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Information/Systems and Quantitative Core Courses in AACSB Accredited Business Schools

ABSTRACT: During the 1994 academic year, a survey was conducted of institutions accredited by the American Assembly of Collegiate Schools of Business

(AACSB). The purpose of the survey was to determine the nature and characteristics of the quantitative and Information Systems core courses. The results, which were contrasted to those of a similar survey done in 1987, provide a snapshot of the current status of these core classes, reveal evolutionary changes, and portend possible future trends.

KEYWORDS: Information Systems, Management Science, Statistics, Production Operations Management, Calculus

INTRODUCTION

In the past few years, Information Systems, Management Science and

other quantitative-based disciplines in business schools accredited by the American Assembly of Collegiate

Schools of Business (AACSB) have undergone considerable changes both in terms of their emphasis and their content. The dramatic growth in personal computer usage and the development of user-friendly and relatively inexpensive quantitative software packages appear to have been major factors in AACSB's reconsideration of their position. While these changes were occurring, AACSB accrediting standards were shifting in a way to allow, if not encourage diversity in the range of missions provided by member schools. In the late 1950's, studies by Pierson et al (1) and reports from the Carnegie Foundation (2) recommended that business schools alter their image as "trade schools" and place greater emphasis on "academic quality and rigor." The studies and reports suggested that at the undergraduate level, business schools should have less specialization and should demand higher academic standards. In an effort to assure a comprehensive breadth of subject matter coverage as well as to compete for top students, the AACSB used the studies and reports as guidance for the

establishment of "core" subject areas in business school accreditation standards. Those core subject areas included Accounting, Marketing, Finance, Business Law, etc. As a result, many business schools revamped their curricula by adding strong quantitative, computer, and information technology components to their core. While AACSB standards have always been purposely vague so as not to endorse any specific "model" curricula, in 1987 the stan-

dards included five broad subject areas, two of which were quantitative analysis and information systems (3).

More recently, AACSB curriculum accrediting guidelines have been significantly altered from those of the past. Current standards state only that coverage should include; ethical and global issues, the influence of political, social, legal and regulatory, environmental and technological issues, and the impact of demographic diversity on organizations (4).

To accomplish these objectives, the standards state that the curriculum should only include foundation knowledge for business in Accounting, Behavioral Science, Economics, and Mathematics and Statistics.

Furthermore, the standards require that written and oral communication should be an important part of the curriculum. No other curriculum guidelines are provided.

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In addition to the omission of terms such as "marketing" and "finance," the words "computer," "information systems," "management science," and "quantitative analyses" are also absent from the present standards. As a consequence, many member schools have felt free to redefine the content and emphasis placed on these subjects. AACSB now places great reliance on each school to define its own mission provided that the mission is consistent with the common purpose shared by all member schools—"the preparation of students to enter useful professional and societal lives."

The current standards, then, allow member schools much latitude to define their missions. In the absence of specific requirements, schools it

appears, can become less broad in their approach—a potential reversal of the trend suggested by the literature of 25 years ago.

Many business school faculty have raised concerns over the role and importance that information systems and quantitative disciplines should/will now play in their missions. For example, in the current version of the standards, the term "technological issues" have replaced the words "computer" and "information systems." As a result, will it suffice for an accredited business school to include the study of the role of tech-

nology without providing specific instruction in computer skills and business information systems concepts?

Similarly the words "quantitative analysis" have been supplanted simply by "mathematics/statistics" in the standards. Of concern to those (re)designing the curriculum of quantitative core courses of member schools are such questions as I) should the scientific approach to decision making (*i.e.*, the analytical concept of profit maximization, efficiency, cost/time minimization and mathematical model building) be sacrificed or absorbed into other courses under this new schema? and ii)

should quantitative 'tools' replace quantitative analyses in a business school's mission?

