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MBA Information Systems Curriculum Needs: A Business Survey

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Abstract

Information systems is one of the most rapidly changing fields in business. Some of the more recent developments include innovations in data communications, end-user computing, expert systems, and office automation. In order to educate MBA students who wish to specialize in this field, the curriculum must be revised at regular intervals to adapt to these changes, but at the same time students must receive a grounding in the basics of the field so they can adapt in the future. This study discusses the sources of information on information systems curricula, including the recommendations of major professional bodies, surveys of other information systems programs, and surveys of business management. In particular, a survey of 53 Canadian information systems managers is discussed in the light of curriculum needs for MBA information systems programs.

MBA INFORMATION SYSTEMS CURRICULUM NEEDS: A BUSINESS SURVEY

1. Introduction

Current trends in business computing, including the increased use of office automation, data communications, and end-user computing, are resulting in the consumption of an ever-growing proportion of computing resources [9]. Given the rapidly increasing importance of end-user computing in particular, we would expect that information systems managers would be interested in hiring support personnel with the user-oriented training that would parallel the changing needs in this field, as well as the more traditional EDP-oriented requirements. The trend towards a more consultative role for data processing personnel working with users has been well-established [3]. For example, user-oriented staff are required to staff information centres, which have in the past few years been seen as a suitable approach to supporting end-users of all categories [1]. "End-users" have been classified into six groups by Rockart and Flannery [9], but in general end-users include all those who actually work with computers as a tool, rather than those who use results other people generate with computers, but who may or may not be directly associated with the information systems organization.

In order to satisfy the educational requirements for graduates of the business programs who will fill the roles of computing support staff in the future, it is necessary to constantly refine the curricula being offered to business

students who are majoring in information systems. This refining process is carried out by academics in consultation with business organizations, which have a strong impact on standardized curriculum proposals of the most influential curriculum developers, the Association For Computing Machinery and the Data Processing Management Association [2,6,8]. These curricula are adopted to varying degrees by business schools [10,11], depending upon the size of the business schools and the influence of information systems faculty within the schools. Proposals are frequently made for particular curriculum upgrades to match the latest trends [7,12]. Surveys are also taken from time to time on business needs in particular aspects of information systems education, primarily at the undergraduate level [3,5]. The curricula taught in business schools also has a great impact on the computing needs of these schools, which are increasingly moving towards microcomputers and common software packages [4]. This reflects, to a great extent, similar trends in business.

2. Curriculum Requirements For MBA Information Systems Programs

In this paper we will be particularly concerned with curricula for MBA programs in information systems. The ACM Graduate Curriculum recommendations [8] for a systems designer specialization in information systems at the master's level includes two pre-requisite courses and ten program courses. These are listed in columns 1-2 of Table 4, and can easily be covered in a two year (20 course) program, even if the first year of the program covers an introduction to other topics of

importance to business, including the two prerequisite courses. This would be expected to lead to a master's degree in information systems, rather than an MBA. However, students taking an MBA should have some electives in such a program, and the ten courses in the ACM program leave no room for electives if the first year is taken up with required core courses which are typical of an MBA program. The ACM proposals also include a four course "Area Of Emphasis" as an alternative to the ten course major program (IS3 "Systems and Information Concepts In Organizations", IS2 "Program, Data and File Structures", IS5 "Information Analysis", and IS8 "Systems Design"). However, this is a relatively small set of information systems courses for an information systems specialization, and a typical MBA information systems specialization may be forced to opt for some compromise between the two extremes of the ACM proposals.

Most solutions appear to lead to a middle road in the number of information systems courses offered, in order to maintain a broader educational perspective. This is shown most graphically in a survey by Vanacek et al [10] of AACSB (American Association of Colleges and Schools of Business) accredited schools in 1984. At least 43% of all AACSB graduate programs offer a concentration in information systems. Vanecek et al [10] found that the most frequently offered information systems courses offered in all graduate programs surveyed are Management Information Systems, Information System Fundamentals, Systems Analysis and Design, Computer Simulation, Database Processing, and Data and File Structures, in that order. This article also shows that graduate

business schools with a Ph.D./D.B.A. specialization in information systems tend (as would be expected) to have a broader offering of courses in information systems than those schools which do not offer the doctorate.

The Vanacek et al survey also shows that Management Information Systems, Systems Analysis and Design, and Database Processing tend to make up the core in the information systems specialization, although there is a wide diversity in the MBA information systems specialization requirements at the AACSB schools surveyed.

3. Data Collection

In order to evaluate the opinions of future employers on the educational needs of MBA graduates with an information systems specialization, a survey was carried out among information systems management in a number of Canadian corporations and government agencies. Questions related to education were included as a separate section in a questionnaire mainly concerned with software attributes of importance in selecting end-user software. The relevant portion of the questionnaire is included as Attachment I. Of 125 surveys mailed out, 53 were returned, for a response rate of 42%. Some statistics on the organizations replying and the management level of the respondents is shown in Table 1.

