This series describes the experiences of a medium size comprehensive urban university in implementing the DPMA four year model curriculum. Article 1, published in Volume 5 Number 1, described the major steps taken by the Business college faculty to establish a concentration in Management Information Systems within the BSBA degree and, in particular, the rationale used in deciding upon the DPMA 4 year model curriculum for this concentration. This article reports on the pedagogy for courses IS-1 to IS-4. Subsequent articles will report on the remaining courses, evaluate the implementation of these courses and recommend ways to improve their delivery.

JISE invites other institutions to share their experiences in implementing the four year model curriculum. Those institutions that wish to contribute to this series of columns should send a manuscript of no more than 10 double spaced pages to Kathryn McCubbin, CNU, 50 Shoe Lane, Newport News, Virginia 23606.

Implementing the Four Year Model Curriculum   Article 2

THE INITIAL COURSES

Prof. Kathryn McCubbin
Information Technology Services
and Dr. Mayes D. Mathews
Dept. of Management, Marketing, and MIS
Christopher Newport University
Newport News, VA 23606

ABSTRACT: The management information systems curriculum at Christopher Newport University (CNU) initially developed by adding computer courses with a business emphasis to the traditional computer science/computer engineering programs. This initially appeared as an efficient approach to course delivery since many of the courses in the first two years could be shared. As the years passed the Business College faculty became convinced that management information systems was an independent discipline that should be integrated into the business management degree. This is the second article of a series which describes CNU's experience in implementing the DPMA four year model curriculum. This article discusses the curricular adjustments the institution made and the implementation of the first four courses of the Model Curriculum, including text selection, course content, and instructor and student reactions.

INTRODUCTION

The DPMA Model Curriculum, IS90, adopted in 1992 for the MIS concentration in the College of Business at Christopher Newport University has been modified to accommodate the nuances of current programs of the institution. To understand the affect of these modifications it is best to begin with an overview of IS90.

The IS90 Model Curriculum

The IS90 Model Curriculum provides a broad set of seven knowledge clusters shown in Figure 1. These clusters span four topical areas which define Information Systems as a body of knowledge: Computer Concepts, Organizational Concepts, Information Technology, and Systems Theory and Development. They serve as the architecture of the curriculum model as well as the basis of the individual courses.

The DPMA Model Curriculum for the 90s provides the details as to how the depth or level of understanding are defined. Suffice it to say that each occurrence of a knowledge unit forms a progression of increasing competencies. Learning is a logical flow of content and sequencing of
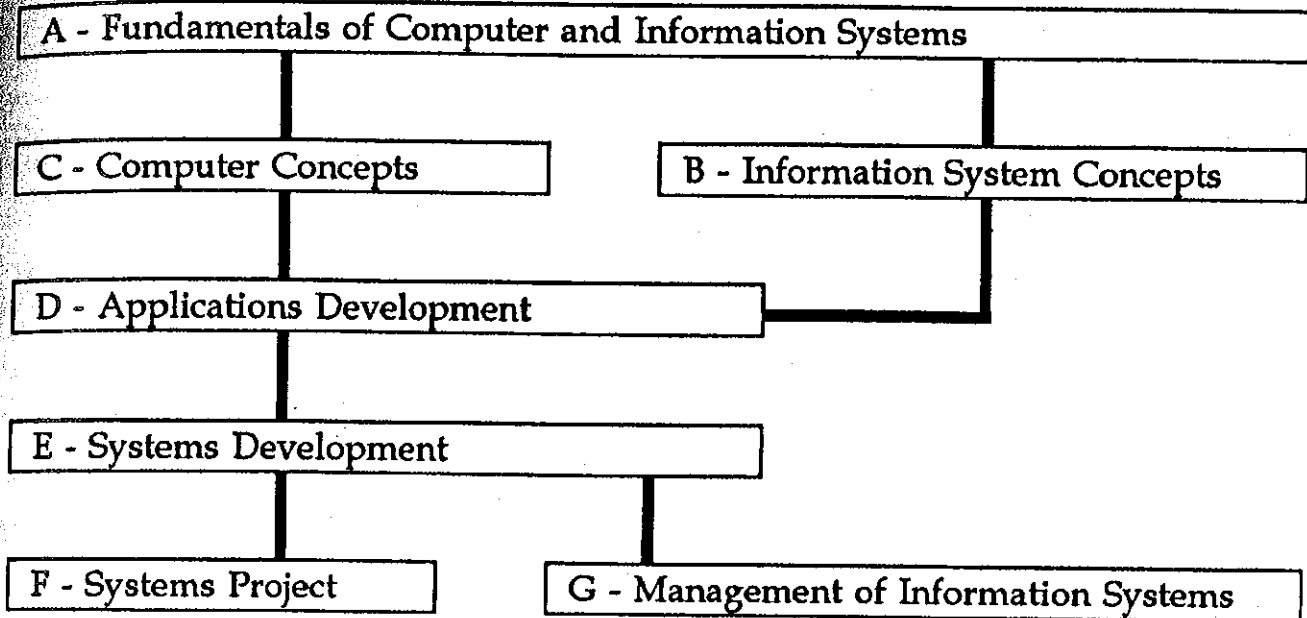
Figure 1: IS90 KNOWLEDGE CLUSTERS

