A Descriptive Study Of Graduate Information Systems Curriculums

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ABSTRACT

The purpose of this study was to conduct a review of courses currently offered in Information Systems (IS) graduate programs across the United States and compare course offerings to the MSIS 2006 Curriculum Model. The review was limited to programs offered in Colleges of Business. While MSIS 2006 is a valuable tool in designing and updating IS curriculums, results show that the model is not followed closely by universities reviewed in this research.

Six of the eleven required courses from MSIS 2006 were not taught at all as full courses at any university reviewed. The five required courses from MSIS 2006 currently offered are Database, Data Communications, Systems Analysis & Design, Enterprise Systems and Project Management. Beyond these five, there is a wide variety of courses being offered.

Keywords: Curriculum; Curricula; Information Systems; Teaching

INTRODUCTION

The controversial Harvard Business Review article "IT Doesn't Matter" took the position that Information Technology (IT) had reached commodity status and that IT management should become boring (Carr, 2003). The implication was that IT management should no longer aggressively seek competitive advantage but instead focus on cost reduction and risk management. One might assume from the article that the rate of change and innovation in IT would slow significantly. The emergence of new developments, such as mobile computing, cloud computing and big data, would seem to indicate that the rate of change has not significantly slowed. In fact, the evolution of technology continues at a very fast pace (Topi et al., 2009) and as a result, Information Systems (IS) programs still have a responsibility to continually review and update IS curriculums (Kung et al., 2006).

The first IS curriculum model was published in 1972 (Ashenhurst, 1972) with updates in 1982 (Nunamaker et al., 1982) and 2000 (Gorgone et al., 2000). Most recent publications include an undergraduate version for information systems, IS2010 (Gorgone et al., 2010) and computer science, CS2013 (ACM, 2013). The most recent graduate IS curriculum model is MSIS 2006 (Gorgone et al., 2006) which was published six years after the previous model, MSIS 2000. It has been eight years since the last update and with the continued changes in the IT environment, the authors felt it was time to review current course offerings in IS curriculums. This study reviews the MSIS 2006 curriculum model and compares it to current course offerings in IS graduate programs in the United States.

LITERATURE REVIEW

There are several studies that review undergraduate curricula for IS (Longenecker and Feinstein, 1991; Longenecker et al., 1995, Gill and Hu, 1999; Lifer et al., 2009). Some studies have proposed their own curriculum (Maier and Gambill, 1996) with others comparing their findings to the current IS model curriculum (Porter and Gambill, 2003; Kung et al., 2006; Apigian and Gambill, 2010). Findings did differ, but most find that there seems to be a core number of classes that all schools seem to cover - IS fundamentals, database, systems analysis and design, network communications, and programming courses (Apigian and Gambill, 2010).

For the IS graduate curriculum, there are fewer studies (Yang, 2013). Studies date back to 1981 (Nunamaker, 1981) and include proposed model curriculums (Gorgone and Kanabar, 1997; Maier and Gambill, 1997). Some studies have compared curricula to critical skills in IT (Downey et al., 2008). Maier and Gambill (1997) identified the most commonly offered courses, which included database, MIS, systems analysis and design, data communications and decision support systems, with little emphasis on new technologies. Gorgone and Kanabar (1997) found that database, systems analysis, and design programming were the most common, with other studies finding similar results (Gorgone et al., 2000). Ramakrishna and Vijayaraman (2000) compared curriculums at 98 universities to the MSIS 2000 model curriculum and found little evidence that the two matched. Since the MSIS 2006 release, there has been little research conducted to compare current institutions with the most recent model (Yang, 2013). Yang (2013) assessed 99 institutions and their alignment to MSIS 2006 and reported their findings on core classes and required classes only. No recent research was found that included both required and elective courses.

METHODOLOGY

Scope

Course data were collected from the websites of master's degree programs within colleges of business at universities in the United States offering information systems as a major. MBA programs and master's degree programs offering minors in information systems were not included in the study and no distinctions were made between accredited and non-accredited universities or colleges of business.

Data Collection

A total of 329 university websites were reviewed with 81 identified as having a Masters program in Information Systems. Classes were verified as active by review of class schedules or correspondence with the university. A total of 1,541 courses were reviewed and cataloged. Similar courses were combined into a single category. For example, all classes dealing with database were combined into a single database category. This method of categorization is consistent with previous curriculum research (Apigian and Gambill, 2010; Porter and Gambill, 2003; Maier and Gambill, 1997). Although there is considerable variety in graduate program names, the most common was Information Systems. A list of the most common names is provided in Table 1.

Table 1: Graduate Program Name

Program Name	Total
Information Systems	25
Management of Information Systems/Technology	18
Computer Information Systems	9
Information Technology/Management	8
Accounting and IS	6
Business Information Systems	6

RESULTS

Overview

The MSIS 2006 Model Curriculum and Guidelines for Graduate Degree Programs in Information Systems is the most recent curriculum model. The model includes course names and detailed course descriptions that were used to help categorize currently offered courses and provide a basis for comparing MSIS 2006 with current course offerings. MSIS 2006 is available on the ACM website (Gorgone et al., 2006).

Course Offerings

MSIS 2006 consists of two IS Foundations (technical prerequisites) courses, three Business Foundation courses, eleven IS Core courses, and four Career Electives. Every IS program reviewed included a fixed number of

required courses and a group of elective courses from which students were required to choose a certain number of electives. This study focused on IS courses only and it made no attempt to identify Business Foundation courses. The average number of required courses was six and the average number of elective courses offered was nine.

Table 2 lists the top 15 most often required courses, in descending order, with frequency and percentage offered. Database is the most often required course but is only required at 63% of universities. Management of IS comes in second on the list at 58% and Systems Analysis & Design is third at 56%. The percentages drop off quickly from there with only the top five courses required at one-third or more of reviewed universities. The remaining ten courses in the list are only required at 10-20% of universities.