Table 1

Statistics On 53 Organizations Surveyed

Statistic	Median
Number of Employees	2800
Number of Business Professionals	500
End-Users of Microcomputers	138
End-Users of Other Computers	200

Note: End-users could use both microcomputers and other computers, but this information was not collected.

Job Position of Survey Respondents

Position	Number
Vice-President	3
General Manager	2
Director/Controller	12
Manager	28
Analyst/Consultant/Project Leader	8
	53

4. Data Analysis

The questionnaire listed a set of topics which might be taught in an MBA program in information systems, and respondents were asked to check whether they were Not Necessary, Could Be Useful, Desirable, Very Desirable, or Mandatory in such a program. These responses were then used to generate a rank-ordered list of importance of these topics, shown in Table 2. While the rank ordering generated is not particularly decisive, the topics can be clustered into three groups which are relatively well-defined

Table 2

Ranking Of Educational Topics

For MBA Students Specializing In Information Systems

Rank	Topic
	Most Important Topics
1.	(Systems Analysis And Design
2.	(Database Management Systems
3.	((Decision Support Systems
	(
	Moderately Important Topics
4.	(Fourth Generation Languages
5.	(Information Resource Management
6.	(Office Automation
7.	(Field Project
	Least Important Topics
8.	(Programming Languages
9.	(Expert Systems

Note: Ranks of bracketed topics are not significantly different pairwise at the .05 level, as measured by the Wilcoxon matched pairs signed-ranks test.

statistically. Among the topics within each group there is some uncertainty in ranking, but the group of topics ranked as most important includes Systems Analysis And Design, Database Management Systems, and Decision Support Systems. The moderately important group includes Fourth Generation Languages, Information Resource Management, Office Automation and Field Project. The last group in importance includes Programming Languages and Expert Systems. This last group is of particular significance

because it includes one topic (third or lower generation programming languages) which is rapidly fading in importance for the more general business end-user due to the increased use of fourth generation languages and other software (but still very important for the EDP application software developer or maintenance programmer who is a fulltime user of one or more of these languages). Respondents were asked to indicate which computer language would be most suitable for information systems students to learn, and they indicated BASIC, COBOL, PASCAL, APL, and FORTRAN, in that order. Other languages mentioned included C and PL/1. The other topic ranked as least important is expert systems, which is very new and has made little impact on the general market place as yet.

In addition to the topics included in the list, respondents were asked to list up to three topics they thought should also be taught to MBA students in information systems. The ranked list of this open-ended set appears in Table 3. Some of the topics mentioned are normally taught in the general business courses or are subsumed in the topics listed in Table 3 and were therefore not included in Table 4. Of these topics, the top three: Communications and Networking, Systems Design And Development Topics, and Project Management, are mentioned frequently enough to be given at least the level of importance of the topics listed in the "moderately important" topics of Table 3.

Table 4 is an attempt to match the survey topics to the ACM curriculum recommendations. The first two columns in the table list the number and the name for the ACM course recommendations,

and the third column lists the topics in the survey, including the three most popular topics added by survey respondents. Clearly there is not a one-to-one correspondence, but the topics listed in the survey were taken from an existing MBA program and would not be expected to match, as discussed above.

Table 3

Additional Information Systems Education Topics

The following additional topics, ranked in order of frequency, were also added to the list by respondents. A few other topics mentioned but not included in the following, are normally subsumed in other business courses or under the topics already listed.

Topic	Frequency
Communications and networking	9
System design and development topics	9
Project management	7
Recent technology (Desktop publishing, microcomputer systems)	4
Strategic information systems issues	3
Costs and benefits of information systems	3
Interpersonal skills	3
Consulting skills	2
Impact of information technology on staff	1
Ergonomics and health issues	1

Table 4

Comparison Of Survey Topics With ACM Graduate Information Systems Recommendations *

ACM Recommended Courses		
Number	Name	Survey Topic
	Prerequisite Courses	
P1	Computer Programming	Programming Languages
P2	Quantitative Methods	
	Information Systems Stream Courses	
IS1	Computer Systems Concepts	Introductory Course
IS2	Program, Data And File Structures	Programming Languages, (2) Syst. Design and Devel.
IS3	Systems And Information Concepts In Organizations	Introductory Course, Information Resource Mgement
IS4	Data Management	Database Management Systems, FourthGen. Languages
IS5	Information Analysis	Systems Analysis And Design
IS6	Data Communications, Networks And Distributed Processing	Office Automation, (1) Communications and Networks
IS7	Modeling And Decision Systems	Decision Support Systems, Expert Systems, Fourth Gen. Languages
IS8	Systems Design	Systems Analysis And Design
IS9	MIS Policy	Information Resource Mgement
IS10	System Development Projects	Field Project, (3) Project Management

(x) Importance ranking in additional topics listed by respondents, according to number of times mentioned.

* See Nunamaker et al, Reference 8.

