

IN SEARCH OF THE TYPICAL IS PROGRAM

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ABSTRACT

The purpose of this study was to determine the typical IS program content and structure by examining IS course titles from AACSB-accredited business school. The results of the study will (1) provide a benchmark for faculty to compare their own IS programs and (2) provide a basis for comparing IS programs in the future.

Keywords: information systems education, model curricula, AACSB schools

INTRODUCTION

Every information systems (IS) program faces the challenge of offering a relevant curriculum that reflects a constantly changing technological environment. Numerous forces influence the structure of programs such as employer needs and faculty interests. As a result, IS curricula can vary considerably in program requirements.

Is there a “typical” IS program? The purpose of this study was to answer that question. The authors examined IS course titles from AACSB-accredited business schools to determine the “typical” IS program content and structure. The results of the study will (1) provide a benchmark for faculty to compare their own IS programs and (2) provide a basis for comparing IS programs in the future.

FORCES THAT SHAPE CURRICULA

Many factors can influence the design of an IS curriculum. In this paper, four specific factors are considered: (1) recommendations of model curricula, (2) skills and technologies desired by employers, (3) the interests of faculty and (4) benchmark studies.

Model Curricula

As a starting point in designing and updating an IS program, many faculty consider the recommendations of model curricula. Perhaps the most recognized curriculum model is IS '97 (6), a joint effort of the ACM, AITP, and Association for Information Systems (AIS). The model recommends a total of 10 courses (see Table 1) for IS majors to complete (excluding the prerequisite '97.P0 – Knowledge Work Software Tool Kit).

Curriculum Model 2000 (5) of the Information Resource Management Association (IRMA) and the Data Administration Managers Association (DAMA) recommends a program that includes a total of seven courses, five required and two electives. The five required courses include: Information Resources Management Principles; Information Systems Technology; Algorithm Concepts and Information Management; Data Warehousing, Data Mining, and Decision

Support Systems; Data Resource Structures and Administration; and last of all, Design and Implementation.

Table 1. The IS'97 Model Curriculum

Course No.	Course Title	Course No.	Course Title
IS'97.1	Fundamentals of Information Systems	IS'97.6	Networks and Telecommunications
IS'97.2	Personal Productivity with IS Technology	IS'97.7	Analysis and Logical Design
IS'97.3	Information Systems Theory and Practice	IS'97.8	Physical Design and Implementation with DBMS
IS'97.4	Information Technology Hardware and Software	IS'97.9	Physical Design and Implementation with a Programming Environment
IS'97.5	Programming, Data, File, and Object Structures	IS'97.10	Project Management and Practice

While model curricula provide an excellent starting point in program design, other factors play a role in shaping the eventual direction.

Employer Needs

The content of IS programs must constantly be adjusted to reflect the needs of employers. Maier, Clark, and Remington (7) examined the change in skills and knowledge requirements as defined by classified advertisements over four decades. The average number of skills per ad increased from 2.63/ad in the late 70s to 3.50 in the mid 90s (increased diversity).

Athey and Plotnicki (3) analyzed newspaper advertisements to determine job opportunities for programming languages, database skills, infrastructure skills, networking skills, and other miscellaneous technologies. They concluded their study “reinforced what many IT educators have anecdotally known for some time. The IT field is expanding into many new technologies but very few “older” technologies are really disappearing. This conclusion underscores the dilemma that IS programs face in trying to design the “right” curriculum.

More recently, Chaudhury and Rao (4) examined the impact of e-commerce technologies on information systems curricula. They concluded that in “the late 90s, we are witnessing a major shift from host-based systems and client/server into World Wide Web (WWW) systems. They described changes that are required in a typical IS program to accommodate this shift. Specific technologies and skills identified for WWW environments included Java, XML, VBScript/JavaScript, CGI/Perl, VB/ASP, SQL, and TCP/IP.

Faculty Interests

Beyond model curricula and the demands of employers, individual faculty preferences can also influence the content of IS programs. Ahmadi and Bradston (2) compared topics preferred by MIS faculty with topics preferred by MIS directors. The results did show a practitioner and academic divide regarding the balance of practice and theory. MIS directors preferred “MIS

graduates being hired today to have more technical skills than in the past.” MIS faculty focused on “the more theoretical, managerial, and communication aspects of the field (p.24).”