These issues invoke considerable interest in the approach which accredited schools are actually taking in their instruction of quantitative/information systems courses. As was shown in a similar (but not identical) study by

Lawrence (5) and as borne out by the results of the current study, at many institutions the required core quantitative and information systems courses are frequently offered through the same department. Many faculty in these departments are responsible for teaching in both areas. For faculty and administrators in such departments, the integration of quantitative/information systems throughout the core curriculum is of considerable importance.

To provide some guidance to these educators, a survey was taken in late Spring through early Summer, 1994 in order to acquire a snapshot of current curriculum activities in core quantitative/information systems courses at AACSB member institutions.

THE SURVEY

In an attempt to ascertain the current position of AACSB institutions, a questionnaire was sent to the 272 member US schools with an undergraduate program. A total of 128 (47%) completed and returned the questionnaires. In many instances, questionnaire items similar to those in Lawrence's original survey (5) were included to determine

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changes that might have taken place over time. In general, the survey sought to address the following issues:

Computer /Information Systems (C/IS) How much is taught at the lower division and upper division?

Is the subject taught in the business school? In which department?

Does the course include computer information systems concepts?

Does the course include business information systems concepts?

Is a programming language part of the course?

Are computer packages taught? Which ones?

Calculus

Is it required? How much is required? Is it taught in the business school or by another academic unit?

Statistics

How much is taught at the lower division and how much at the upper division?

Are Calculus and/or C/IS prerequisites for the introductory Statistics course.

Is Statistics taught in the business school? In which department?

Management Science (MS) and Production Operations Management (POM)

Are either or both courses included in the core?

If only POM is required, are topics from MS included?

If only MS is required, are topics from POM included?

Are Calculus, C/IS, and/ or Statistics prerequisites for the course?

Which departments are responsible for teaching the MS/POM courses?

Separate analyses were performed for responses concerned with i) Computer/Information Systems and ii) Management Science/Production Operations Management.

COMPUTER/ INFORMATION

SYSTEMS COURSES The discipline of 'Information

Systems' has evolved significantly over the last 20 years and information technology (IT) in the business curriculum has undergone concomitant changes. As IT plays an increasingly important role in so many facets of business, it has become even more important for undergraduates to receive core-level instruction

in this discipline. When the discipline of Information Systems was young, C/IS courses were often taught by Computer Science faculty who focused on more technical aspects of IT such as concepts of compilers, computer architecture, or computer programming. Today, C/IS courses are likely to be taught by faculty who themselves have received formal training in the discipline of Information Systems. Fortunately, in most institutions the content of C/IS curricula, including the core course is influenced by such faculty. Nonetheless, many institutions are either still slow to change or simply believe that certain topics should be retained in the core C/IS course

DEGREE OF EMPHASIS ON CORE C/IS COURSES

Data were collected to ascertain whether introductory C/IS courses were presented as lower or upper divisional offerings. As Table A indicates, at more than 80% of responding institutions the introductory C/IS course is a lower divisional offering (50% + 31.25%) compared to 60% in 1987. For some of those (31.25%), the course and/or its curriculum appear(s) to be important enough to warrant offering it with additional credits also at a more senior level. Only a minority of respondents (18.75%) do not offer C/IS until the upper division compared to 40% in 1987. It would appear that like many core courses, most institutions require students to be well-founded in the elements of C/IS in preparation for their major field of study. In addition, there has been a significant shift of emphasis in the last few years, in which the C/IS course has been deemed to be sufficiently important to introduce it earlier in the business program.

Respondents were surveyed to determine the number of curricular units that are allocated to C/IS. The results shown in Table 2 reveal that institutions that offer C/IS as a lower division course and those that offer it at both levels, allocate on average more units to their offerings (3.5 and 6.3) than those that offer it only at the upper division (2.6). This would seem to reinforce the importance that most institutions place on this kind of course in the overall business program.

INSTRUCTIONAL DEPARTMENT

Respondents were surveyed to determine which school or department actually provided the C/IS instruction. Almost 80% indicated that the business school itself provides this. Typically, if the instruction is provided elsewhere, it is overwhelmingly from the Computer Science Department with a few institutions reporting that the Mathematics Department provides the instruction.

