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COMPUTER EDUCATION FOR MANAGEMENT STUDENTS

C. Lawrence Merkley, University of Lethbridge

ABSTRACT

The School of Management at The University of Lethbridge has successfully implemented an innovative program to provide computing literacy to undergraduate management students. During the past year, the School has replaced a programming language course, typical of those traditionally required of undergraduates, with a course which integrates instruction in relevant concepts, terminology and issues in management computing with an extensive experiential component in a microcomputer lab. In the lab a selection of applications packages and a programming language reinforce concepts taught in the class, and provide specific tools for use elsewhere in the student's program. This paper describes the development of this course, preliminary reactions, and plans for the coming year.

BACKGROUND

The University of Lethbridge is a non-denominational, co-educational institution established in 1967. The University has grown rapidly in recent years with a full-time enrollment in 1982 of 2200 students with part-time and summer school enrollment of 1700. Undergraduate degrees are offered in Arts, Science, Fine Arts, Music, Education, Nursing and Management. There is one graduate degree program planned in Education.

The School of Management was created as a separate entity in July, 1981 from a department within the Faculty of Arts and Science. The School offers a four year Bachelor of Management program which incorporates the University's overall liberal arts philosophy. The first two years in the program are spent in preparatory, pre-management study in the Faculty of Arts and Science. The final two years are devoted to professional study in the School of Management.

Students who graduate from the School's program tend to remain in Western Canada and a large portion of them stay in Southern Alberta. Slightly better than 50% of the School's graduates are accounting majors, with most of the remainder completing majors in marketing and personnel.

Until 1983, all entering Management students were required to complete a course titled Computing Science 1600, which essentially offers an introduction to computer programming using BASIC. The course provides an excellent introduction to programming principles and involves an intensive lab experience.

While Computing Science 1600 accomplishes its purpose well, management students do not learn enough about computers in a managerial context from the course. There is seldom an opportunity to use the BASIC instruction received in management courses and little appreciation is gained of the computer's potential. Further, there has been very little initiative taken by faculty members to use the computer in management courses.

With the formal establishment of the School, the entire management curriculum was carefully analyzed to try to identify weaknesses and possible opportunities. It became clear early in that process that the computing component must be upgraded, and indeed become an integral part of the School's program.

With this in mind, a serious search for information and experience was undertaken. Experts in computer education were consulted and several conferences were attended. Experiences and opinions available for review were also considered. [1; 2; 3; 6] There appeared to be considerable and growing interest in revising the traditional courses offered in computing for management students and adding an experiential component which would extend beyond simple instruction in a specific programming language. The School acquired an IBM Personal Computer and a large collection of software for evaluation. In the fall of 1982 a proposal was presented to the University which if accepted would enable the School to establish a microcomputer laboratory as an instructional resource for two new management systems courses and a faculty research facility. Other existing courses would be modified as needed to utilize the students' training. The proposal was accepted, with the result that a "test run" of the introductory course was offered to a small group of ten students in the July, 1983 Summer Session prior to its being offered to more than 120 students during the following school year. This was undertaken to determine if the course objectives could be achieved, and to gain experience with the equipment. The students were registered Management students, nine of whom had already completed at least one computer course.

INFORMATION SYSTEMS I: THE INTRODUCTORY COURSE

Information Systems I (IS1) replaces Computing Science 1600 as the required introductory course for all management students. Students are encouraged to take this course as early as possible in their program so that the tools will be available to them for use in other courses.

IS1 is a three hour, one term credit course., and includes a three hour lab. The present course objectives and those tested in the Summer Session are:

- to provide students with a working knowledge of the concepts, issues and terminology in computer systems related to management,
- to experience the application of these concepts to realistic management problems through the use of selected applications software packages on micro-computers,
- to develop sufficient skill in these software packages to allow their immediate use by students in other courses, and
- to engender enthusiasm in the subject matter sufficient to motivate students to initiate projects in other courses using the computing resources available.

The application areas for which software is used in the lab include:

-   -Office automation - word processing
    -Accounting systems
    -Database management and retrieval
    -Planning - spreadsheet simulation
    -Programming

The lecture section of the course follows the outline of traditional courses in management computing. The subjects dealt with are referred to in the attached course outline (Appendix I) and follow the text outline. A selection of movies is used to deal with subjects such as office automation, privacy and management computer applications.