Benchmark Studies

Maier and Gambill (8) examined IT courses taught by 43 AACSB business schools. Courses included in the typical CIS/MIS curriculum were: COBOL I and II, Computer Concepts, DBMS Concepts I, Data Communications, Data/File Structures, DSS/ED/ESS/NN, IS Project, IS Concepts, Management of IS, Microcomputer Applications, Systems Analysis and Design. Maier and Gambill concluded:

Indications of an evolving curriculum are evident even in this early effort. Mainframe computers . . . are not the primary platform in any program . . . Other indications . . . are the complete absence of FORTRAN from all programs, the number of programs now offering C/C++, and the inclusion of temporary topics . . .

The dynamic nature of the information systems field demands that a period examination of course offerings be conducted to determine the direction programs are moving. The purpose of this study was to examine IS course titles from AACSB-accredited business schools to determine the typical IS program content and structure. The results of the study will (1) provide a benchmark for faculty to compare their own IS programs and (2) provide a basis for comparing IS programs in the future.

RESEARCH QUESTIONS, METHODOLOGY, AND DATA ANALYSIS

The authors sought questions to the following specific research questions:

1. How many total hours of IS are required for a major? How many hours are prescribed?
2. In what department is IS typically located? What prefix is used for IS courses?
3. What courses seem to represent the “core” of the typical IS program?
4. How has the curriculum changed over the last five years?

The authors examined Web pages of IS programs from 40 different AACSB-accredited schools (effective Summer 2000). The names of 390 AACSB-accredited programs were retrieved from the AACSB Web site (1) to create a master list. A graduate student was assigned the job of finding the home Web page for each program. A systematic random sample was generated by selecting every fifth institution name from the master list.

Two individuals independently extracted course titles from the Web pages associated with each IS program. Program information and course titles were entered into a Microsoft Access database for analysis. A third individual reviewed the data entries for consistency.

Analysis of the data was completed using Microsoft Access queries. In many cases, a manual examination of the results was used to further refine categorizations and frequency counts. The results of the study are limited by the currency and accuracy of the information posted on program Web sites as well as the authors’ abilities to interpret and categorize course titles.

Program Structure and Other Characteristics

Tables 2, 3, 4, and 5 describe general characteristics of the IS programs examined. Thirty-four (85%) of the programs represented are based upon a semester credit hour semester. A total of 540 course titles were collected across all 40 programs. The fewest number of courses examined was five (eight for QP); the most was 28 (20 for QP). Table 2 also shows the averages and ranges for total hours and required hours.

Half the programs were located in an IS department. All but one program was described as a major or concentration. Many different prefixes are used to identify courses in the area; CIS is used most often (25% of programs).

Table 2. Description of Sample

Characteristic	Semester Programs (SP)	Quarter Programs (QP)
Number of programs in sample	34	6
Total number of courses	540	
Range of total courses	5-28	8-20
Average # of courses examined	13.76	12.00
Average # of total hours	27	32
Range of total hours	18-57	15-46
Average # of required hours	21	25
Range of required hours	27-27	32-32

Table 3. Location of Program

Description	No. of Programs
IS (BIS, CIS, etc.)	20
With Accounting	3
With OM or MS	4
With Management	11
With Computer Science	2

Table 4. Type of IS Program

Description	No. of Programs
Major	28
Concentration	11
Degree	1

Table 5. Course Prefixes

Description	No. of Programs	Description	No. of Programs
CIS	10	BIS	2
MIS	5	MGT	2
IS	3	Other	18

Program Content

Table 6 shows the most common courses required or included in a required choice of the IS programs examined. Almost every program (95%) required a course with database in the title. More than 80% required a course in systems analysis and design. Three-fourths of the programs examined still required a programming language or programming course. About two-thirds specified a course in telecommunications or networks.

Tables 7, 8, 9, and 10 demonstrate the variety of course titles. Readers should note that the right-hand column in each of these tables shows the “number of courses” counted. It is possible that an institution could offer more than one course per table. For example, an

institution might offer both a systems analysis and design course as well as a systems development course.