A - Fundamentals of Computer and Information Systems

C - Computer Concepts		B - Information System Concepts

D - Applications Development

E - Systems Development

F - Systems Project	G - Management of Information Systems

Figure 2: BACCALAUREATE CURRICULAR STRUCTURE

Area	Credit Hours
1. Study of Words and Numbers	
English Composition	6
Mathematics	6
Foreign Language	6
Total Area 1	18
2. Liberal Studies	
Humanities	12
Social Science	12
Natural Science (Lab)	8
Total Area 2	32
3. Physical Education & Health	2
4. Degree Studies	6
5. Major and Concentration Req.	64
Total Requirements	122

material in a spiraling manner until competency is attained for each body of knowledge. The clusters emphasize the development of information systems to solve organizational problems beginning with a conceptual foundation, progressing through the development of systems skills and culminating in an in-depth managerial understanding of information systems.

Implementation

Implementation of the DPMA IS90 Model Curriculum required the introduction of a concentration for the BSBA degree within the College of Business and Economics that would satisfy three overlapping curricular structures; the General Education Curriculum, the Supporting Course Curriculum, and the IS90 based MIS concentration curriculum.

General Education Curriculum

Christopher Newport University is committed to a core of liberal arts studies that dictate the curricular structure for all Baccalaureate degree programs, although some differences exist among letters

degrees, science degrees and professional degrees. Figure 2 summarizes the requirements for the MIS concentration which is considered to be a professional degree. Figure 3 displays the four year recommended course sequence that conforms to the Baccalaureate curriculum structure and implements the IS90 Model Curriculum.

The incorporation of IS90 into the framework of the Business curriculum also had to accommodate the articulation agreement with local community colleges. This agreement allows up to 60 semester hours of credit obtained through community colleges to apply toward the baccalaureate degree. This has the effect of linking the Associate of Science Degree in Computer Systems to the MIS concentration for the Bachelor of Science in Business Administration (BSBA) degree. To preserve this relationship, which is attractive to both the students and the institutions, courses offered at the freshman and sophomore level at the University must be consistent with those offered at the two year community colleges.

Supporting Course Curriculum

The general university curricular structure encapsulates the business curriculum by including the BSBA common core curriculum in Area 5 as referenced in Figure 2. The BSBA common core courses are shown in Figure 4.

All BSBA students additionally complete two semesters of economics and may elect to take a variety of courses such as Managerial Accounting, Organizational Behavior, Human Resources Management, International Business Management, Consumer Behavior and Small Business Management.

