeastern university is spurred by several concerns. The MIS major program in question has evolved from a concentration program within the Business Administration degree program, which is housed in the Management department. At the time of the review, the program was in its 2<sup>nd</sup> year of operation. Faculty and administrator concerns for the MIS major program are: lack of technical skill emphasis in course content, employment marketability for the graduates, and enrollment. During the process, the first two concerns became a single concern as one of the group member viewed programming skill as the key to job marketability for our graduates.

The program review effort was a new learning experience for six MIS faculty members and the chair of the department. The process evolved from an initial focus on concern for graduates getting jobs. Tasks assigned to faculty were to look for job positions in IT industry and to identify knowledge and skill competencies suitable for our graduates. This effort resulted in divergent thinking on jobs deemed suitable for our graduates. Faculty members whose backgrounds are in Operations Management focused on technical positions such as database developers or engineers, system analyst, web developers or engineers and

web designers. In contrast, a few other faculty members in the group decided that business analyst position should be the primary job position followed by lower level positions such as junior system analyst, junior database developer, and assistant project manager positions. Collectively, the MIS faculty has some programming knowledge in at least one programming language: C, Java, VBA, macro and procedural languages. The program does require all MIS majors to take a 200-level VBA programming course from the Computer Science department. A second course in Java programming is an elective course in the program. Such minimal level of programming preparation of students certainly does not prepare our students to be programmers, although the purpose of the program review is to identify shortcomings that could be addressed through program revisions.

This outcome from the initial task of focusing on job positions revealed an issue with business-technical orientation of the program. To identify the proper orientation for the MIS program in terms of knowledge and skills competencies, the MIS faculty in this paper has in the past, used other existing programs in the state, and faculty input as guidelines for establishing the program. The approach of benchmarking may not offer the best approach if these selected programs were misaligned with current IT job market trends for certain skills and knowledge competencies. Additionally, we need to acknowledge that the backgrounds of students, program visibility, and recruiting efforts and opportunities may differ, and that program deviations from IT job market trends may or may not affect graduates to a significant degree in terms of employment marketability. As an example, large consulting firms do hire non-MIS or non-CS graduates such as Math or English majors for their IT positions, as strong analytical, problem-solving, and communications skills are critical assets to have in IT positions. Such hires typically go through on-the-job training assignments and career building programs to acquire highly demanded technical IT skills. This is typically true for graduates from universities that have high visibility in terms of quality of education.

Probable misunderstandings and different perspectives on the issue of orientation prompted a write-up on a literature review of the subject and a reference point on the discipline. The Association of Computing Machinery (ACM) published career guide was used as a basis for the Information Systems discipline. The description of the IS discipline according to this source is as follows:

"Information systems (IS) is concerned with the information that computer systems can provide to aid a company, non-profit or governmental organization in defining and achieving its goals. It is also concerned with the processes that an enterprise can implement and improve using information technology. IS professionals must understand both technical and organizational factors, and must be able to help an organization determine how information and technology-enabled business processes can provide a foundation for superior organizational performance. They serve as a bridge between the technical and management communities within an organization."

The description for IS discipline also included the fact that, "majority of IS programs are housed in business schools, and may have different names such as Management Information Systems (MIS), computer information systems (CIS), or business information systems (BIS). All IS degrees combine business and computing topics, but the emphasis between technical and organizational issues varies among programs. For example, programs differ substantially in the amount of programming required."

The enrollment issue concern was discussed from the need to increase recruitment effort in a nearby military base. A few of our faculty who was teaching business courses in the military base was asked to design a questionnaire survey to collect information about interest level for the program. The survey result revealed more than 60% of the respondents were interested in the program focusing on logistics and supply chain management topics. Other recruitment activities in a work plan document generated from the review process included linking student organization activities with recruitment effort, and participation in

university-sponsored events for new incoming freshmen.

