PERCEPTIONS OF BUSINESS COMPUTER APPLICATION CURRICULUM NEEDS FOR PUBLIC UNDERGRADUATE EDUCATION INSTITUTIONS IN TULSA, OKLAHOMA

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ACKNOWLEDGMENTS

One aspect of doing a study involving the future directions of our society is considering the effect of the escalating pace of change on one's own environment. If this research activity was taking place five years from now everyone might have been tied in to a computer for the thesis defense. Bill Venable could have been in Colombia, South America, and Tom Smith at a computer terminal in his office at Stillwater or the one in Tulsa. John Baird might have stayed at his Stillwater home, enjoying his vacation. I could have been in my office at home with textbooks and research materials at my disposal.

Ten years from now I might have completed all the coursework and other activities through telecommunications and correspondence courses, never having met Bill, Tom, or John. I will pray that our society never evolves to that point because it would be very unfortunate if I had not enjoyed the frequent personal and emotional interaction which has given me the support and encouragement I needed to continue my own human resource development.

A very special thanks to my daughters Rene and Jancy for their consideration and the sacrifices they made so that Jean and I could return to college in the middle of our lives and to Marta and Lee who helped us "keep it together."

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CHAPTER I

INTRODUCTION

The accelerating proliferation of the use of computers in virtually every aspect of our society has dictated a need for review and revision of our educational system's method of providing relevant learning experiences in the application of computers. Colleges and universities must rely on systematic analysis to determine current and near term educational needs as outlined by Brackhaus (1983). Frequent evaluation must be made to determine where curriculum changes are necessary. Knowles (1980, p. 123) states, "Educational needs are the things people 'ought' to learn for their own good, for the good of the organization, and for the good of the community." Effective programs will be dynamic and curriculum changes frequent, timely, and based on sound systematic needs analysis of the community.

Statement of the Problem

There has been no recent research to identify an undergraduate business computer applications curriculum appropriate for Tulsa's public supported, post secondary educational environment. Rapid technological advancements have placed emphasis on the requirement for educational

institutions to identify and implement the most relevant business computer applications curriculum possible.

Purpose of the Study

The purpose of this study was to determine courses which might be included in an undergraduate business computer applications curriculum appropriate for the Tulsa's public supported, post secondary educational environment.

The objectives of this study were:

1. to determine currently recognized business computer applications curricula and

2. to conduct a needs assessment for an undergraduate business computer applications program in Tulsa.

Assumptions

1. There is a need for a business oriented computer applications program in Tulsa.

2. The purpose of public education is to meet the needs of the community it serves.

Scope and Limitations

Only students in business programs at the University Center at Tulsa and Tulsa Junior College were included in the study. A panel of experts made up of postsecondary computer science educators from the Tulsa area provided input regarding the direction of computer science education.

Only students enrolled in public supported

undergraduate business and computer programs in Tulsa were included in the study.

A limited number of Tulsa Junior College students participated in the survey.

The panel of experts comprised of computer science educators from postsecondary public education institutions were from the Tulsa area.

Definition of Terms

Business computer applications curriculum - An educational program which combines traditional business courses and computer applications courses.

Data communications - The transmission of information through networks, phone lines and satellites.

Emphasis areas - Areas within the Data Processing Management Association proposed 1986 curriculum which allow concentrated study in a specific area of the Management Information Systems program.

Financial systems auditing - The application of sound accounting practices in a computer systems environment.

Generic software - Computer programs written and marketed for a large segment of the population.

Information management - The planning, implementation and control of information resources.

Integrated Office Management Systems - Desk top computers, word processors, and large central computers are linked in networks.

Management information systems curriculum - A field of study involving the management of information resources.

Needs assessment - The evaluation of an environment or situation to determine the direction of subsequent action.

Programmer - Individuals who write and test computer understandable code.

Systems analyst - A person who conducts needs analysis and prepares program specification documentation of computer information systems.

Organization of the Study

In Chapter I the study was described, the problem and purpose were stated and the objectives to be met by the study were presented. Also identified in Chapter I were the assumptions and limitations of the study and the definitions of terms utilized in the study. Chapter II contained a review of literature including a brief history of computer technology and its impact on business, data processing and education. In addition, Chapter II gave an overview of the undergraduate educational environment in Tulsa. Chapter III contained the methodology of the study including an interview of educators, selection of subjects, data gathering instrument, and collection and analysis of data. Chapter IV included a presentation of the findings, while Chapter V included the summary, conclusions and recommendations for practice and further research.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this study was to determine an appropriate business computer applications curriculum for an undergraduate program in Tulsa. Chapter II presents an overview of the undergraduate public educational institutions in Tulsa, a brief history of computer technology, and the impact of technological advancement on business, data processing, and education.

Present Educational Environment

Tulsa is a metropolitan area of approximately 360,000 people. Undergraduate public supported post secondary education institutions include Tulsa Junior College and the University Center at Tulsa.

Tulsa Junior College

Tulsa Junior College was established as a public supported, two year post secondary institution in 1970 with the purpose of providing technical skills and educational opportunities in response to community needs. Programs at the three Tulsa Junior College campuses are developed with direction from advisory committees composed of individuals

representing many areas of Tulsa business and industry. The college provides programs of study for over 15,000 full and part time students who are planning to continue at the junior level at a senior college or university, preparing for specific careers, or seeking continuing education.

Individuals earning an Associate in Arts or Associate in Science degree at Tulsa Junior College satisfy the general education requirements of undergraduate programs at state supported four year colleges and universities. Tulsa Junior College computer programs under the business department provide technical skills in business application programming, computer operating systems, hardware operation and system design. Over 4,500 students are enrolled in computer science classes.

University Center at Tulsa

The University Center at Tulsa was established through the 38th Oklahoma Legislature enactment of Senate Bill Number 480 in July, 1982. Estimates at that time were that the student body would number 20,000 by the year 2000.

Senate Bill Number 480 authorized and directed the Oklahoma State Regents for Higher Education to establish a university center to make programs of public higher education available to citizens in the Tulsa metropolitan area. According to "Developmental Aspects of the University Center at Tulsa" (1982), the bill provides that:

> 1) The State Regents shall have governmental control of the center. 2) The center shall draw

> upon the educational resources of existing colleges and universities to provide needed courses and programs. 3) The center shall offer educational programs at the third and fourth years of undergraduate study and at the master's level. 4) The center shall not be in duplication of courses offered by Tulsa Junior College or the Langston Urban Center Program. 5) The State Regents shall create an advisory board of citizens from the Tulsa area to counsel and advise the Regents as the administering agency for the Tulsa higher education program. (p. 3)

In a meeting of representatives from nine institutions, both public and private, in the Tulsa area it was determined Langston University, Northeastern Oklahoma State University, Oklahoma State University and the University of Oklahoma would provide instruction at the University Center at Tulsa.

Tulsa Junior College and Rogers State College have exclusive jurisdiction over all lower division work while Langston University was given priority for upper division courses and programs. Graduate programs are offered through Northeastern Oklahoma State University, Oklahoma State University, and the University of Oklahoma. When more than one public institution offers work in a given field, proximity as well as level of accreditation is considered in determining which institution will provide the program.

Priority was given to the establishment of educational programs which were in high demand and not available through public and private institutions in the Tulsa area and care was given to avoiding duplication of the efforts of private institutions where the introduction of a publicly supported program would result in a dramatic decline in student demand within the private institution.

According to "Developmental Aspects of the University Center at Tulsa" (1982), there are several important elements concerning the development of the University Center at Tulsa...

> Public and private institutions must plan together for the articulation of students so that the mix of courses available from both public and private institutions can be utilized most efficiently and effectively. There should be a systematic phasing in of courses and degree programs that may, in some cases, duplicate the private programs currently available. This phasing in should be well planned and deliberately implemented to ensure maintenance of the highest possible level of quality and allow the private institutions time to manage the changing nature of their programs. (p. 14)

The approach of a "University Center" draws from a variety of academic and community resources. This cooperative involvement has made a number of quality public higher education programs available in Tulsa and others will be added as needs are determined and as resources permit.