5. Discussion

Given the ranking of the topics on the questionnaire, there are several important points to note:

a) Computer programming knowledge is relatively unimportant to information systems graduates, and this was confirmed by the Duncan [3] survey of business managers. However, a related topic is data and file structures which is usually taught with the aid of a programming language.

b) The much heralded expert systems field has not made an impression on IS managers, concerning the need to hire personnel versed in the use of expert systems (again confirmed by the Duncan survey). However, since the field is relatively new the jury is still out on the importance of this discipline to business. In planning curricula it is important to look ahead as far as possible in order to anticipate business needs.

c) Assuming a common grounding in the fundamental aspects of information systems and management, systems analysis and design is the top-ranked topic for information systems education, as shown by this survey and confirmed by the Duncan survey of managers. The business school curriculum survey by Vanecek et al [10] ranked management information systems as the most important, followed by systems analysis and design. Database management systems and data structures,(the latter as included in "Systems design and development" topics in this survey and by the Vanecek survey) are also regarded as important. Computer simulation followed in importance in the Vanacek survey but was not mentioned as an additional topic in this survey or in

the Duncan survey of business managers.

d) Data communications and networking was top-ranked in interest in additional topics in this survey, and was second-ranked out of 34 topics in the Duncan survey of business managers. However, this was not even mentioned as a separate topic in the Vanacek survey of business school curricula. Decision support systems ranked in the top group in this survey and was recommended as an important topic for addition, in the Duncan survey of managers. This topic was not mentioned separately in the Vanacek et al survey.

e) Project management was given third rank as an additional topic in this survey, and ranked fifth of 34 topics in the Duncan survey of managers. It was not mentioned separately in the Vanacek et al survey.

f) Information resource management ranked in the middle class of topics in this survey, ninth of 34 topics in the Duncan survey of managers, and would be expected to be subsumed in management information systems, the top-ranked topic in the Vanecek et al survey.

6. Conclusions

Strong conclusions concerning MBA information systems curriculum recommendations cannot be drawn from this study, due to the wide diversity of opinions among business schools and standard curriculum recommendations. However, there are three sources of information which can be helpful in refining and upgrading existing MBA programs in information systems. These include the

graduate recommendations from the ACM, industry surveys, and the content of other existing programs. These have all been discussed in this report. The following conclusions can be stated concerning MBA information systems curricula development:

a) Given the constraints on MBA programs in general, the ACM recommendations cannot be adopted as stated, but can be used as guidelines tempered by what is desirable in the particular program and by the preferences of potential employers as indicated in this survey.

b) The available data on existing MBA programs is not complete. Many of the topics mentioned by business managers may be subsumed in existing courses mentioned in the survey by Vanecek et al, but disguised by the names of these courses.

c) The most important conclusion is that the information systems field is dynamic and is always undergoing changes of some sort due to the rapid advance in technology. Information systems curricula must be revised at regular intervals to ensure that graduates are prepared to meet the challenges of change in their chosen field. This requires a basic grounding in the discipline which can be used by the graduate to adapt to change, and attention to the latest innovations so the graduate is aware of the current state of the art. Curriculum changes to suit the needs of the student must take into account the preferences of the business community, the recommendations of the major curriculum bodies, curricula in other MBA programs, and the overall fit with the particular MBA program being considered.

Acknowledgments

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Attachment 1

III. QUESTIONS CONCERNING MBA GRADUATES IN INFORMATION SYSTEMS

MBA graduates in information systems can be expected to fill positions in a broad range of information systems positions, such as systems analyst, database manager, information centre specialist, computer operations manager, business systems analyst, systems salesperson, systems consultant, etc.

Information systems students take courses which give them a general background in the various functional areas of business. In addition, they take courses in various aspects of information systems. The following are information systems topics which are or could be made available to them. Ple e check the response which indicates your opinion on the information systems topics which could be made available to these students (again, NN = Not Necessary, CBU = Could Be Useful, DES = Desirable, VDES = Very Desirable, and MAN = Mandatory).

	NN	CBU	DES	VDES	MAN
66. Database management systems	[ ]	[ ]	[ ]	[ ]	[ ]
67. Systems analysis and design	[ ]	[ ]	[ ]	[ ]	[ ]
68. Decision support systems	[ ]	[ ]	[ ]	[ ]	[ ]
69. Expert systems	[ ]	[ ]	[ ]	[ ]	[ ]
70. Field project in information systems	[ ]	[ ]	[ ]	[ ]	[ ]
71. Fourth generation languages	[ ]	[ ]	[ ]	[ ]	[ ]
72. Information resource management	[ ]	[ ]	[ ]	[ ]	[ ]
73. Office automation	[ ]	[ ]	[ ]	[ ]	[ ]
74. Computer programming language	[ ]	[ ]	[ ]	[ ]	[ ]

If you checked anything other than Not Necessary for Question 74, please check the language you think would be the most suitable language for information systems students to learn.

[ ] a) BASIC

[ ] b) FORTRAN

[ ] c) COBOL

[ ] d) APL

[ ] e) PASCAL

[ ] f) Other (please specify) _____

... continued

Other information systems topics you think are important (please specify)

75. _____

76. _____

77. _____

78. Please feel free to include any additional comments you may have which are relevant to busi ess professional computer use and university-level education.

_____

_____

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Thank you very much for your assistance i this survey.

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