#### **4. ALIGNMENT OF MIS CURRICULUM WITH JOB MARKET**

The MIS program under review fits the description for the IS education given that it is housed in the School of Business and Economics and the completion of 30 credit hours of business core (required) courses meets the basic requirements of business and business process knowledge that is integral to the MIS education. In addition, courses such as MIS 330 Systems Analysis and Design and MIS 331 Systems Development have coverage of business processes as context for learning system modeling tools, user requirement, and system design techniques. A review of the course content in the MIS curriculum led to the identification of additional skills that should be added to each course to improve the skill set for business analyst, junior system analyst, and project management assistant positions. A summary of current emphasis of MIS skills and new skills identified for existing courses is provided in a table in Appendix B. To strengthen the curriculum, additional resources and software are required. The two greatest needs are better access to CASE tools and a network lab.

The learning outcome of this process is the view that our MIS graduates are to be employed for their business knowledge and their skills in applying software tools for improving business processes. MIS students can also increase their employability by improving technical knowledge in IT support areas such as computer networking and programming skills through their course electives in the program.

Although the curriculum trains students in both business and IT skills, it is essential that students learn to synthesize the two knowledge areas and apply them to business situations. The curriculum could be strengthened by adding new courses that focuses on Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), and Supply Chain Management (SCM) with the appropriate IT knowledge and software as teaching tools in these areas.

The 2004 Annual Workforce Development survey report in Figure 2 revealed that certification is an important consideration for hiring decision in Network Design and Administration and Tech Support categories of IT jobs. Faculty resource constraints in setting up a full-fledged certification program may require collaborating with community colleges in offering IT certification to students.

Workers in Developed Countries," Communications of ACM, Volume 50, Issue 2, pp. 89-94.

## 5. CONCLUSIONS

Overall the activity of reviewing the program was a good experience for the faculty involved. The analysis of IT jobs indicates the need for more technical skills, and the understanding that IT certification has a significant weight in hiring decision. Given that the review direction was preceded by the majority view that job marketability for students is a critical success factor for our IS education, skills in certain software tools in the discipline was identified as resource needed for the program. Further literature review related to IT job trends and program review approaches indicated that "value-added" business process knowledge, and communications, team collaborative and project management skills are critical competencies that are of value to employers. By going back to the basics on the origin of the discipline and ACM's definition of IS education in business schools, some MIS faculty were encouraged to reflect on these findings in strengthening their course content to include emphasis in "soft" skills in core MIS subjects such as System Analysis, Database Management System and System Design.

## 6. REFERENCES

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**FIGURE 2: RELATIVE IMPORTANCE OF BACKGROUND FACTORS FOR IT CATEGORIES TO HIRING MANAGERS**

	> 1 year of previous experience in related field	4 year college degree in related field	4 year college degree in non-related field	2 year associates degree	Previous work experience	Vendor Certification or Training	Advanced degrees	Other
Tech Support	58%	42%	2%	27%	24%	20%	2%	7%
Database development or administration	48%	50%	3%	15%	17%	15%	3%	18%
Programming or software engineering	47%	51%	1%	12%	15%	11%	5%	23%
Web development or administration	53%	39%	3%	19%	18%	15%	3%	19%
Network systems design or administration	53%	51%	4%	15%	18%	22%	3%	11%
Enterprise systems analysis or integration	40%	43%	3%	8%	14%	14%	4%	32%
Digital media	35%	21%	2%	18%	14%	10%	3%	44%
Average	46%	41%	3%	16%	17%	14%	3%	25%