Information on demographics of the University Center at Tulsa is derived from a number of informal reports, interviews, and from a volume of statistics maintained by University Center at Tulsa administrative personnel.

The University Center at Tulsa student is typically older than students on a traditional campus, works full time, is married, and has extensive prior college study. Students are more serious in their study and they want programs that will provide immediate benefit in their work environment.

Characteristics of a typical student include

(Developmental Aspects of the University Center at Tulsa, 1985): an average age of more than 25 years, married, working and attending classes part time. The typical student has lived in Tulsa over ten years, prefers evening classes, is enrolled in five semester hours, and is likely to take summer classes. Of the Spring 1985 enrollment, 41% were undergraduate students, 62% were female, and 60% were business majors.

These statistics show many of the patterns as discussed by Rauch (1981), who said, "We have moved from a youth culture in the 1960's to an adult culture in the late 1970's." (p. 11) Adults are returning to our educational institutions in record numbers. The majority are part time learners and do not find curricula developed for traditional college students meeting their needs. (Rauch, 1981)

Summary, Educational Environment

A student pursuing a business oriented bachelor of science degree through state supported institutions in Tulsa would work toward an Associates of Arts degree at a junior college and could enroll concurrently at University Center at Tulsa pursing a degree through Langston or Northeastern.

Tulsa Junior College was the only post secondary institution in the Tulsa area for thirteen years. Because there was no state supported four year educational institution and because there was a strong demand for what have historically been categorized upper division courses,

many of the subjects taught at Tulsa Junior College would have traditionally been offered at the junior and senior level in Oklahoma's state universities. These courses are accepted by Langston and Northeastern as satisfying specific course requirements. However, a student must complete a total of between 124 and 130 hours to satisfy requirements of undergraduate programs. Thus, a typical student has the potential of including many more of what have been traditionally designated upper division (junior and senior) level courses in their plan of study. This fact has significant bearing on the development of undergraduate programs in Tulsa.

History

To identify how we reached the present technological state as it relates to the business application of computers, we must gain a perspective of the historical development of the American economy.

In the eighteenth- and early nineteenth-century America followed a pattern of agricultural development. An essential transportation network was built to make maximum use of rich raw material resources in the economy.

The devastation of World War I was a major factor in reducing the economic influence of Germany and Britain and increasing the influence of the United States.

By 1919 the "Industrial Revolution" was believed to have reached its peak. The American industrial structure

had expanded greatly.

In spite of the economic decline of the 1930s, by the early 1940s the production of manufactured goods reached new highs in the United States. This was largely due to the needs of World War II.

Continued expansion of American activity and international trade has occurred since World War II ended. A more efficient international utilization of raw materials for the production of finished goods and the rise of the multinational corporation have characterized America's growth. "The American economy was noted during the three decades following World War II for its dominance in the aircraft and electrical industries--industries representative of the high technology society in which we live." (Zimmerman, 1984, p. 230)

The decline of the smoke stack industries and the greater emphasis placed on the importance of high technology industries are seen as the "Third Wave" in American economic development. Between 1955 and 1965, the decade when the "Third Wave" began, computers began to seep slowly into the business world. (Toffler, 1981)

Electronic computers were developed during the early 1950s. The primary use of the computer during its inception was military and scientific applications. During the first ten years after the inception of the computer the cost was such that only the government and a few large corporations could afford their use. (Osborne, 1980)

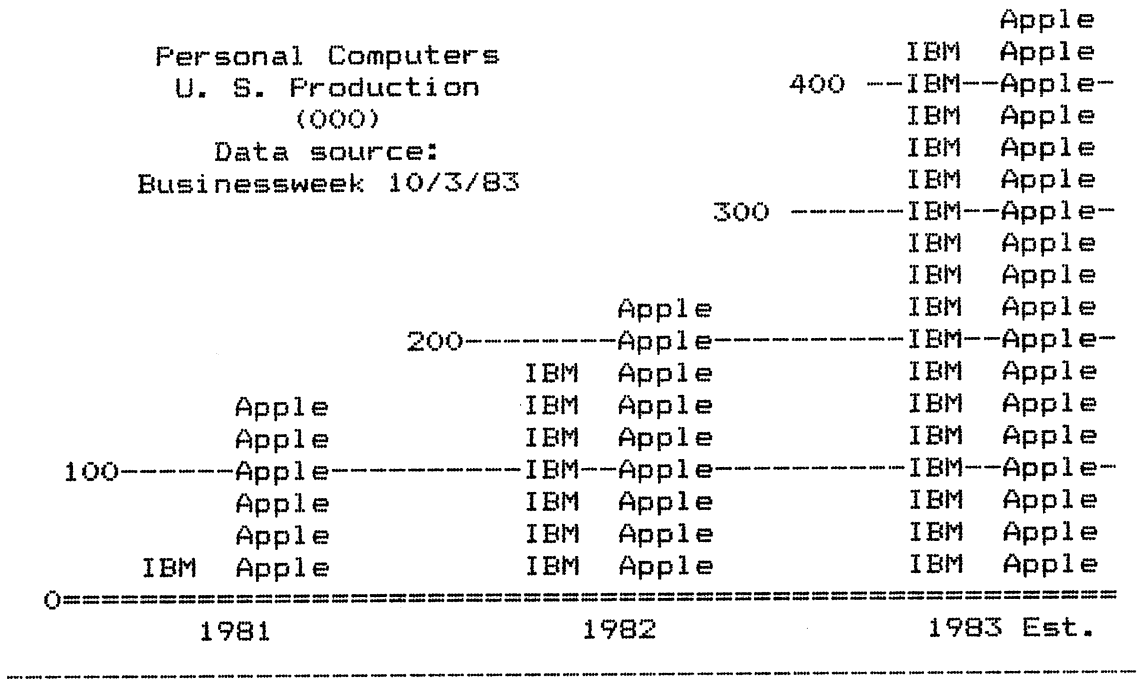
Computer science curricula were developed under the control and guidance of the mathematics and/or science departments of many universities. Additionally, electrical engineering departments developed programs related to the physical attributes of computer development. These highly technical mathematics, science, and engineering curriculums were expensive to establish and the cost of keeping current with technology has been more than some universities could afford.

During the 1970s computer miniaturization advanced with lightning rapidity as capacity increased and cost decreased. The use of computers in medium and large companies increased dramatically and "mini" computers became affordable.

The advent of the "micro" computer has escalated computer sales and the applications of computers in homes and businesses. The October 3, 1983 Businessweek cover story states, "Reports now circulating in the industry say that IBM has already ordered enough components to build 2 million small computers during 1984--more than the total number of all brands of the small machines sold in the U. S. through 1983." Table I shows the dramatic increase in computer sales for the Apple and IBM since 1981.

TABLE I

MICROCOMPUTER SALES



Other computer manufacturers have recorded like increases in personal computer sales.

Since the inception of the desk top computer the primary demand for education has moved toward the application of computers as opposed to the more technical aspects of computer programming and electrical engineering.

Technological Impact

The technological advancement of the computer follows closely the life cycle pattern of the telephone. People initially went to a neighbor's home to use their phone and planning a call would often be made weeks in advance. Now the telephone is taken for granted as a necessity. (Stocker, 1984)

"The life cycle pattern would indicate that people need to know much more about computers than they are presently learning. The life cycle pattern would also seem to indicate that the kinds of things they should be learning are not the machine language/assembly language concepts." (Stocker, 1984, p. 11) Generic software packages are today's parallel to the dial phone versus telephone operator placed calls. Programmer demand may soon follow that of switchboard operators.

Data processing professionals are concerned over the technological change. In survey data reported by Raho (1985), Data Processing Management Association (DPMA) members indicated the current priority problem area to be educational issues which fell into three main areas: user education, data processing management education and education in microcomputers.

The survey also indicated the highest priority of future concern to be the various facets of the development of information systems within the organization including: development of distributed data processing and networking,

the implementation of the data base concept, security, the technological interfacing of support systems, the diversity of possible application systems and the use of microcomputers within the organization.