Respondents were asked to indicate the name of the department providing the instruction. Handwritten responses were classified into three categories. 'IS' departments is the label used for departments whose only mission appears to be 'Information Systems' (e.g., 'MIS,' or 'IS,' or 'CIS,' etc.). 'Hybrid' departments are those focusing upon information systems and at least one other discipline (e.g., 'Management/Information Systems,' or 'Management Science and Information Systems,' etc.). Departments classified as 'Other' have more traditional names in which the notion of information systems does not appear (e.g., Management, Accounting, Marketing"etc.)

Table C reveals a number of interesting results from these classifications. Thirty nine (39%) percent of all responding institutions have a separate department dedicated to the discipline of 'Information Systems.' Another 25% recognize the existence of such a discipline by incorporating a label such as 'information systems' forming a hybrid department name, bringing the total number of respondent schools that

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define 'Information Systems' as a discipline to 64% (i.e., Total IS + Total Hybrid: 39% + 25%). This is a considerable change from 1987 when only 42% of schools had departments in which Information Systems was clearly identified as a discipline.

Information Systems Curricula Respondents were asked to indicate whether the emphasis in their core course(s) was on 'computer' information systems or 'business' information systems. In a hierarchical sense, computer information systems focus on the technology of computer hardware and software while business information systems are more concerned with the uses of computer technology in business. In an ideal environment, students would first receive instruction in the elements of computer technology (CIS). This would provide them with a foundation

upon which they could better understand the application of the technology in business (BIS). Table 4 shows that at most institutions, including those where the instruction is provided only at the upper division, students receive instruction in both CIS and BIS. In addition, few institutions provide only BIS coverage because they seem to recognize that without CIS coverage, BIS coverage might not be particularly useful. Institutions that offer courses at the upper divisional level seem to be somewhat out of step by offering only BIS at more than three times the frequency of the other institutions (20% versus 6%). Not surprisingly, more of the institutions (88%) that provide more coverage (both in terms of courses offered at both levels and in terms of units of coverage-see Table 2), report that they teach both BIS and CIS.

TABLE 1 Required C/IS Courses by Division

- lower Only 50%
- Upper Only 18.75%
- Upper and Lower 31.25%

Total 100% (N=112)

TABLE 2 Distribution of C/IS Courses by Number of Units

Percent Responding	Lower Only 48%	Upper Only 18%	Upper and Lower 34%	Total 100% (N=103)
Average Units in The Core	3.5	2.6	6.3	

**TABLE 3 Information Systems
Department Names**

	Total
"IS" Department	39%
Hybrid Department	25%
Other Department	36%
Total	100% (N=87)

TABLE 4 Distribution of Computer Courses by Course Type

CIS BIS
CIS and BIS Neither Total

Lower Only 25% 6% 67% 2%
100% (N=53)

Upper Only 28% 20% 52% 0%
100% (N=25)

Upper and lower 6% 6% 88% 0%
100% (N=34)

Total 20% 9% 71% 1%
100% (N=112)

An interesting anomaly that appeared in the data was the response of one institution that reported that it neither covered CIS nor BIS concepts. An examination of that institution's responses to other items in the questionnaire revealed that the institution dedicated three lower divisional units only to the study of software packages.

SOFTWARE AND 'PACKAGES'

Traditionally, C/IS courses have also included in their curricula i) computer programming, and ii) productivity software. For the most part computer programming was taught using GWBASIC, and productivity software usually focused on DOS-based WordPerfect, Lotus 1-2-3, and dBase III+. This section discusses the results of this survey regarding these topics; the data for those discussions can be found in Table 5.

Computer Programming

This survey reveals a dramatic change in the importance of computer programming in C/IS courses.

Traditionally, core C/IS courses have included computer programming as a major component of the curriculum. This survey shows a dramatic shift from that trend; a majority of schools have eliminated this subject completely. It would seem that with the pressure to include more topics into this course, computer programming is becoming relatively less important and therefore expendable.