## APPENDIX A

Top 10 courses (% of programs offering) (Maier & Gambill, 1996)	Top 10 courses currently (Gill & Hu, 1999)	Top 10 courses in the next 5 years (Gill & Hu, 1999)	Top 10 courses currently (Shah & Martin, 1997)	Top 10 courses in the next 5 years (Shah & Martin, 1997)
Database (90.7%)	Relational Database	Internet Technologies and Usage	Systems Development Life Cycle (100%)	Data Communication (100%)
Data Communications (81.4%)	Systems Analysis/Structured Analysis	Computer Networking	Database (100%)	Database (98.7%)
COBOL I (72.1%)	Data Management (e.g., Data Modeling)	Client/Server Application Development	Structured Programming (93.2%)	Object-Oriented Programming (94.1%)
DSS/ES/Neural Networks (63.1%)	Telecommunications	Windows Application Development	Data Communication (89.6%)	Client/Server (94.1%)
COBOL II (60.5%)	Computer Networking	Distributed Processing	Case Tools (72.68%)	Case Tools (91%)
Computer Concepts (60.5%)	Internet Technologies and Usage	Fourth-Generation Languages	Data Structure (68.6%)	Systems Development Life Cycle (89.9%)
Systems Analysis and Design (60.5%)	Client/Server Application Development	IS case studies in emerging technologies	End-User Computing (68.1%)	Internet (84.5%)
Management of IS (58.1%)	End User Applications (e.g., spreadsheets, DBMS)	Telecommunications	4GL (60.6%)	Structured Programming (81.3%)
IS Projects (51.2%)	Programming in at least one 3 GL (e.g., COBOL, C)	Emerging Information Technologies	Prototyping (56.9%)	Multi-Media (78.9%)
Data/File Structures (44.2%)	IS case studies emphasizing implementation issues	IS case studies emphasis	Internet (54.3%)	Prototyping (78.1%)

**APPENDIX B**

MIS course	Description	Prereq. course	Current skill emphasis	Software tools	Additional required Skills	Additional required Resources
MIS 300	Intro to Information Systems	BADM 214, CSC 102	MS Office Applications	MS Excel and MS Access	Basic Web design skills using MS FrontPage	
MIS 320*	Introduction to Data Base	CSC 102, MIS 300, MGT 311	Data modeling, database Design, using Access, Drawing ERD using Visio, and elementary SQL	MS Access, Visio, SQL+	Data Structure	
MIS 321*	Advanced DB	MIS 320	Advanced SQL Programming	SQL+	Creating forms and reports, Some basics of data Admin, Web-based Data bases	Oracle
MIS 330*	Systems Analysis and Design	MIS320, CSC102	Planning, Analysis and Design of IS, Data modeling, process modeling,	MS Project, MS ACCESS, Visio	Using CASE Tools, Business Process Reengineering, Pseudocodes	CASE Tools Software
MIS 331*	Systems Development	MIS 330	Data Modeling, Process Modeling, Architecture Design, Implementation of IS	MS Project, MS ACCESS, VISIO	CASE Tools SW, Visual Basic Programming, Architecture Design	CASE Tools SW,
MIS 420*	Management Support Systems	CSC 102, MIS 300, MGT 311, MGT 325	Decision analysis, quantitative models, data mining models	Excel SOLVER, SAS enterprise miner for data mining	Bias reduction strategies in decision making, AHP for evaluating multiple criteria decisions, influence diagramming	Expert Choice, Visio, Scenario Manager

MIS 430*	Computer Networking	MIS300	Principles of Networking and data communication	VISIO	Some practical experience in System Architecture Design, simulation of systems	A small lab for networking, Oracle
MIS course	Description	Prereq. course	Current skill emphasis	Software tools	Additional required Skills	Additional required Resources
MGMT 340	IT Project Mgmt	CSC 102, MIS 300, MIS 300, BADM216	Project Scope, Cost, Time management, Risk Assessment and Control; Quality and HR management issues	MS Project		
MIS 435*	Electronic Commerce	CSC102, MIS300, MGMT311	Development of e-business plan, use of web server and file transfer, web hosting, web design, web browser control, active server page	MS FrontPage, HTML, CSS, DHTML, Javascript, ASP Script	XML, XHTML, and more advanced skills in CSS, Javascript, and ASP	Sufficient Web Space for each student (at least 500 MB space)
MIS 410	Supply Chain Management	BADM216, MIS300	SCM concepts, analysis, design, IT issues, quality issues, international elements, E-Business	MS Office	Simulation	
MIS 440	Java Programming	CSC102, MIS300	Development of JAVA applications	JAVA		