There are more than one million computers in United States businesses churning out two billion pages of information every day. "Handling information used to be seen as an adjunct to corporate policies; now it is often the goal." (Pellman, 1984, p. 20)

Planning for information management is based on the concept that information is a resource that must be managed like a corporation's personnel, cash, and equipment. Traditional computerized systems were generally designed for the exclusive use of a section or department in a corporation disregarding the need for cross-divisional management and operational information. Strategic information views the corporation in its entirety, not as a singular section or department. (Kubicki, 1985)

Information management personnel will have a major impact on corporate environments in the coming decade. Information managers will be better qualified and an information science degree will become an absolute necessity. One realm the data processing manager will have to impact is the strategic use of information by corporations. The increasing use of personal computers will cause data processing managers to be more responsible and have a better understanding of information systems and their

uses. Data processing managers offering advice to students indicate that technical expertise is not enough. "People coming out of school need to have more business awareness. They should concentrate on basic communications skills from written to verbal. Interpersonal skills are very important." (Berg, 1984, p. 24)

Information published in "Business Week's Guide to Careers", (1980) states...

> With the addition of 50 new computer terminals and the creation of a master's program in management information systems, the University of Missouri at Columbia has begun to catch up with a nationwide demand for specialists in computer programming for business. The speciality combines business and management courses with training in the design and use of computer software geared for business applications. (p. 9)

The Association for Computing Machinery publication, "ACM Curricula Recommendations for Information Systems" Volume II (1983), indicates an increasing demand in the public and private sector for information systems technology. "The interest in information systems solutions to business problems is growing at a rapid rate, well exceeding the capabilities of the information systems community to satisfy these demands." (p. 79) The Association for Computing Machinery recommends an information systems curriculum which follows the American Assembly of Collegiate Schools of Business accreditation standards which include course work comprised of the following:

> 1) a background of the concepts, processes, and institutions in marketing and distribution, production, and financing functions of business enterprise, 2) a background of the economic and

> legal environment of business enterprise along with consideration of the social and political influences on business, 3) a basic understanding of the concepts and methods of accounting, quantitative methods, and informations systems, 4) a study of organization theory, interpersonal relationships, control and motivation systems, and communications and, 5) a study of administration processes under conditions of uncertainty including integrating analysis and policy determination at the overall management level. (ACM Curricula Recommendations for Informations Systems, 1983, p. 82)

The ACM curriculum recommendations also include a prerequisite course in quantitative methods which includes the study of mathematical aspects of program development. Other ACM prerequisite recommendations included a course in finite mathematics (i.e. logic, sets and relations, and linear algebra) and a course in elementary statistics.

The Data Processing Management Association (DPMA) 1984 directory includes a list of 236 colleges and universities which have implemented all or part of the DPMA undergraduate computer information systems curriculum. The "DPMA Model Curriculum for Undergraduate Computer Information Systems Education" (1981), preface states,

> The curriculum guidelines are designed primarily for four year undergraduate programs offered either through schools of business or through applied computer science programs which require a concentration of business courses. These guidelines recognize the need for articulation between two and four year programs, as well as the value of having terminal degree courses of study at both levels.

The field of computer information systems is moving towards database systems with microcomputers becoming as important as mainframe computers. Automated development

tools are being used with greater frequency to increase programmer/analyst productivity and there is a trend toward the use of inquiry, report writer, and decision support languages which may be used by personnel without a programming background. The computer will become a management tool as well as an operational tool and the computer information specialist will need a greater understanding of the business processes. (Tussing, 1984)

Summary

The sales of small computers for business and home use have far exceeded even the most optimistic predictions over the last few years. The impact has been to move the emphasis of undergraduate computer programs toward business applications as opposed to the "pure" computer science offered by many undergraduate programs. Many colleges are beginning to offer computer programs within the business department as well as continuing to provide the traditional computer science program through math and science departments.

Such programs are titled Management Information Systems, Computer Information Systems and Information Systems. All have in common a core which includes traditional business courses and computer courses. The emphasis in mathematics and computer courses has moved toward computer applications in business.

CHAPTER III

METHODOLOGY

The purpose of this study was to determine courses which might be included in an undergraduate business computer applications curriculum appropriate for Tulsa's public supported, post secondary educational environment. Five steps were followed as described in this chapter: (1) telephone and in-person interviews were conducted with college and university educators in the field of business computer applications, (2) the population sample was selected, (3) the instrument was devised, (4) the method of collecting data was identified, and (5) the method of analysis and the display of results was determined.

Interviews With Educators

Telephone and in-person interviews were conducted with six college and university computer science advisory and/or faculty personnel from Tulsa and the surrounding area.

During the interview each person was asked: to provide information on their respective curriculum, what the basis for their curriculum was, what immediate and future revisions were planned, and their perception as to the direction of computer education. Additionally, a request was

made that they attend or send a representative to a February, 1985, meeting.

A meeting of a panel of experts comprised of educators from Rogers State College, Tulsa Junior College, and Oklahoma State University School of Technical Training was held in February, 1985, to gain input as to the direction of business computer applications programs.

Selection of Sample

The sample utilized in this study was an accidental sample and was selected based on availability. Although there are disadvantages to this form of sampling, "When the phenomena being investigated are homogeneous within the population, however, the bias may not be too great." (Arkava and Lane, 1983, p. 158) The homogeneity of the population sample selected allowed for a smaller sample without sacrificing the validity of the study.

A utopian population for this study would have been employed people with a business and computer science background who are knowledgable in undergraduate curriculum development methodology. Business student majors at the University Center at Tulsa and Tulsa Junior College were selected because it was anticipated that a majority would be employed, they would have had at least an introductory computer course, and most would have recently been involved with degree planning. Additionally, from a marketing aspect, they are the clientele to be served.

Data-Gathering Instrument

A questionnaire, consisting of six major sections, was designed to: (1) gather demographic information, (2) determine the student perception of business course requirements, (3) identify perceived mathematics course needs, (4) determine opinions on present and future employment opportunities in business computer field, (5) identify computer related courses which should be included in the degree plan as required, (6) determine which computer courses would be the most popular if offered as electives.

The survey instrument also asked participants if they were interested in a computer major or minor and if they would help as an advisor in the development of the curriculum.

The questionnaire was reviewed and discussed by computer and business course instructors at the University Center at Tulsa. Suggestions and comments were analyzed and the questionnaire redesigned.

A pilot test was conducted with the cooperation of students in a master's in business administration class offered at the University Center at Tulsa through Oklahoma State University. The administrator of the survey asked each pilot participant for comments and recommendations as the questionnaires were returned. Suggestions led to the development of an "information sheet" which provided course descriptions corresponding to course titles on the questionnaire. See Appendix B for a copy of the final

version of the questionnaire and information sheet.

The final questionnaire solicited between sixty and eighty entries depending on individual participant selections. The time to complete the instrument ranged between ten and twenty minutes with the majority completed in under fifteen minutes.

A cover letter to the questionnaire was written to explain the purpose. See Appendix C for a copy of the cover letter.

Collection of Data

The questionnaires were administered and collected by business class instructors. The best response was found to be when an instructor introduced the instrument using information from the cover letter and then ask students to complete the questionnaire during the first few minutes of class. The poorest response (zero) was received when an instructor distributed the questionnaire before an exam and asked the participants to return them to the researcher at their convenience.

Analysis of Data

Data were assimilated using an International Business Machine Personal Computer (IBM PC) and computer programs written by the researcher specifically for the project using Scientific Time Share Corporation's version of A Programming Language (APL). Numeric codes were entered directly into

the computer from the precoded questionnaire.

Section 1 of the questionnaire contained demographic information. Frequency counts and percentages were used to analyze participant characteristics.

Sections 2, 3, 4, 5, and 6 were analyzed by determining the response rate for each category, developing a response percentage based on the number of participants responding to a given category, and ranking the selections in high to low percentage order. Data was omitted in a few instances where participants incorrectly entered more selections than were specified in the instructions. Horizontal bars were incorporated into data displays.

CHAPTER IV

PRESENTATION OF FINDINGS

The content of this chapter is divided into six sections. Sections are presented in the following order: (1) results of telephone interviews and meeting with educators, (2) response to the questionnaire, (3) demographics of respondents, (4) statistics on emphasis area selections, (5) tabulations of course selections within emphasis area, and (6) data indicating the most popular computer course.