MIS Concentration Requirements

Christopher Newport University was in the process of establishing MIS courses within the BSBA degree program at approximately the same time IS90 was released. Hence, the University did not have any direct course equivalents to the nine courses required to implement

knowledge clusters A through F shown in Figure 1. The existing Computer Science or Information Science degree curricula did, however, have some courses that could be modified to partially satisfy IS90 requirements. Three such courses are currently outsourced to the Computer Science Department; **IS-1 Fundamental Concepts of Information and Computer Technology, IS-3 Computer Concepts,** and **COBOL.**

Although COBOL is not a separate course in IS90 the University does recommend the course for all MIS majors. There are several reasons for this decision:

1. As an existing course no additional resources are required;

2. COBOL remains the procedural language of choice for many businesses;

3. The existing COBOL course has no prerequisite;

4. COBOL satisfied three hours of the Area 4 requirements shown in Figure 2;

5. It is taught in the Virginia Community College system and thus is part of the articulation agreement.

PROGRESS REPORT ON THE DELIVERY OF FIRST FOUR IS90 COURSES

For the purpose of reporting on the progress of these courses a short survey form was prepared. Each instructor received a survey form containing the definitions of the five levels of knowledge; None, Awareness, Literacy, Concept, Detailed Understanding, and Skilled Use, together with a list of the knowledge elements from the IS90 Model Curriculum for her/his particular course.

Both the instructor and the students were asked to rate each element according to knowledge level. For the instructor this meant rating each element according to the target level of knowledge the instructor had designed into the course plan. For the student this meant rating the knowledge element based a perception the student had of her/his understanding of the knowledge element. In addition to the survey an

interview was held with each instructor during which text selection, course content, and the instructor's reaction to the course was discussed. The results of the surveys and interviews follow.

IS -1 FUNDAMENTAL CONCEPTS OF INFORMATION AND COMPUTER TECHNOLOGY

Text

A separate text is used for each of the three software application which are taught; word processing, spreadsheets, and database management. The textbooks chosen are the result of several years of textbook examination and experimentation. The common disadvantage of most texts was found to be lack of depth. Each of the four instructors that taught this course in Spring 1993 indicated their particular satisfaction with the Lotus text. The three texts are; Laudon & Laudon, Solving Classic Business Problems; An Introduction to Lotus 1-2-3, Release 2.3 , Addison-Wesley, 1992, Kenneth D. Gorham, Personal Productivity with dBASE III PLUS Primer, Wm. C. Brown, 1989, and James Moore, Learning WordPerfect's Essentials, CNU, 1992.

Course Content

All sections of the course are taught in a classroom equipped with a personal computer for each student. The computers are linked by an ethernet Novell network so that data files, assignments, and tests can be readily accessible. Classroom instruction is primarily "hands-on". Projects are assigned in each of the software application packages.

Instructor Reaction

All of the instructors indicated that they enjoyed teaching the class. There was general consensus regarding how the course could be improved;

1. Use textbooks of the quality and style of the Lotus 1-2-3- text,

2. Upgrade the computers in the classroom to be compatible with those in the general use computer labs on campus,

Figure 3: RECOMMENDED COURSE SEQUENCE

Freshman Year

Fall		Spring	
English 101 Rhetoric	3	English 102 Writing	3
Math 125 - Elem Stat.	3	Math 135 - Calculus	3
Foreign Language I	3	Foreign Language II	3
Natural Science/ Lab I	4	Natural Science/ Lab II	4
IS - 1 Software App.	3	IS - 3 Computer Concepts	3
Total	16	Total	16

Sophomore Year

Fall		Spring	
Accounting I	3	Accounting II	3
Economics I	3	Economics II	3
Global Humanities	3	Global Humanities	3
IS - 4 Appl. Dev.	3	IS - 5 Appl. Implementation	3
COBOL	3	Physical Ed./ Health	2
Total	15	Total	14

Junior Year

Fall		Spring	
IS - 2 MIS Concepts	3	Business Statistics	3
IS - 6 Sys. Dev. I	3	IS - 7 Sys. Dev. II	3
Principles of Management	3	Principles of Marketing	3
General Elective	3	General Elective	3
Principles of Psychology I	3	Principles of Psychology II	3
Total	15	Total	15

Senior Year

Fall		Spring	
IS - 8 Systems Project	3	IS - 9 MIS Policies & Strategies	3
Finance	3	Business Ethics	3
Quantitative Analysis	3	Business Law	3
Global Humanities	3	Global Humanities	3
Economics Elective	3	Business Policy & Strategies	3
Total	15	Total	15

3. Replace dBASE III+ with another database software package (no consensus on which one), and

4. Tighten the requirement of the prerequisite course (Computer Literacy or equivalent). The disparity in computer background among students makes the course unnecessarily difficult to teach. It was felt that many students were taking the course to enhance their performance in a specific major, for example, WordPerfect for English majors or Lotus 1-2-3 for Accounting majors.