As the reader can see, a variety of course titles exist in the systems, database, and communications areas. An “other” category was created in each case to simplify the presentation because of the large variety of titles. Programming courses are categorized by programming language whenever possible. The authors found it interesting that COBOL is still well-represented in IS curricula. Visual Basic appeared infrequently in the course titles reviewed. The authors believe that Visual Basic is probably a regular course offering in most curricula, but programs have chosen course titles that do not reflect the language.

Table 6. Most Common Courses

No. of Programs Offering:	No. of Programs
“Database” course	38 (95.0%)
Systems analysis and design course	33 (82.5%)
“Programming” course (does not include those with application development titles)	30 (75.0%)
Telecommunications and networks	27 (67.5%)

Table 7. “Database” Courses

Course Title	No. of Courses	Course Title	No. of Courses
Database Management	3	Database Applications	1
Database Management Systems	8	Database Administration	1
Database Systems	5	Database Technologies	2
Business Database Systems	3	Advanced DB courses	5
Database Design (and . . .)	6	Other database courses	14

Table 8. “Systems” Courses

Course Title	No. of Courses	Course Title	No. of Courses
Systems Analysis and Design	18	Principles of Info Systems Analysis & Design	1
Business Systems Analysis and Design	3	Intro to Systems Analysis and Design	1
Systems Analysis	2	Info Systems Analysis & Design	1
Information Systems Analysis	2	Analysis of Information Systems	1
Systems Analysis and Development	1	System Development	5
Systems Analysis and Design Theory	1	Advanced System Development	5
Systems Analysis and Conceptual Design	1	Other systems titles	8

Table 9. “Communications” or “Network” Courses

Course Title	No. of Courses
Data or network communications; data communications and networks	13
Business data communications or business telecommunications	7
Computer networking	3
Telecommunications (and . . .)	9
Local area networks	2
Advanced network courses	3
Other communications courses	10

Table 10. Programming courses (from course titles)

Course Title	No. of Courses	Course Title	No. of Courses
COBOL	21	CICS	1
Visual Basic	5	Object-oriented	6
C/C++	4	Structured programming	5
Ada	1	Business or computer programming (no language specified)	17
Assembly	2	Advanced courses (no language specified)	8
Java	1	Program design	6
RPG	1	Other programming courses	13

Table 11. Status of COBOL

Status	No. of Courses
Required or required choice	16
Elective	5
Not mentioned	19
Other	0

Table 12. Status of Visual Basic

Status	No. of Courses
Required or required choice	3
Elective	2
Not mentioned	35
Other	0

FINDINGS

The comparison of IS programs and course titles shows many similarities, but substantial differences. Most IS programs are classified as majors or concentrations, but the departmental location varies quite a bit as does the prefix for designating courses. For semester-based programs, the average number of total program hours was 27; the average number of required program hours was 21.

Courses most often included in an IS program were database and systems analysis and design. A programming language or course was also frequently included, as well as a data communications course. COBOL appeared in course titles more than Visual Basic. However, this may be due to the nature of the course titles examined.

Table 13 compares the findings of the Maier and Gambill study (8) with those of the current study. Differences in the data collection and analysis process make a strict comparison difficult.

Table 13. Comparison with Maier and Gambill

Course offering	% Current Study	% Maier and Gambill
“Database” course	95.0%	90.7%
Systems analysis and design course	82.5%	67.5%
Telecommunications and networks	67.5%	81.4%
COBOL	40.0%	72.1% (COBOL I)

A comparison of this study with the Maier and Gambill study confirms that database is still the most commonly required course in the curriculum. The percentages reported for systems

analysis and design and communications are almost the opposite for the two studies – however, this could be due to collection and reporting differences. Perhaps the most significant change is in the COBOL area. Consistent with changes in the IS industry, COBOL’s presence seems to be waning.

CONCLUSIONS

The purpose of this study was to examine IS course titles from AACSB-accredited business schools to determine the typical IS program structure and content. The authors examined Web pages of 40 IS programs offering 540 course titles to conclude the following:

- A typical IS program requires a total of 27 semester credit hours; 21 of these hours are specified.
- The typical program is designated as a major and most often located in a “IS” department.
- Curricula typically require a database, systems analysis and design, programming, and communications course.
- Over the past five years, courses in database, systems analysis and design, and data communications have maintained a prominent position in the curriculum. The popularity of COBOL is waning.

The authors hope the results of this study will be useful to IS programs in updating their curricula. The results will also provide a benchmark for future comparisons.

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