Results of Interviews and Meeting

Telephone and in-person interviews were conducted between September, 1984, and January, 1985. Contacts were made with computer science advisory and/or faculty personnel at the University of Tulsa, Oklahoma State University, Northeastern State University, Rogers State College, Oklahoma State Technical College and Tulsa Junior College. These informal discussions were held to determine educator's perceptions as to the present and future need for business computer application programs.

Interviews and the review of related literature revealed the Association for Computing Machinery (ACM) and

the Data Processing Management Association (DPMA) curriculum models to be the most predominant base for Management Information Systems (MIS) programs.

Subsequent discussions with representatives of the ACM and DPMA revealed the DPMA model to be under current revision while the ACM model was defined prior to 1982 and no revisions were under consideration. Publications describing the current ACM and DPMA models as well as the rough draft for the DPMA 1986 model were ordered and received.

The meeting of educators from Rogers State College, Tulsa Junior College, and Oklahoma State Technical College was held in February, 1985, to gain opinions on the direction of business computer applications programs. The preliminary DPMA 1986 curriculum model was discussed and found to be a good basis for the development of a curriculum for Tulsa. Three reasons were cited for using the proposed DPMA 1986 model: (1) the curriculum revision was presently in process, (2) emphasis areas allowed the curriculum to be implemented in stages based on highest demand and, (3) the DPMA 1986 curriculum encourages coordination between junior college and university programs.

Representatives of junior college programs indicated that the overwhelming majority of students in their computer classes were interested in business applications of computers. One representative indicated that 95% of the 4000 to 5000 people involved in his computer programs were

interested in business applications while less than five percent were working toward math based scientific computer applications.

A spokesperson from a smaller college said a higher percentage of his students were interested in a math/science based program. One possible reason is that more international students were enrolled at that institution and subsequent discussions with a number of international students at the University Center at Tulsa revealed that many were sent to the United States specifically to acquire math, engineering, and/or computer science degrees.

The coordinator for development of the DPMA 1986 curriculum agreed to the use of the preliminary model specifications as the basis for Tulsa needs assessment research. The researcher, in turn, agreed to provide feedback to the coordinator so results of the Tulsa survey might be included as part of the basis for final DPMA 1986 curriculum decisions.

Response to the Questionnaire

The survey was presented in April, 1985, to business classes at the University Center at Tulsa and to a limited number of students in the Tulsa Junior College computer program which is part of that school's business department. Participation was voluntary. A brief introduction was made which included a statement as to the purpose of the study, comments on the meaning of "emphasis areas" and a statement

indicating that such a program might be implemented in Tulsa within the next few years.

The survey was presented to between 200 and 300 students at University Center at Tulsa and Tulsa Junior College. An exact number can not be determined because many students are in more than one class and would, of course, complete only one questionnaire.

The response to the survey numbered 120. Of these, 5 were not included in the data analysis because they were completed by students in other than business or computer science programs. A factor in the response rate may be that many students were reluctant to complete the form because they were not familiar with computer terminology. Those electing to complete the form might, conversely, be expected to understand better the course descriptions. Since most of the business classes are conducted at night and the majority of students are working full time, the added effort of completing the questionnaire was often not well received.

Demographics of Respondents

Of 115 business students completing the questionnaire, 93 were employed. The average age was 29 in a range of 18 through 50. The median age was 30. Computer majors and/or minors numbered 52 and a total of 90 participants indicated that they would like more information on a major or minor in computers. A total of 46 participants indicated that they would be willing to participate in an advisory capacity in

the development and implementation of a Management Information Systems curriculum while 48 indicated that they had attained an associate degree of which 35 were earned at Tulsa Junior College.

Emphasis Area Selection

Participants were asked to indicate which emphasis area was of most interest to them personally. The responses are summarized as a percent of total and ranked high to low as follows:

1. 23% Information Management
2. 21% Financial Systems and Auditing
3. 18% Systems/software Programming
4. 16% Systems Analysis
5. 13% Integrated Office Systems
6. 8% Data Communications

Participants were asked to indicate which emphasis area was in most demand in today's business environment. The responses are summarized as a percent of total and ranked high to low as follows:

1. 24% Systems Analysis
2. 21% Information Management
3. 17% Systems/software Programming
4. 17% Integrated Office Systems
5. 12% Data Communications
6. 9% Financial Systems and Auditing

Participants were asked to indicate which emphasis area

would be in most demand in 1990's business environment. The responses are summarized as a percent of total and ranked high to low as follows:

1. 34% Information Management
2. 21% Data Communications
4. 16% Integrated Office Systems
4. 15% Systems/software Programming
5. 10% Systems Analysis
6. 4% Financial Systems and Auditing

The emphasis area of Information Management was determined to first in importance in both personal preference and the most in demand during the 1990's. Systems Analysis was chosen as the most in demand in today's business environment.

Selections Within Emphasis Area

Tables II through VII display course selections within each of the six emphasis areas. These are ranked in order of percent of total responses and subdivided by business, mathematics, and computer categories. These categories of courses are commonly used in the development of management information systems curriculum. The largest percentage represents courses most consistently selected by respondents as important to the curriculum core. The smallest percentage represents courses least selected by respondents as necessary to the curriculum core. Horizontal bar charts were used to provide visual emphasis.

Table II is a graphic display of the analysis of courses the participants indicate should be required of persons selecting the Systems Analysis emphasis area within the management information systems major.

The following are the top ten business courses selected by the majority of participants: Principles of Management, Management Information Systems, Business Communications, Managerial Accounting, Business Statistics, Principles of Finance, Financial Accounting, Introduction to Business, Business Law, and Organizational Behavior.

In the mathematics section college algebra (97%) and business calculus (73%) were perceived by an overwhelming majority as critical to the Systems Analysis emphasis area with the third choice in the mathematics section receiving 48%.

The top ten computer courses were: Systems Analysis and Design, Introduction to Computer Information Systems, Program Design and Development, Data Structures and Databases, Computer Problem Solving, Problem Solving With Computers, Microcomputer Applications in Business, Software: Selection & Development, Hardware And Architecture, and Computers and Organizations.

The course in computer Hardware and Architecture was considered to be of more importance within the Systems Analysis emphasis area than in some other areas of concentration.