Instruction related to the software systems and languages takes place during the assigned lab time. Students are expected to complete lab assignments which require use of the lab facility during time scheduled for general student use. Lab instruction parallels presentation of the lecture material. For example, when office automation is discussed in the lecture section, a word processing language is taught in the lab. A database language is used which illustrates concepts in database management which are taught in class.

The software application areas selected are intended to represent the most critical subject areas which can be adequately covered in a normal term. Also, the level of detail covered varies among these topics in order to emphasize certain areas seen to be more valuable than others for this course. For example, in Accounting Systems, instruction is offered in the use of a fairly straight-forward General Ledger System, with reference only being made to such other related systems as accounts payable, accounts receivable, and inventory management.

It was felt that students should learn enough of the rudiments of a programming language to be able to write simple programs and, if desired, to become proficient on their own or through electing additional instruction in traditional programming courses. BASIC was selected as the instructional language for largely practical reasons. It is the de facto 'standard' for personal computers, it is taught as the introductory course for all other students at The University of Lethbridge, and it is easy to learn. Several other languages such as COBOL, FORTRAN, PASCAL and RPG are presented in the lecture part of the course in sufficient detail to allow students to recognize their respective strengths and weaknesses, and to decide in which language or languages they desire further instruction.

The selection of specific packages was tied to the hardware available. The School was provided with IBM- PC Systems each equipped with 256 K of memory and two floppy disk drives. The packages selected include:

-dBASE II	-Database management
-Lotus 1-2-3	-Spreadsheet simulation
-Word Perfect	-Word processing
-BASIC	-Programming language
-Fogle	-Computing
General Ledger	-General ledger accounting
-DOS 2.0	-Operating System

These software packages are of excellent quality and were all available at significant educational discounts. Testing procedures for the course include three written tests plus a final exam for the lecture material, and two "hands on" exams in the lab. The experiment in the lab with real-time exams worked well. By so doing, students were tested in the most efficient way available which would measure their ability to actually use the various packages in a problem-solving situation.

REACTIONS

A detailed survey of students' impressions of the course was conducted after the Summer Session was finished. Much of the survey requested student feedback as to the course's instructional strengths and weaknesses. In this regard, students generally found the programming language and word processing language most difficult to learn (7 of 10), with the spreadsheet language and operating system the easiest (7 of 10). The reaction to the difficulty of other topics in the course was widely scattered, with no more than 3 of the 10 students feeling that any one topic was too easy or too difficult.

In terms of the summer session's achievement of the course's objectives specified earlier, student reactions were uniformly enthusiastic (Appendix II). Almost all the students decided as a result of the course to continue their computing education. Several indicated a desire to pursue a career in a computer- related field because of this experience. Of particular interest is the fact that nearly every student in the School has since tried to register for this course, even though they have already satisfied their computing requirement. Their feeling seems to be that obtaining an adequate computing education is essential in finding and performing a job -- and they are hearing from their peers that IS1 satisfies that need.

Although the class size was small, the limits of the course were tested in a few interesting aspects:

1. A wheelchair student with limited finger dexterity required a few physical alterations to the lab to enable his use of the computer.
2. An African student had difficulty speaking and writing English. Even though he had completed a prior course in computing, he experienced incredible frustration working with a computer. (At times we were concerned he might damage the machine with his "aggressive" typing.)
3. One of the machines failed the day of the lab final, necessitating a schedule adjustment. Sufficient machines have now been acquired to allow one backup unit for just such emergencies.

Community reaction has been most encouraging. Interest in the School's certificate program has increased, and many local business leaders have asked that a special course or series of courses be offered similar to the IS1 course for the business community.

PLANS FOR NEXT YEAR

Many institutions have moved in the direction described in this paper. Recent experience suggests that others are experiencing similar results with programs which offer related instructional opportunities. [4; 5; 7; 8] The School of Management intends to build on its past year's experience and that reported by others in several areas:

1. A series of short courses in the lab will be offered to the faculty dealing with the soft-ware packages and general use of the computer.
2. Several management courses are being modified to include computer-based assignments. Specific lab time will be designated for each of these courses.
3. Information Systems II is an optional course which will include a more intensive treatment of systems analysis and a more comprehensive section on the use of the database management language with four weeks of lab time devoted to instruction in this language, and a major group project to integrate the tools and concepts in a practical problem.
4. A complete set of software packages, dBASE II and 1-2-3 "templates" will be prepared for use in several courses. For example, in the Quantitative Methods course, programs which deliver solutions for topics such as PERT, Markov Chains and Queuing Theory will be available. 1-2-3 templates for use in Finance, Accounting and Management Science classes will be developed. These programs will be small and topic specific. They will not replace the generalized packages available on the University's central system such as CM, SPSS or LINDO which are useful for large research projects. They will, however, satisfy all the instructional requirements of the School's Management courses, and introduce students to the flexibility available through computer-based solutions.
5. A community course will be offered which will be designed to satisfy similar objectives with a working audience in mind.
6. An effort will be made to continue to measure and record student reaction and relevant performance as a result of IS1 and other computer initiatives.

SUMMARY

The benefits expected from this program are:

1. Students acquire tools useful to them immediately in other courses and projects.
2. Students develop an awareness of the ways in which computers can be used in management.
3. Students integrate theory with practice by focussing more on problem definition, analysis and interpretation through computerized problem-solving than on memorizing algorithms.
4. Students experience computer applications on a micro-computer system, providing an exposure to an environment reasonably close to the one in which they will work after graduation. They also discover the value and necessity of such mundane tasks as file maintenance, diskette backup and other housekeeping activities.
5. Response time and reliability are no longer a concern in lab management and test administration. The occasional system failure has no impact on the ability of a faculty member or student to complete his work uninterrupted, as another machine is readily available near-by. Response time is determined entirely by the user, who seems to be quite tolerant of the self-induced delays experienced in a micro-computer environment.
6. Experience in a micro environment appears to heighten a student's interest in and imagination about the computer's possible uses. Also, there seems to be a stronger identification between student and machine with micros than with remote central systems. Certainly the student's fear of computers is eliminated and replaced with a healthy mixture of enthusiasm and skepticism. Initial observation even suggests that by reducing some of the uncertainties associated with time sharing usage, anxiety levels are lower and students become more confident in their ability to use the computer.

This program and its specific solutions developed for the School of Management is clearly situational. However, there are some important conceptual implications for computer instruction presented here which deserve consideration. In any event, the introduction of this program has generated excitement and interest management students and the business community, and positions the School of Management among an increasing number of institutions who are trying to provide relevant and integrated computer instruction.

APPENDIX I

Management 3060 - Information Systems I

The primary objective of this course is to provide students with an understanding of the concepts, terminology and issues associated with the use of computers in management. A laboratory session is required in which students will acquire a working knowledge of various application software packages using a micro computer. Students will be expected to use these tools in other management courses and are encouraged to use them in course-related assignments and independent projects.

Course Outline:

- Introduction to Data Processing Concepts and Computer Fundamentals
- Computer Hardware
- Computer Software
- Computer Programming
- Overview of Programming Languages
- Data Processing
- Data Communications
- Information Processing and Database Systems
- Office Automation
- Management Information and Decision Support Systems
- Computer Applications in Business
- Systems Analysis and Design
- Acquisition of Computing Resources
- Computer Resource Management
- Computers and Society

Laboratory Outline:

- Operating System, File Management
- Financial simulation - spreadsheet system
- BASIC programming language
- Word Processing system
- General ledger system
- Database management system

Text: Computers in Business Management by James A. O'Brien (Irwin, 1982)

Grade Assignment:

Laboratory Assignments	35%
Interim Exams*	30%
Final Exam	35%

*Three short quizzes will be given during the term.

Credit Lecture - 3 hours
      Lab - 3 hours

Prerequisites: Admission to the school

APPENDIX II

Information Systems I - Survey Question 4

"Assess the influence this course has had on your plans in each of the following areas by rating. them as indicated:"

a. Desire to take another computer-related course in:

	1	2	3	4	5	NR
- a programming language	4	2	4			
- information systems	5	3	1			1
- computing science topics	2	4	2	1		1

b. Desire to become more proficient in:

	1	2	3	4	5	NR
- word processing	3	2	2	1		2
- spreadsheet analysis	7	2	1			
- accounting systems	6	2	1			1
- programming language	2	2	2	1		3
- database language	3	1	3			3

c. Desire to pursue a career in a computer-related field

	1	2	3	4	5	NR
	3	4	2		1	

Note:
1 - Strongly Positive
3 - Indifferent
5 - Strongly Negative
NR- No Response

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