In courses of study in which such a decision has not been made, the language of choice continues to be BASIC. In institutions that have chosen to have more units of study available for C/IS, computer programming is addressed both with BASIC and with Fourth Generation Language macros. Increasingly, spreadsheet packages such as Excel or Lotus (for Windows) are providing an easier-to-learn and more powerful programming environment than traditional Third Generation languages such as BASIC. Adaptation of this kind of programming can be seen to one degree or another across all the

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C/IS courses.

Word Processing

Despite claims that high school graduates are entering college with increasing levels of computer literacy, most business schools continue to teach word-processing in the core C/IS curriculum. Although there were no data collected in this regard, it may be that while this topic continues to be taught, it is to be hoped that there is less coverage than in the past.

The preferred word-processing package is WordPerfect, with Microsoft Word trailing significantly. The preference for WordPerfect over Word is interesting since Computer Reseller News reports that Word consistently outsells WordPerfect. This contradiction may reflect the fact that because of funding problems, many institutions may have

not been able to upgrade their student PC laboratories to support Microsoft Windows. Applications such as Word are only available for Windows or for Macintosh environments.

Spreadsheets

It is clear from the data that spreadsheet packages are taught in virtually every C/IS core course. The preference for Lotus over Excel is interesting for a number of reasons. While it is true that Lotus 1-2-3 was once the preferred (and practically only) spreadsheet package used in industry, that trend has shifted dramatically in favor of Excel.

That most C/IS courses continue to teach Lotus probably reflects an inability of many institutions to support the Windows environment. As more and more institutions upgrade their computing facilities, it can be expected that th

TABLE 5 Software Used in C/IS Core Courses

		Lower Only	Upper Only	Upper and Lower	Total
Programming	None	69%	61%	53%	65%
	BASIC	22%	26%	28%	25%
	Macros	9%	13%	19%	10%
	Total	100%	100%	100%	100%
		(N=55)	(N=23)	(N=32)	(N=107)
Word Processing	None	11%	37%	14%	18%
	WordPerfect	81%	46%	43%	64%
	Word	8%	17%	43%	17%
	Total	100%	100%	100%	100%
		(N=53)	(N=24)	(N=21)	(N=98)
Spreadsheets	None	2%	0%	0%	1%
	Lotus	64%	71%	73%	68%
	Excel	20%	4%	16%	15%
	Quantro Pro	14%	25%	11%	15%
	Total	100%	100%	100%	100%
		(N=56)	(N=24)	(N=37)	(N=117)
Database	None	14%	4%	10%	11%
	dBase	63%	65%	76%	67%
	Paradox	22%	30%	14%	22%
	Total	100%	100%	100%	100%
		(N=49)	(N=23)	(N=29)	(N=101)
Graphics	None	80%	80%	79%	80%
	Harvard	14%	15%	21%	16%
	PageMaker	6%	5%	0%	4%
	Total	100%	100%	100%	100%
		(N=51)	(N=20)	(N=28)	(N=99)

'share' of Excel and Lotus (for Windows) will become more even.

Database Processing

Database software continues to be taught by most institutions (89%) with the most favored package being dBase III+ for DOS. The fact that this package continues to be preferred reinforces the notion that most responding institutions are still teaching DOS-based packages. Although these results do not

show up in the data themselves, a few respondents indicated in handwritten comments that database principles are addressed via the increasingly powerful data manipulation features of spreadsheets such as Excel or Lotus 1-2-3 for Windows. It can be expected that as more institutions upgrade their computing facilities, they will be able to experiment with these kinds of features and perhaps even eliminate the coverage of a specific database package.