TABLE II

REQUIRED COURSES -- SYSTEMS ANALYSIS

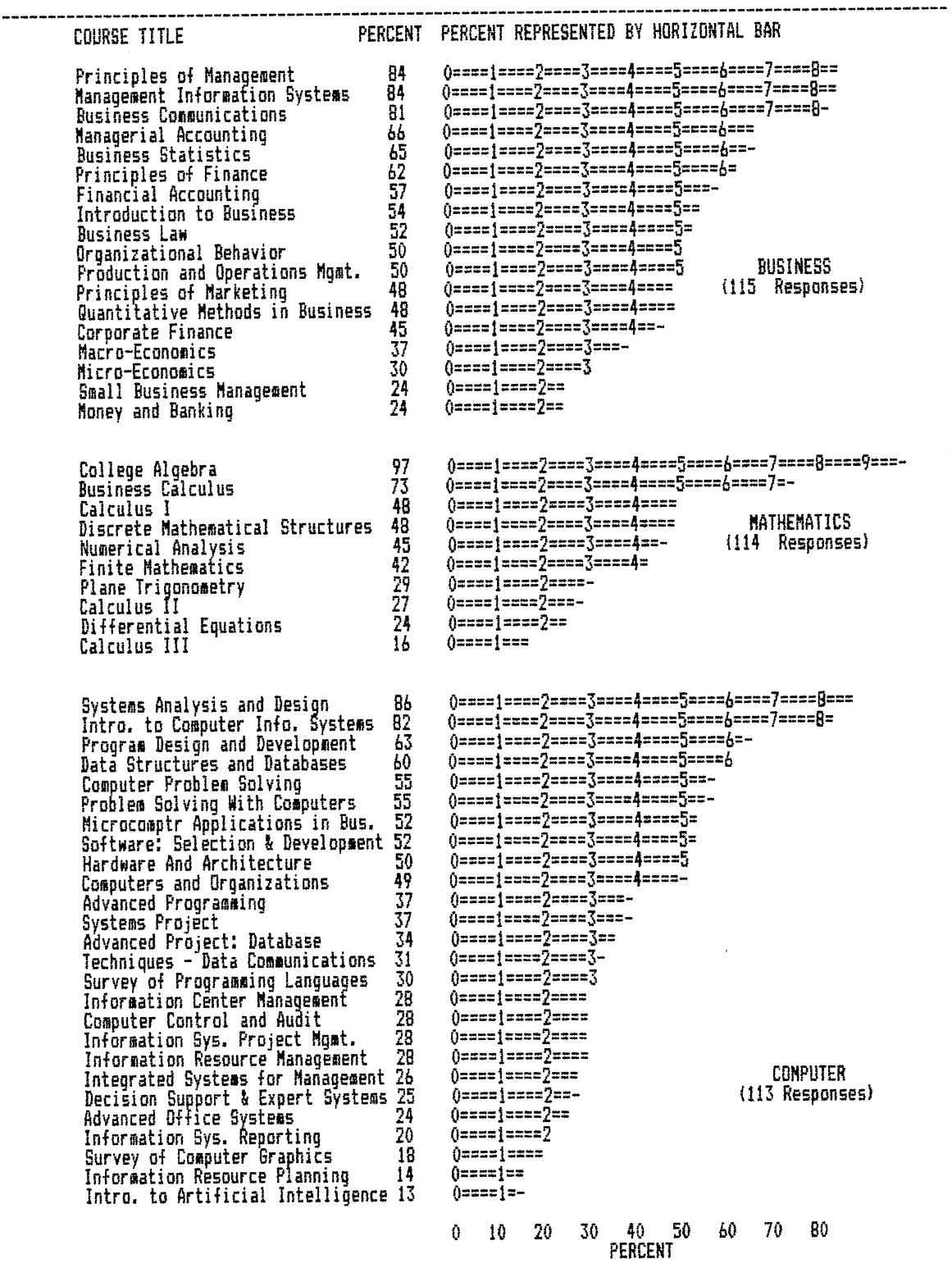


Table III is a graphic display of the analysis of courses the participants indicate should be required of persons selecting the Systems / Software Programming emphasis area.

The following are the top ten business courses selected by the majority of participants: Management Information Systems, Principles of Management, Business Communications, Managerial Accounting, Introduction to Business, Financial Accounting, Business Statistics, Principles of Finance, Business Law, and Quantitative Methods in Business.

In the mathematics section college algebra (98%) and business calculus (70%) were perceived by an overwhelming majority as critical to the Systems/Software Programming emphasis area with the third choice in the mathematics section receiving 49%.

The top ten computer courses were: Introduction to Computer Information Systems, Systems Analysis and Design, Program Design and Development, Software: Selection & Development, Data Structures and Databases, Computer Problem Solving, Hardware And Architecture, Microcomputer Applications in Business, Problem Solving With Computers, and Advanced Programming.

Quantitative methods and advanced programming courses were considered to be of unique importance within the Systems / Software Programming emphasis area.

TABLE III

REQUIRED COURSES -- SYSTEMS/SOFTWARE PROGRAMMING

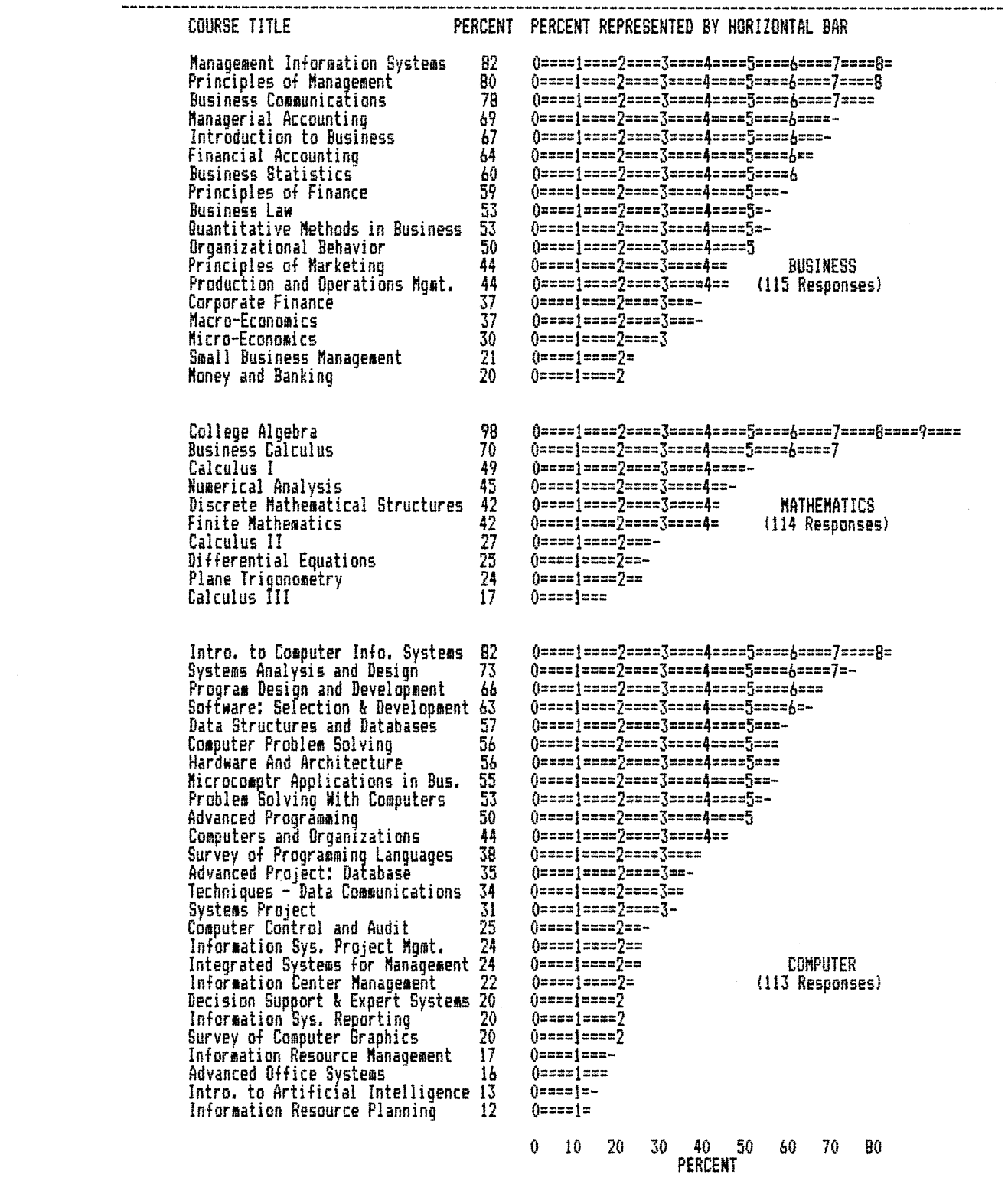


Table IV is a graphic display of the analysis of courses the participants indicate should be required of persons selecting the Integrated Office Systems emphasis area.

The following are the top ten business courses selected by the majority of participants: Principles of Management, Management Information Systems, Business Communications, Managerial Accounting, Principles of Finance, Organizational Behavior, Introduction to Business, Financial Accounting, Business Statistics, and Business Law.

In the mathematics section college algebra (97%) and business calculus (77%) were perceived by an overwhelming majority as critical to the Integrated Office Systems emphasis area with the third choice in the mathematics section receiving 45%.

The top ten computer courses were: Introduction to Computer Information Systems, Systems Analysis and Design, Microcomputer Applications in Business, Program Design and Development, Data Structures and Databases, Software: Selection & Development, Computers and Organizations, Computer Problem Solving, Integrated Systems for Management, and Problem Solving With Programs.

The course in computer Production and Operation Management was considered to be of more importance within the Integrated Office Systems emphasis area than in some other areas of concentration.

