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The Design of an Information Management Curriculum for Business Students

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Historically the information systems curriculum within schools of business has been directed at training students for careers as business systems analysts and programmers within a corporate MIS/DP department. However, as the use of computer based information systems has spread across virtually all functional areas of business and as the roles and responsibilities of traditional business systems analysts have changed, there is a growing concensus that a new approach to the information management curriculum should be developed. In this paper we present an approach developed by at the College of Business at Northeastern University to provide both MIS majors and non MIS majors with information literacy, competency in information processing tools and information management concepts.
Introduction

The information systems curriculum within schools of business has historically focused most of its attention on the preparing of MIS majors for careers as programmers and systems analysts within a corporate MIS/DP department. The guidelines published by the DPMA and ACM put a strong emphasis on programming and project management. (see Exhibit I) [1,2,3,4] Two-thirds of the required subjects in a typical course of study emphasize proficiency at programming languages and systems analysis. Because students within an undergraduate business program are required to take a wide range of functional area courses, they are thereby limited in the number of courses they can take within an MIS concentration.

The following sequence of courses is fairly typical of the core requirements for an MIS concentration within colleges of business.

Introduction to Computer technology and MIS  
COBOL Programming (1-2)  
Systems Analysis and Design  
Database Management Systems  
Information Resource Management

Within this MIS sequence the first course usually doubles as both a required survey course for non-majors as well as the first course in the MIS sequence for majors. When this is the case, an introduction to computer programming is usually part of the course. Table 1 reflects the results of a 1984 survey of Colleges of Business for A.A.C.S.B., on the topics most likely covered in the required introductory course. [6]
Table 1

Topics included in the Required Introductory Course

<table>
<thead>
<tr>
<th>Topic</th>
<th>Number of Schools</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Systems Analysis</td>
<td>55</td>
<td>88.7</td>
</tr>
<tr>
<td>2. Systems Theory</td>
<td>53</td>
<td>85.5</td>
</tr>
<tr>
<td>3. Computing Equipment</td>
<td>52</td>
<td>83.9</td>
</tr>
<tr>
<td>4. Data Base</td>
<td>51</td>
<td>82.3</td>
</tr>
<tr>
<td>5. MIS by management level</td>
<td>49</td>
<td>79</td>
</tr>
<tr>
<td>6. System Life Cycle</td>
<td>49</td>
<td>79</td>
</tr>
<tr>
<td>7. Decision Support</td>
<td>46</td>
<td>74.2</td>
</tr>
<tr>
<td>8. DBMS</td>
<td>45</td>
<td>72.6</td>
</tr>
<tr>
<td>9. MIS by functional area</td>
<td>45</td>
<td>72.6</td>
</tr>
<tr>
<td>10. Programming languages</td>
<td>43</td>
<td>69.4</td>
</tr>
<tr>
<td>11. Computer Security</td>
<td>40</td>
<td>64.5</td>
</tr>
<tr>
<td>12. Management Theory</td>
<td>33</td>
<td>53.2</td>
</tr>
</tbody>
</table>

An analysis of the Table 1 data suggests the following interpretations. First, the typical introductory course has a computer, rather than an MIS emphasis. The top topics most often covered in this class are not management related. This is not necessarily inappropriate for an introductory course, but the broad range of topics covered in this course would suggest rather shallow treatment specifically of the management or non-technical issues.

Second, Professors are using this course as a means of teaching systems analysis and design techniques to the broad range of majors and non-majors enrolled in the course. This is probably a useful place to introduce such techniques particularly if end users are to begin taking on more responsibility for their own systems. However, in a typical business program, this broad based course covering everything from programming languages to management theory is the only one that non majors will be exposed to. This overview can not provide adequate literacy, hands on skills and a management orientation in enough depth to equip end users to take control of their own information processing needs.
From the content and administration of the MIS curriculum several inferences can be drawn about the relationship that is assumed to exist between these two categories of students -majors and non-majors -and the field of information processing. They are the following:

1) A career in MIS means software and systems development.

2) Educational preparation for an MIS career means primarily acquiring the skills to be able to develop and manipulate software tools.

3) Responsibility for ensuring the availability and adequacy of information to personnel in a business is the responsibility of the MIS department. This means for example that data management, systems planning and implementing cost effectiveness criteria would be the responsibility of the MIS department. This is the case, despite the fact that MIS majors receive very little education in these aspects of MIS and can not understand possibly understand the properties of the information involved as well as the users of it would.