Computer Graphics

The data collected in this survey indicate that most institutions (80%) do not teach computer graphics in core *C/IS* courses. Considering the likelihood that so many respondents' institutions are unable to support Windows applications, it is to be expected that those same institutions would be unable to support resource-demanding graphics applications. Unlike the other software productivity packages where DOS alternatives can really be used to teach application software principles, there really is no good (*i.e.*, easy-to-use and easy-to-learn) DOS alternative for graphics applications. Considering the increasing role that business graphics and presentation graphics play in today's business environment, it is to be hoped that this topic will increasingly be added to *C/IS* core course syllabi, perhaps at the expense of other less important topics.

SUMMARIZING TABLE E An overall summary of the data in

Table E indicates that in the core *C/IS* course, most institutions i) do not teach any computer programming (63%), ii) teach word processing (82%), iii) almost unanimously teach about spread-

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sheets (99%), iv) teach database processing (89%), and v) do not teach much about computer graphics (78%).

QUANTITATIVE COURSES

Survey data were collected to determine the degree of emphasis placed by member schools on the subject areas of Calculus, Statistics, Management Science, and Production Operations Management. Information was gathered regarding the number of units required, prerequisites, and whether such courses are offered at the lower or upper division.

Calculus

Calculus concepts are the foundation of many principles of Economics, Statistics, and Management Science as well as numerous other business disciplines. However, some of these concepts can be and are taught without using Calculus.

That there is a debate regarding this matter can be seen in the treatment of many introductory Economics, Statistics, and Management Science textbooks. At one extreme there are texts in which Calculus is never mentioned; at the other extreme, most of the subject matter treatment is dependent upon a thorough understanding of Calculus concepts and functions. This survey revealed that Calculus is incorporated into 88% of the AACSB core curricula, up slightly from 85% in 1987. Furthermore, while a three unit semester course taught outside business schools is the norm, 30% of all accredited schools require four or more semester units, up from 27% in 1987. Thus, there appears to be no trend away from the common approach of requiring Calculus for the business major; in fact the trend is in the opposite direction. The current and previous surveys both

determined that the trend for Calculus to be taken outside the business school remains high (96% as compared to 93% in 1987).

Statistics

As discussed previously, Statistics is the only quantitative subject specifically mentioned in the current AACSB standards. As a result, every accredited business school requires at least one 3-unit course in Statistics. However, the level and depth of Statistics coverage varies widely among accredited schools.

A statement in the 1987 standards suggested that Statistics was one of the courses that "could" be taught at the lower division. Table 6 indicates that in the current survey, 68% (41% + 27%) of respondents offer Statistics only at the lower division (up considerably from the 57% (38% + 19%) reported in 1987). The rest are split about evenly (16% each) between offering one course at the lower division and one at the upper division versus only offering Statistics at the upper division.

Another way of viewing these figures

is that 59% (100% - 41%) of the schools require more than an introductory

three unit course in Statistics. In fact, 46% (27% + 16% + 3%) require at least two Statistics courses compared to 50% (19% + 26% + 1% + 4%) reported in 1987. Of those requiring more than one Statistics course, 41% ($[16\% + 3\%] / [27\% + 16\% + 3\%]$) require at least one course at the upper division level.

Unlike the 1987 survey however, no school required three Statistics courses (as compared to 4% in 1987). A few schools (7%, as compared with 9% in 1987) offer Statistics in formats other than traditional 3-unit courses, while a few commented that additional statistical coverage is obtained in follow-on Management Science or Production Operations Management classes.

	One Lower Div	Two Upper Div	One Lower and One Upper Div	One Upper Div	Two Upper Div	Three Lower/Upper Div	Total
1994	41%	27%	16%	13%	3%	0%	100%
1987	38%	19%	26%	12%	1%	4%	100%

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Regardless of the number of Statistics courses required, a majority of schools (59%) require Calculus and/or Computer Information Systems as a pre-requisite (down slightly from 61% in 1987).

Another topic of concern regarding Statistics is the department that teaches the course. Topic emphasis and even the degree of topic coverage can be affected by the perspective of the instructing department. Statistics is a subject which, like Calculus, can be taught outside the business school. This survey found that 70% of schools teach all Statistics courses within the business school. Eighty percent (80%) teach at least one Statistics course within the business school. This is down from 1987 when 92% taught at least one Statistics course within the business school.