Table 2: Top 15 Required Courses

Rank	Course Name	Required	Required %
1	Database	50	63.4%
2	Management of IS	46	58.2%
3	Systems Analysis & Design	44	55.7%
4	Project Management	37	46.8%
5	Data Communications & Networking	29	36.7%
6	E-business / E-commerce	16	20.3%
7	Privacy & Security	15	19.0%
8	Object Oriented Programming	12	15.2%
9	Seminar in IS	11	13.9%
10	Statistical Theory	11	13.9%
11	Enterprise Systems	10	12.7%
12	Thesis/Research	9	11.4%
13	IS Projects (BD=Design, Construct, Implement)	9	11.4%
14	Systems Development	9	11.4%
15	Knowledge Management	8	10.1%

Table 3 lists the top 15 most often offered elective courses in descending order with frequency and percentage offered. Even the most frequently offered elective, Privacy & Security, was only offered at 37% of universities reviewed. Special Topics in IS and Database at second and third were the only other courses offered as electives by at least one-third of universities. The percentages fall off steadily from there with the bottom six elective courses offered at less than 20% of universities surveyed.

Table 3: Top 15 Elective Courses

Rank	Course Name	Elective	Elective %
1	Privacy & Security	29	36.7%
2	Special Topics in IS	27	34.2%
3	Database	24	34.2%
4	E-business / E-commerce	24	30.4%
5	Management of IS	23	29.1%
6	Data Mining / Data Warehousing	19	24.1%
7	Project Management	18	22.8%
8	Data Communications & Networking	18	22.8%
9	Thesis/Research	16	20.3%
10	Systems Analysis & Design	15	19.0%
11	IS, Global	13	16.5%
12	DSS/ES/ESS/NN	12	15.2%
13	Seminar in IS	11	13.9%
14	Supply Chain & Logistics	11	13.9%
15	Business Process Reengineering	10	12.7%

Table 4 compares the MSIS 2006 curriculum model to the top most required courses from Table 2. Only five of the top most required courses match up with the recommended courses from MSIS 2006. In fact, of the remaining six courses in the MSIS 2006 model, none were required at any university in the study. This presents a

question of whether the model curriculum or the profile curriculum represents the actual needs of the students and industry.

Table 4: Comparison Of MSIS 2006 To Current Required Courses

MSIS 2006 Model	Current Required	Required %
Data Management	Database	63%
Data Communication & Networking	Data Communication & Networking	37%
IT Infrastructure	None	0%
Analysis, Modeling, Design	Systems Analysis & Design	56%
Enterprise Models	Enterprise Systems	13%
Emerging Technologies and Issues	None	0%
Project & Change Management	Project Management	47%
Strategy and Policy	None	0%
Integrated Capstone	None	0%
Implications of Digitization	None	0%
Human Computer Interaction	None	0%

Table 5 compares the MSIS 2006 model to current Elective course offerings. This list is very similar to Table 4 in that only four courses from the top fifteen elective courses in Table 3 match up with MSIS 2006 courses. Of the remaining seven courses in MSIS 2006, only two were offered at all. Enterprise Systems was offered as an elective at 3% of universities and Human Computer Action was offered as an elective at 1% of universities in the study.

Table 5: Comparison Of MSIS 2006 To Current Elective Courses

MSIS 2006 Model	Current Elective	Elective %
Data Management	Database	34%
Data Communication & Networking	Data Communication & Networking	37%
IT Infrastructure	None	0%
Analysis, Modeling, Design	Systems Analysis & Design	19%
Enterprise Models	Enterprise Systems	3%
Emerging Technologies and Issues	None	0%
Project & Change Management	Project Management	23%
Strategy and Policy	None	0%
Integrated Capstone	None	0%
Implications of Digitization	None	0%
Human Computer Interaction	None	1%

LIMITATIONS

There are two major limitations of this research. The first is the subjective nature of the categorization process. There were 4,998 courses reviewed, with 1,671 within graduate programs and 3,327 not specifically for a Master's degrees in IS (most were courses for MBA or other graduate programs). It became necessary to assign similar courses into a smaller number of categories. For example, there were 128 different names for courses included in the Database category. Most of the time, it was obvious as to which category a course should be counted in, but that was not true in all cases; sometimes it was necessary to make a judgment call to the best of one's abilities.

The second limitation is the dependence on information published on university websites. Some programs had easy-to-find and detailed information on course offerings while others were very difficult to navigate and detailed information was not always readily available.

CONCLUSION

It is clear from this research that the MSIS 2006 curriculum model is not being closely followed at universities in the United States. In general, less than half of the courses from the 2006 model are being required at

any university reviewed in this research. Beyond the four or five most offered courses, there is a wide variety of course offerings at universities reviewed in this study. It is possible the wide variety in IS programs is due to the demands of the markets they serve. It may be that the field of IS has become so diverse that a single curriculum model is not enough to represent the needs of the market.

AUTHOR INFORMATION

Charles H. Apigian is an Associate Professor and Chair of the Computer Information Systems Department at Middle Tennessee State University. He received a Ph.D. in Manufacturing Management and Engineering at The University of Toledo. He has published in OMEGA: International Journal of Management Science, Journal of Computer Information Systems, Journal of Electronic Commerce Research, International Journal of Innovative Management, Journal of Statistics Education, and Information & Management. Prior to pursuing an academic career, he held the position of Vice President for an automotive supplier, with experience in quality systems, information technology, and corporate strategy. His research interests include information security and privacy and curricular issues in IS. Email: Stan.Gambill@mtsu.edu.

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