4) People who do not major in MIS will give control of their data over to the MIS department to make decisions for them on such items as relevance, storage and retrieval mechanisms, data protection and systems requirements.

5) What a non-major needs to know about MIS is limited to an outsider's cursory view of "what they do" in the Data Processing/MIS department.

Exhibit II shows these relationships.

A Changing Landscape

The situation that has just been described exists in many schools and businesses today. However, there has also been rapid technological change resulting in the widespread hands on use of computers by many non-MIS people. This phenomenon is forcing Universities to rethink their MIS curriculum.
On the one hand, many students in an MIS concentration within a college of business feel squeezed out of many traditional MIS/DP jobs by competition from CS and CIS majors with much more software and system development coursework. Despite the fact that MIS majors have a business degree, many employers still focus on the number of programming languages an applicant knows. To make matters worse, the body of relevant knowledge seems to be growing exponentially. In addition to knowing about software and system development, students are also expected to bring some knowledge of telecommunications, expert systems and Fourth Generation software to the marketplace.

On the other hand, non-MIS majors increasingly find themselves required to have a knowledge of computer hardware and popular business software for jobs in traditional functional areas such as finance, marketing and manufacturing. Beyond this skill level, these functional managers also need to be familiar enough with computer technology and capacity planning techniques to make informed decisions about investments in personal computing hardware and software.

The surface level response to these educational challenges has often been to substitute word processing and spreadsheet assignments for the traditional programming component taught in the introductory course. A more basic change in curriculum is likely to emerge from the attempt to answer the question: What is it that business majors need to know about information processing? The answer suggests that the goals as well as the audience for information systems literacy, use and management practices has widened considerably.

A dramatic change is occurring in the relationship that both MIS concentrators and non-concentrators have with information processing. Instead of two distinct relationships derived from one's position either inside or outside the data processing department, there appears to be a growing need to prepare all business students for their role as hands on users of information systems. MIS concentrators must redefine their role in light of this environment and the knowledge explosion in the field. As a result of these changes it seems that there should be three distinct educational tracks which prepare individuals for these separate organizational responsibilities.
First, the approach to educating a business end user must change. The mission of the traditional survey course in MIS will have to be altered. Besides introducing business students to MIS as one of the functional areas of the business, students need to become competent users of the technology. They also need to develop an awareness as to which types of problems lend themselves to technical solutions. This set of characteristics defines information literate end users.

At the same time, as the body of technological information to be absorbed grows, MIS majors have to be realistic about the kinds of career opportunities they can pursue. It seems that the job of large scale software development, whether done in house or at a software development company is best left to the Computer Science (CS) or Computer Information Systems (CIS) majors who have acquired more technical skills due to a much more specialized curriculum. One academic track then seems to be preparation for a return to backroom large systems development projects.

However, in between these two relationships lies a gap. The end user may be able to articulate her/his information needs and identify categories of technical solutions, but this person neither wants to nor is capable of being an expert in all the relevant technical solutions. The software developer may build nice software for end users, but it still has to be tailored to the particular context in which it will be used. This gap can be filled by the MIS major with a business degree. It represents a new career path for these students and the solution to some of the problems presented above. (Exhibit III shows these three relationships)

NORTHEASTERN'S VISION OF THE FUTURE

The College of Business at Northeastern University is in the process of defining a new information systems curriculum which we hope will effectively meet the needs of end user managers and those students who wish to pursue a business career with a stronger MIS focus. Our assumptions in putting together this curriculum are that all business managers will need to be competent in three areas of information processing: 1) understanding the role of information and the MIS/DP function in an organization; 2) becoming competent in the use of computer based information processing tools; and 3) developing an ability to take responsibility for one's own information processing needs and use of corporate data.
For those students who wish to major in MIS, our goal is to provide the skills which will enable students to become department level business analysts who are sufficiently competent to understand how information processing tools work and how to identify and match user needs to the appropriate tools. We require that MIS concentrators be "double majors". That is in addition to a 6 course sequence in MIS we also require that students take all the required courses to specialize in another discipline.