TABLE IV

REQUIRED COURSES -- INTEGRATED OFFICE SYSTEMS

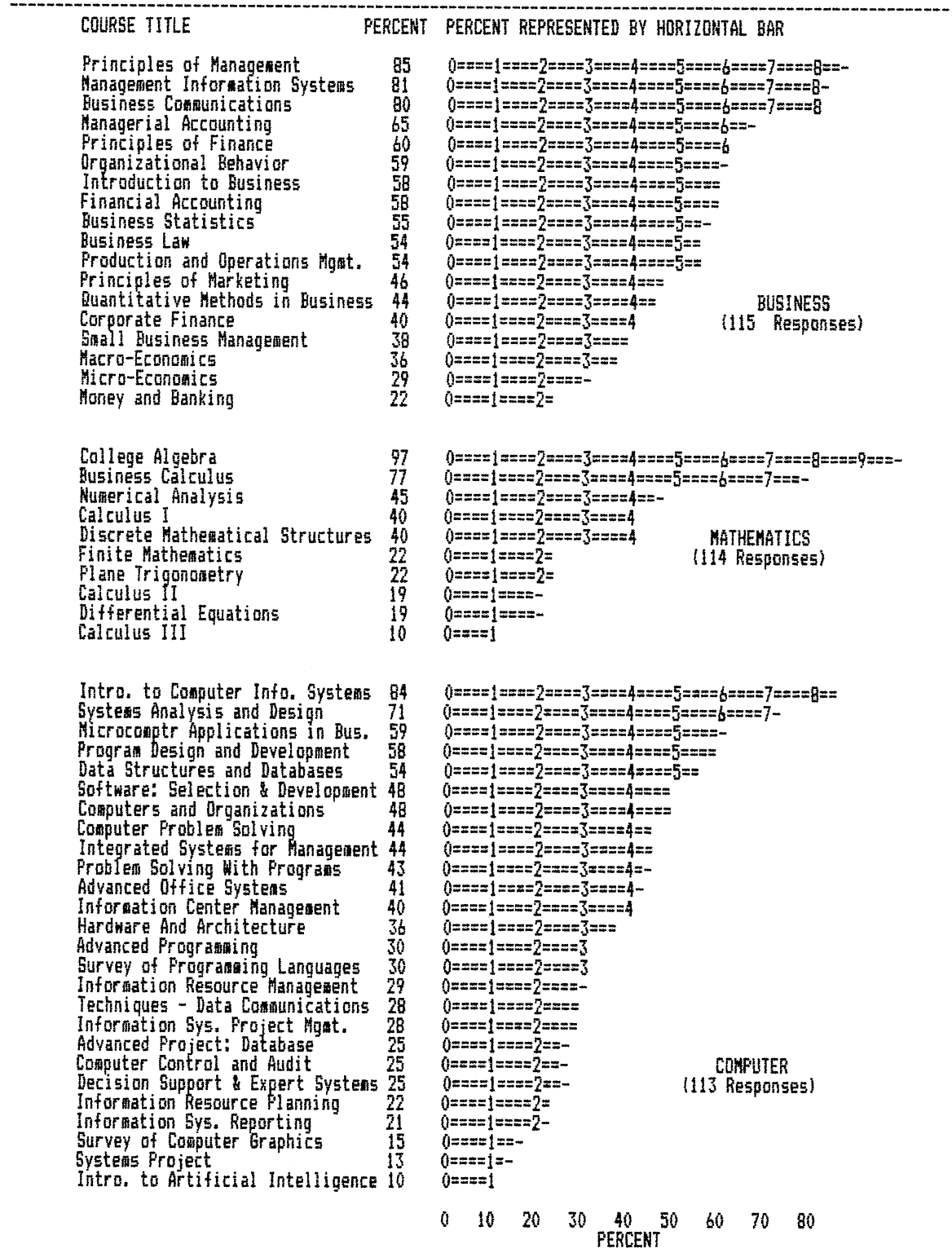


Table V is a graphic display of the analysis of courses the participants indicate should be required of persons selecting the Financial Systems and Auditing emphasis area within the management information systems major.

The following are the top ten business courses selected by the majority of participants: Principles of Management, Business Communications, Management Information Systems, Principles of Finance, Financial Accounting, Managerial Accounting, Corporate Finance, Business Statistics, Introduction to Business, and Principles of Marketing.

In the mathematics section college algebra (98%) and business calculus (77%) were perceived by an overwhelming majority as critical to the Financial Systems and Auditing emphasis area with the third choice in the mathematics section receiving 47%.

The top ten computer courses were: Introduction to Computer Information Systems, Systems Analysis and Design, Computer Control and Audit, Program Design and Development, Microcomputer Applications in Business, Data Structures and Databases, Computer Problem Solving, Software: Selection & Development, Problem Solving With Programs, and Computers and Organizations.

Corporate Finance and Computer Control and Audit courses were considered to be of unique importance within the Financial Systems and Auditing emphasis area.

TABLE V

REQUIRED COURSES -- FINANCIAL SYSTEMS AND AUDITING

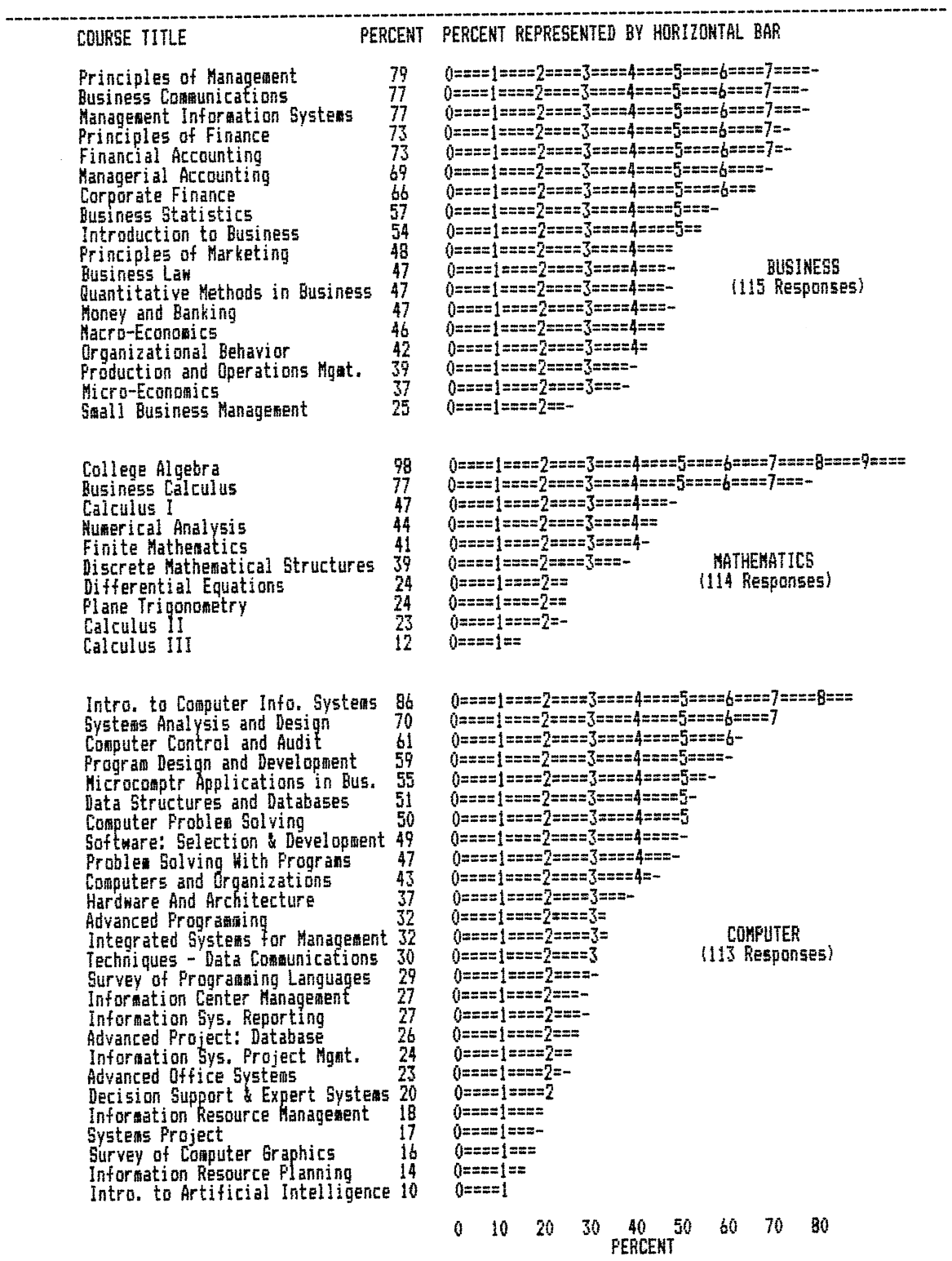


Table VI is a graphic display of the analysis of courses the participants indicate should be required of persons selecting the Data Communications emphasis area.