Figure 4: COLLEGE OF BUSINESS CORE CURRICULUM

Credit Hours	Courses
Principles of Accounting	6
Financial Management	3
Principles of Marketing	3
Principles of Management	3
Statistical Methods	3
Legal Environment	3
Quantitative Methods	3
Business Policy and Strategy	3
Business Conditions/Forecasting	3
Total	30

Figure 5: HIGHEST RATED KNOWLEDGE ELEMENTS FOR IS - 1

Knowledge Elements	Rated by
Physical Representation of Date	Student
Machine Structures: CPU, Memory, Bus, Controllers	Student
Auxiliary Storage	Both
Very High Level Language	Instructor
Local/Wide Area Networks	Instructor
Operating System Utilities	Instructor
End-User Computing Using PC Software Packages	Both
Formal Problem Solving	Both
Sequence, Selection, and Loop Control Structures	Instructor
Sorting and Searching, Editing, Reporting, Updating	Student
Value of Information	Student

Figure 6: HIGHEST RATED KNOWLEDGE ELEMENTS FOR IS-2

Knowledge Elements	Rated by
Management Information Systems	Instructor
Office Automation	Both
Information Resource Management	Instructor
Value of Information	Instructor
Systems Development Life Cycle	Instructor
Effect of Is on the Organizational Structure and Management Style	Student
Group Support	Student
Decision Support	Student
Type of Work Groups Within the Organization	Student
Hierarchical and Flow Models of Organizations	Student

The last recommendation is of particular importance to the MIS concentration since the remaining IS courses depend upon the student's understanding of fundamental computer concepts. The "electronic classroom" environment in which the course is taught offers a unique opportunity to demonstrate the basic features of such concepts as operating systems and file management.

Survey Results

Figure 5 shows the survey results for IS - 1. There were 95 student respondees and 4 instructors responded.

IS - 2: INFORMATION SYSTEMS CONCEPTS

Text

The initial text, Robert Schulteir and Mary Sumner, MIS, The Manager's View, Irwin Press, 1992, was adapted from a topics course on business information systems. It is attractive to students because of its extensive use of specific business applications and the fact that little or no computer background is required. Beginning in Fall, 1993 students in IS-2 will have completed the prerequisite course, Fundamental Concepts of Information and Computer Technology, and will be prepared for a slightly advanced text. The text which has been chosen is by Raymond McLeod, Management Information Systems, Macmillan, 1993.

Course Content

A systems approach is used to examine the role of technology in business. Michael Porter's fuve forces model and value chain analysis along with Richard Nolan's stages of computer information systems development were used extensively. At least one application system in each of the major functional business areas was examined. Several small projects were included which required that the

students think through the processing cycle.

Instructor Reaction

"It is not a difficult course to teach and I enjoyed teaching it. One of my main objectives was to build student enthusiasm for the MIS program."

Survey Results

Figure 6 shows the survey results for IS - 2. There were 10 students and 1 instructor who responded.

IS-3: Computer Concepts

Text

The text chosen for this course was J. Glenn Brookshear, Computer Science Overview, Benjamin Cummings, 1991. Both students and instructor are pleased with this text. It follows the DPMA Model Curriculum surprisingly closely. It remains at the awareness level for all subject matter and has great breadth. Oddly enough the instructor, an assistant professor of computer science, kept this text on his bookshelf unused for over a year because it didn't fit any of the traditional computer science courses but was too well written to discard. The IS-3 course was the perfect fit.