With this approach we are training students to bridge the gap between those activities that are legitimately within the role of a corporate MIS/DP, function and those software enhancements and systems adjustments that are beyond the skills of functional managers. We see a growing need for this group of individuals who are particularly skilled at micro applications and who report to a department other than MIS/DP. In terms of future career paths, undergraduates with this background are in an excellent position to pursue either an MBA or a Masters in Information Science. Exhibit IV shows the new curriculum emphasis to achieve this goal. The two track curriculum for majors and non-majors is shown in Exhibit V.

The following are descriptions of new/changed courses which are being developed to meet these needs.

INTRODUCTION TO DATA PROCESSING. The goal of this course is to provide students with a foundation level of information literacy. Accordingly, all students will be required to take this course. It will cover the sources and uses of information as well as an introduction to computer hardware, operating systems, an overview of systems analysis and design and an introduction to concepts in information management.

END USER COMPUTING. This will also be a required course, and is focussed exclusively on hands on use of popular business software packages, including word processing, spread sheets and data bases. Currently we are also considering introducing students to some popular fourth generation languages as well.

INFORMATION MANAGEMENT. This course builds upon the student's functional knowledge of computers to develop an appreciation for the contextual aspects of information system use in organizations
and the issues surrounding them. A combination of lecture and case
discussion is used to explore such MIS topics as: the systems
approach, the system development process, information policies and
the impact of information systems on individuals and organizations.

MANAGEMENT INFORMATION SYSTEMS. This will be a capstone course
for MIS concentrators which will focus on some of the same
management issues that non concentrators will examine, but with a
stronger emphasis on the perspective of the MIS/DP department.
Also, less emphasis is placed in this course on systems analysis and
design concepts since student will have already taken a required
course in this area.

The other required courses for the MIS concentration will remain
fairly typical of what traditionally has been taught. This approach
is our attempt to meet the new curriculum that the dynamic
technical and competitive enviornment have created.
FOOTNOTES

1. ACM Education Board, ACM CURRICULA: RECOMMENDATIONS FOR COMPUTER SCIENCE (V.1) FOR INFORMATION SYSTEMS (V.2) FOR RELATED COMPUTER SCIENCE PROGRAMS (V.3), (New York: Association for Computing Machinery, 1983).


6. Raymond McLeod, Jr., "The Undergraduate MIS Course in A.A.C.S.B. Schools," JOURNAL OF MANAGEMENT INFORMATION SYSTEMS, 2, 2, Fall 1985, pp. 73-85.
EXHIBIT I.
RECOMMENDED INFORMATION SYSTEMS CURRICULA

Computer Scientist  System Programmer  System Designer  Applications Systems Programmer  Systems Analyst  Information Information Analyst  Information Architect

ACM Curriculum 78  IFI P  ACM Associate Degree  DPMA

ACM INFORMATION SYSTEMS

TECHNICAL  ORGANIZATIONAL

See Footnote 5.
EXHIBIT II.

ACADEMIC TRACKS AND JOB FUNCTIONS

CS / CIS / MIS

SOFTWARE  SYSTEM

DEVELOPMENT DEVELOPMENT

BUSINESS ADMINISTRATION

USERS

OF INFORMATION
EXHIBIT III — ACADEMIC TRACKS AND JOB FUNCTIONS

C S  C I S  M I S  I M  BUS. ADMIN.

COMPUTER SCIENTIST/PROGRAMMERS
SYSTEM ANALYSTS
INFORMATION ANALYSTS
SOPHISTICATED END USERS
LITERATE END USERS

SYSTEM DEVELOP.  END USER INTERFACE  DECISION MAKING

DEVELOPING THE TOOLS  MATCHING TOOLS TO INFORMATION NEEDS  USING THE INFORMATION
<table>
<thead>
<tr>
<th>EXHIBIT IV — NEW EMPHASSES AT NORTHEASTERN</th>
<th>MATCHING TOOLS TO INFORMATION NEEDS</th>
<th>USE OF TOOLS</th>
<th>IDENTIFY OPPORTUNITIES FOR TECHNICAL SOLUTIONS</th>
<th>TAKING RESPONSIBILITIES FOR USE OF INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSTEM ANALYSIS</td>
<td>SUPPORT — TRAINING</td>
<td>CONSULTING</td>
<td>functional area expertise</td>
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</table>
EXHIBIT V.

TWO-TRACK END USER-ORIENTED CURRICULUM

INTRO TO DP

END USER COMPUTING

INFORMATION MANAGEMENT

ELECTIVE

COBOL I

SYSTEM DEVELOPMENT

DATABASE

ELECTIVE

COBOL II

MIS