The following are the top ten business courses selected by the majority of participants: Business Communications, Management Information Systems, Principles of Management, Managerial Accounting, Principles of Finance, Introduction to Business, Financial Accounting, Business Statistics, Business Law, and Organizational Behavior.

In the mathematics section college algebra (100%) and business calculus (75%) were perceived by an overwhelming majority as critical to the Data Communications emphasis area with the third choice in the mathematics section receiving 49%.

The top ten computer courses were: Introduction to Computer Information Systems, Systems Analysis and Design, Program Design and Development, Data Structures and Databases, Techniques - Data Communications, Microcomputer Applications in Business, Software: Selection & Development, Computer Problem Solving, Computers and Organizations, and Hardware And Architecture.

Techniques - Data Communications was the only course considered uniquely important to the Data Communications emphasis area.

TABLE VI

REQUIRED COURSES -- DATA COMMUNICATIONS

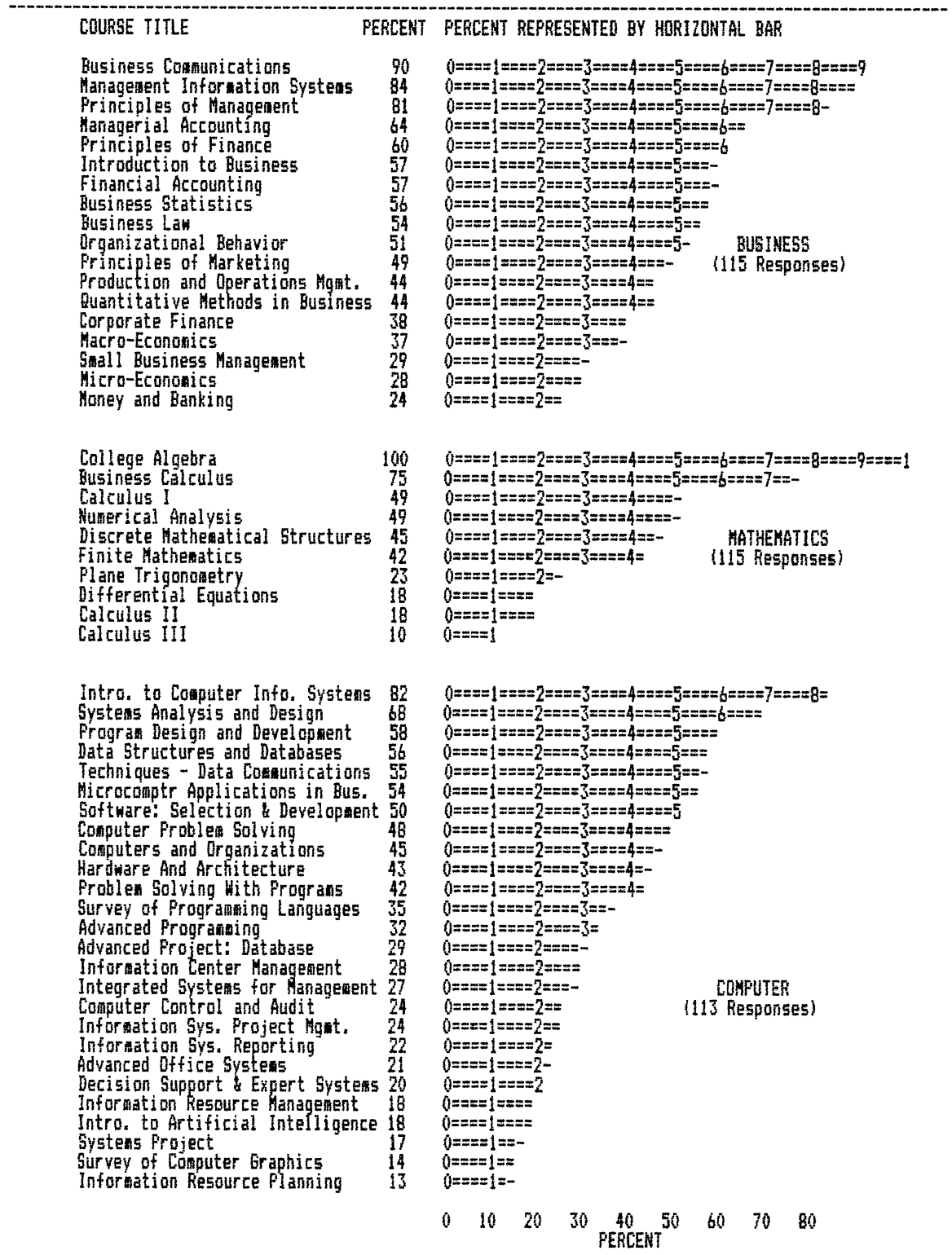


Table VII is a graphic display of the analysis of courses the participants indicate should be required of persons selecting the Information Management emphasis area.

The following are the top ten business courses selected by the majority of participants: Principles of Management, Management Information Systems, Business Communications, Managerial Accounting, Principles of Finance, Business Statistics, Introduction to Business, Business Law, Financial Accounting, and Production and Operations Management.

In the mathematics section college algebra (99%) and business calculus (75%) were perceived by an overwhelming majority as critical to the Information Management emphasis area with the third choice in the mathematics section receiving 44%.

The top ten computer courses were: Introduction to Computer Information Systems, Systems Analysis and Design, Program Design and Development, Data Structures and Databases, Microcomputer Applications in Business, Software: Selection and Development, Information Center Management, Computer Problem Solving, Computers and Organizations, and Information Systems Project Management.

The Production and Operations Management course was considered more important in the area of Information Management than in any other areas of concentration.