Most Statistics courses taught outside the business school are taught in

Statistics or Mathematics Departments. Business schools that require only one Statistics course who also prefer to teach it themselves, tend to offer that course from the same department that teaches either Management Science or Production Operation Management. Approximately 20% of all business

schools offer the Statistics course from within an Economics Department.

MANAGEMENT SCIENCE/PRODUCTION OPERATIONS MANAGEMENT

Perhaps the largest shift in curricular emphasis in the quantitative area in recent years is in the area of Management Science and Production Operations Management. Traditionally these disciplines have had many topics in common. With the availability of a variety of all-purpose MS/POM packages such as QS, STORM and WHAT'S BEST, the emphasis in these courses has shifted away from conceptual mathematics and algorithmics to a more application-oriented approach. It is no longer necessary nor perhaps appropriate for students to be concerned about endless pivoting in the simplex method

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and solving horrible equations to find the average waiting time in an M/M/K queuing system. Instead, instruction can now focus on modeling, problem solutions, and managerial impact of results.

Many schools therefore, have significantly reduced their emphasis in Management Science with a shift mainly into *POM*. The survey results (Table 7) reveal that 47% require only a *POM* course (and no MS course) in the core. However, when the following question was asked of those schools that require only a *POM* class in the core; "Are

MS topics covered in the *POM* course" -80% responded affirmatively while another 11% claimed to have a combined POM/MS course.

While exactly the same percentage as 1987 (87%) stated they required i) a *POM* course, ii) a combined POM/MS course, or iii) both a *POM* and an MS course, the emphasis has changed significantly in favor of just a course in *POM*. The percentage of schools requiring only an MS course has dropped slightly from eight percent to six percent. And when the question was asked of those schools requiring only an MS class in the core, "Are *POM* topics covered in the MS course," 50% responded affirmatively.

Table 8 summarizes the courses and prerequisites required for MS, *POM*, and combined MS/*POM* courses. It is worth noting that the prerequisites for

these courses are significant. More than 71% require Calculus; 64% require Computer/Information Systems; 93% require Statistics; and about 43% require all three. These percentages have not deviated greatly from 1987. (Note that in Table 8, in 1987 data were not collected to determine whether or not all the prerequisites were required for the courses.)

CONCLUSIONS

Observations Regarding C/IS

The findings in this survey reveal that in the last eight years significant changes have taken place in the syllabi of core C/IS courses. In 1988 Lawrence reported that respondents to a similar survey indicated that 'a firm knowledge of a scientific computer language such as BASIC is of primary importance,'

and that 'certain schools refuse to give academic credit for the study of computer packages.' The results of this survey reveal that most institutions have changed their thinking about these issues. To summarize the key findings of this survey:

A majority of business schools have a department that focuses in part or entirely on the discipline of 'information systems.'

The core C/IS course is mainly

taught by business school faculty, mainly from within an Information Systems department.

	Neither MS nor POM	MS Only	POM Only	MS/POM Combined	Both MS/POM	Total
1994	7%	6%	47%	11%	29%	100%
1987	5%	8%	24%	27%	36%	100%

		Calculus	CIS	Statistics	Calc, CIS and Statistics
Management Science	1994	80%	62%	82%	42%
	1987	73%	65%	85%	NA%
Production/Op's M'gm't	1994	69%	54%	84%	43%
	1987	71%	67%	85%	NA%
Combined MS/POM	1994	71%	64%	93%	43%
	1987	76%	80%	97%	NA%

Computer programming is not taught in a large majority of institutions.

Traditional, DOS-based productivity packages continue to be taught by most institutions.

Computer graphics is not a part of most C/IS core course syllabi.