Course Content

This course, taught by the department of computer science, is an adaptation of a Computer Science course in computer organization modified to satisfy the requirements of the DPMA Model Curriculum. The underlying philosophy is that MIS professionals need to know technical processes in order to make effective business decisions. Business applications are emphasized in the context of the importance of the liaison between MIS professionals and computer science professionals in a business organization.

The reason why each subject area is important to MIS students is firmly established when the subject area is introduced. The question "How is this going to help me be a better manager?" is repeated throughout the course. As a result students are very motivated and have made the course the most valued in the program.

Figure 7: HIGHEST RATED KNOWLEDGE FOR IS-3

Knowledge Elements	Rated by
Physical Representation of Data	Instructor
Operating System Functions	Both
Types of Operating Systems	Both
Operating System Utilities	Both
Compilers and Translators	Both
Machine Structures: CPU, Memory, Bus, Controllers	Both

Figure 8: HIGHEST RATED KNOWLEDGE ELEMENTS FOR IS - 4

Knowledge Elements	Rated by
Physical Representation of Data	Instructor
Algorithms and Data Structures	Both
Procedural Language	Both
Application Analysis	Instructor
Construction	Both
Documentation and Testing	Instructor

Instructor Reaction

The instructor is enthusiastic and highly motivated. He has designed the course so that all assignments and grading are transmitted by e-mail. In doing this the students use UNIX basic functions. Instead of telling the students how to use a certain command, the students are given a UNIX command, such as *finger*, and told to find out how it works from on-line system documentation. Such commands are then used in subsequent assignments. The instructor is "very excited" about the course and in the next course offering plans to include a project which requires the students to build a simulator for a simple machine.

Survey Results

Figure 7 shows the survey results for IS - 3. Fifteen (15) students and one (1) instructor responded. The ratings by the students and that of the instructor are notably similar.

IS - 4 APPLICATION DESIGN AND IMPLEMENTATION

Text

The DPMA Model Curriculum recommends that the student leave this course with a detailed understanding of algorithms and data structures and a conceptual understanding of a procedural language. Thirty eight hours out of a total of 45 contact hours are to be devoted to the knowledge elements in these subject areas. For most students this course provides their first exposure to a procedural programming language. The programming language chosen was "C" and the textbook was David Himmel, Workout C, Waite Group Press, 1992. The "Power C" DOS compiler is provided with the text.

Course Content

The class met weekly for 3 hours half of which time was spent in lecture and half in computer lab. Six computer programming projects were assigned each involving a function of a commercial banking application. A large dataset containing a variety of financial transactions was provided for the students.

Instructor's Reaction

The instructor enjoyed teaching the course but found it difficult because of the diversity of the students' technical backgrounds. He feels that a procedural language other than "C" should be a prerequisite or that a programming language other than "C" should be used in IS - 4.

Survey Results

Figure 8 shows the survey results for IS - 4. Twelve (12) students and one (1) instructor responded.

AUTHORS' BIOGRAPHIES

Kathryn McCubbin is an Assistant Professor of MIS and Director of Information Technology Services at Christopher Newport University. She received her Masters degree from Marquette University in 1960 specializing in applied mathematics. Her professional experience includes basic research, product development, and public transportation. She has contributed many articles to both national and international journals and conferences on the development of application systems for space technology, transportation, business, and IS education. Her present research interest includes the use of geographic information systems in corporate strategic planning.

Mayes Mathews is an Associate Professor of Management and Department Chair for the Department of Marketing, Management, and MIS at Christopher Newport University. He received his doctorate degree from Virginia Commonwealth University in 1990, specializing in MIS. He has been the major force behind the University's acceptance of the DPMA 4 year model curriculum. He is currently involved in research in the decision sciences.

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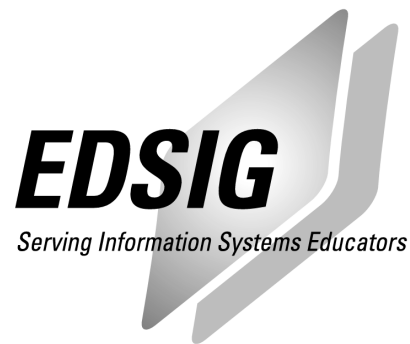
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