.An examination of the detailed data revealed a trend toward capitalizing upon the increasingly rich function of Windows-based spreadsheets, both in terms of programming and in terms of data/information manipulation. As more and more institutions are able to move to Windows-based computing environments, they will be able to explore the potential of replacing traditional computing with macros, and traditional database packages with the data manipulation features of increasingly more powerful spreadsheet packages. A natural consequence of working in such function-rich spreadsheet environments will be an increased ability to introduce integrated business and presentation graphics into the curriculum.

Textbook publishers seem to be prepared for such trends as more and

more of the textbooks being offered for introductory C/IS courses, especially those concerning Excel and Lotus 1-2-3 for Windows contain chapters addressing these topics.

Observations Regarding Quantitative Courses

In the quantitative area, business schools seem to be focusing on exposing students to mathematical foundations early in their program. While the number of schools that require calculus has remained high (and may have actually increased slightly since 1987), there appears to be a significant shift in the level at which Statistics is taught. Most schools teach all of the required Statistics courses at the lower division (up from 57% in 1987), or at both the lower and upper division. The positive benefit of having a lower division Statistics requirement is an early exposure to the statistical analyses used in many upper division functional area courses.

However, with only 59% of schools

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requiring Calculus as a prerequisite for Statistics, and even fewer (31%) requiring C/IS, schools must guard against a "cookbook" approach to Statistics, even though those courses focus on business applications of statistics. It is surprising, despite the popularity of spreadsheet packages, particularly such powerful products as Microsoft Excel or Lotus 1-2-3 for Windows, that more Statistics courses do not require a C/IS prerequisite. It seems evident that business schools are now looking for the POM/MS sequence to concentrate on analysis of business situations rather than on the underlying mathematical principles of the analytical tools used. As a result, MS courses that fail to evolve in recognition of this trend will probably continue to

be absorbed by POM courses. However, particularly with widespread access to relatively inexpensive, comprehensive MS personal computer software, there is now an excellent opportunity for Management Science to return to its roots as a problem solving and analysis program. Management Science can and should play a critical role in the undergraduate curriculum as a systematic interdisciplinary approach to the analyses of large, complex practical systems.

Meanwhile POM is also likely to continue to benefit from having POM more tools and approaches to integrate with the behavioral aspects of the discipline. But while the shift of some traditional MS topics into the POM course may be welcome (by some), care must be taken not to dilute the design and strategic managerial issues that are a foundation of POM.

SUMMARY

Based on the average or modal results of this survey, the following represents a 'typical' outline for the information systems/quantitative core courses currently offered by AACSB accredited US business schools:

Calculus: One lower division 3-unit class taught outside the business school.

Information systems: One lower division 3-unit class taught within the business school. The topics that are included

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are concepts of business information systems, word processing, spreadsheets, and database concepts. Computer programming and computer graphics are not included.

Statistics: One lower division 3-unit class and some training beyond this

class (via a second lower division course or upper division instruction) taught within the business school, Calculus is a prerequisite.

POM/Management Science: One upper division 3-unit POM class that includes Management Science topics, using Calculus, Statistics, and Information Systems are prerequisites.

It is clear that in the last few years the changing requirements of the AACSB have led to changes in the content of core Information Systems/Quantitative courses in accredited US business schools. Many of these changes are a direct result of the widespread growth of personal computing. This is really

not surprising considering the dramatic changes that personal computers have also had on American business. As PCs become even more ubiquitous in the next few years, continuing to change everyday business practices, business schools must evolve their curricula and continue to educate the kinds of graduates who will be able to meet the challenges of the next century

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BIOGRAPHIES

John Lawrence is professor and past chairman of the Department of Management Science/Information Systems at California State University, Fullerton where he has also served as the coordinator of the management information systems program for the School of Business Administration and Economics. He has served as president of the Orange County Chapter of the Operations Research Society of America/The Institute of Management Science (ORSA/nMS, now INFORMS-Institute for Operations Research Management Science). He is the author of several papers and presentations in the areas of curriculum content in accredited business schools, the

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