TABLE VII

REQUIRED COURSES -- INFORMATION MANAGEMENT

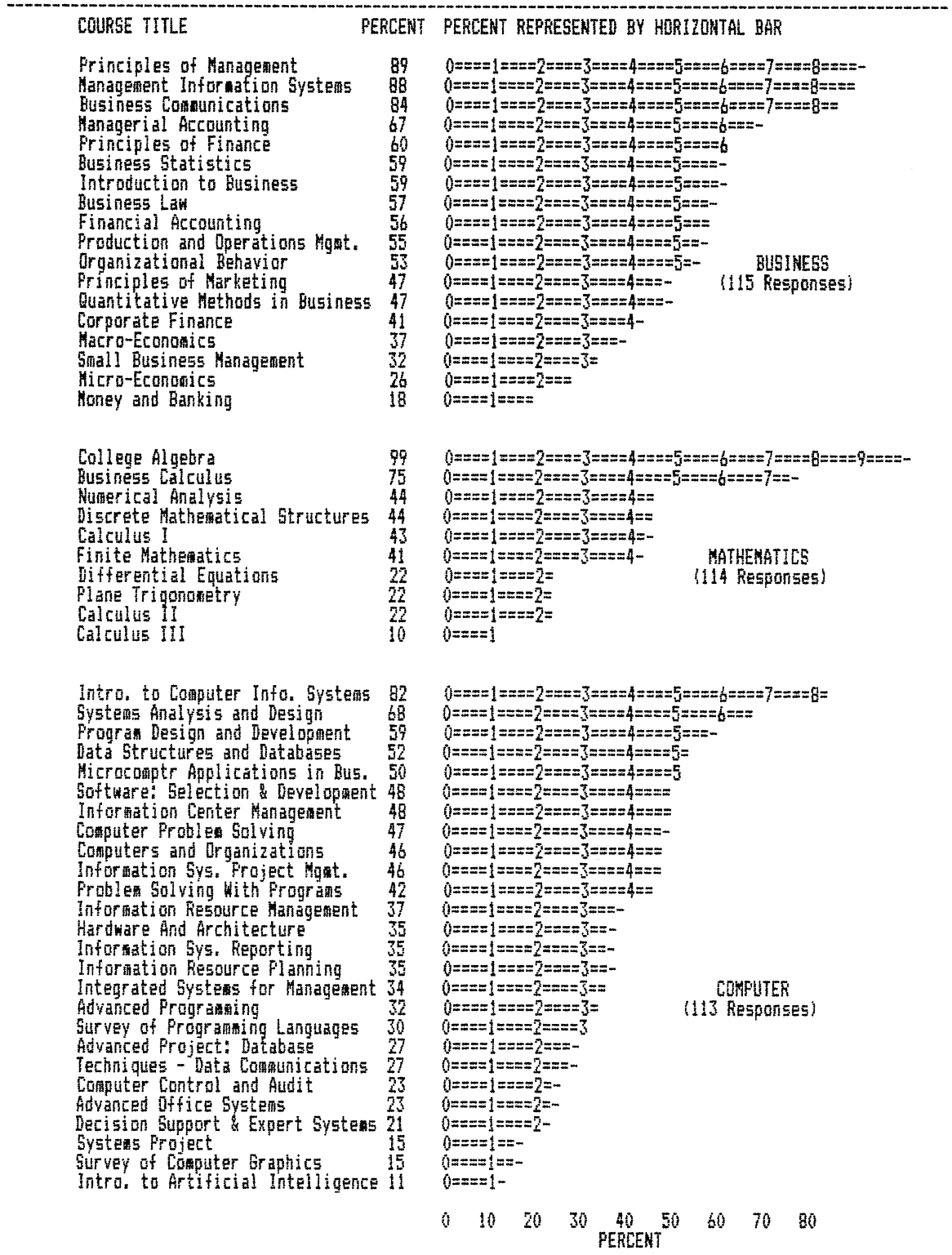


Table VIII is a summary of the numeric data contained in Tables II through VII. Additionally, the percent rankings of each course were averaged and results were used to display courses selected most frequently overall in high to low rank order.

Within the table lines are drawn to indicate the business, mathematics, and computer subdivisions in that order. A break within each subdivision was used to indicate courses falling below a 50% level. The 50% break point is arbitrary and only serves as the researcher's base in the evaluation of the data.

An asterisk is used to highlight those courses found to be uniquely important within each emphasis area. Although these courses fell below the 50% level in the overall average, they equaled or surpassed the 50% level when addressing the specific emphasis area.

Production and operations management was considered to be a unique course requirement in Systems Analysis, Integrated Office Systems, and Information Management emphasis areas. Quantitative methods in business was a unique selection within the Systems/Software Programmer emphasis area while corporate finance was selected by 66% of the participants as being of unique importance to the Financial Systems and Auditing emphasis area.

No mathematics courses other than college algebra and business calculus were considered to be unique requirements within any of the emphasis areas.

TABLE VIII

PERCENT OF RESPONSES -- SUMMARY

BUSINESS COURSES	AVERAGE	SYS. ANALYST	PROG.	OFFICE SYS.	FINANCE	DATA COMM.	INFO. MGMT.
Principles of Management	83	84	80	85	79	81	89
Management Information Systems	83	84	83	81	77	84	88
Business Communications	82	81	78	80	77	90	83
Managerial Accounting	67	66	69	65	69	64	67
Principles of Finance	62	62	59	60	73	60	60
Financial Accounting	61	57	64	58	76	57	56
Business Statistics	59	65	60	55	57	56	59
Introduction to Business	57	54	57	58	54	57	59
Business Law	54	52	53	54	57	54	57
Organizational Behavior	51	50	50	59	42	51	53
Production and Operations Management	48	50 *	43	54 *	39	44	55 *
Principles of Marketing	47	48	43	46	48	49	47
Quantitative Methods in Business	47	48	53 *	44	47	43	47
Corporate Finance	45	45	37	40	66 *	38	41
Macro-Economics	38	38	37	36	46	37	37
Micro-Economics	30	30	30	29	37	28	26
Small Business Management	28	23	21	38	25	30	32
Money and Banking	26	23	20	22	47	23	18
MATHEMATICS COURSES							
College Algebra	98	97	98	97	98	100	99
Business Calculus	75	73	70	77	77	75	75
Numerical Analysis	44	45	45	44	44	40	44
Calculus I	44	48	49	40	46	40	43
Discrete Mathematical Structures	43	48	43	40	39	45	44
Finite Mathematics	42	43	42	44	41	42	41
Plane Trigonometry	24	29	23	22	25	23	22
Calculus II	23	27	27	19	23	18	22
Differential Equations	22	23	25	19	24	18	23
Calculus III	13	16	17	10	12	11	10
COMPUTER COURSES							
Intro. to Computer Information Systems	83	82	82	84	86	82	82
Systems Analysis and Design	73	86	73	71	70	68	68
Program Design and Development	60	63	65	58	59	58	59
Data Structures and Databases	55	60	57	54	51	57	52
Microcomputer Applications in Business	54	52	55	59	55	54	50
Software: Selection & Development	51	52	63	48	49	50	48
Computer Problem Solving	50	55	56	44	50	48	47
Computers and Organizations	46	49	44	48	43	45	46
Problem Solving With Programs	46	50 *	53 *	42	47	42	42
Hardware And Architecture	43	50 *	56 *	36	37	43	35
Advanced Programming	36	37	50 *	30	32	33	32
Techniques - Data Communications	34	31	34	28	30	55 *	27
Survey of Programming Languages	32	30	38	30	29	35	30
Information Center Management	32	28	22	40	27	28	48
Integrated Systems for Management	31	26	24	44	32	27	34
Computer Control and Audit	31	28	25	25	61 *	25	23
Advanced Project: Database	29	34	35	25	26	29	27
Information Systems Project Management	29	28	24	28	24	24	46
Advanced Office Systems	25	24	16	41	23	21	23
Information Systems Reporting	24	20	19	21	27	22	35
Information Resource Management	23	17	18	29	18	18	37
Systems Project	22	37	31	13	17	17	15
Decision Support & Expert Systems	22	25	20	25	20	19	21
Information Resource Planning	18	14	12	22	14	13	35
Survey of Computer Graphics	16	18	19	15	16	14	15
Intro. to Artificial Intelligence	13	13	13	10	10	18	12

Within the computer category, the problem solving with programs and hardware and architecture courses were considered as uniquely important. Advanced programming was uniquely important within the Programming emphasis while computer control and audit was considered important by 61% of the respondents. Techniques - data communications was considered important (55%) when referring to the Data Communications emphasis area. However, the course was considered of low priority within the other five emphasis areas.

No computer courses within the Integrated Office Systems and Information Management Systems emphasis areas were considered to be of unique importance when using the 50% break.

Most Popular Computer Course

The most frequent response to the question asking for a selection of six courses which they might want to take as electives in their present major resulted in 35 percent indicating that they would want to take a course in microcomputer applications for business.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The content of the chapter is divided into four sections. A summary of the study is presented in the first section followed by the conclusions of the study. The implications section discusses the relevance of the study to the Tulsa educational environment and the final section contains the recommendations for practice and further research.

Summary of the Findings

The purpose of this study was to determine courses which might be included in an undergraduate business computer applications curriculum appropriate for the Tulsa public supported, post secondary educational environment.

The present post secondary public educational environment in Tulsa includes the three campuses comprising Tulsa Junior College and the recently created University Center at Tulsa. Individuals earning an Associate in Arts or Associate in Science degree at Tulsa Junior College satisfy the general education requirements of undergraduate programs at state supported four year colleges and universities.

Tulsa Junior College computer programs under the business department has over 4,500 students.

Tulsa Junior College is well established and offers some courses historically categorized as upper division at Oklahoma's state universities. These courses are accepted by Langston and Northeastern as satisfying specific course requirements. A typical student has the potential of including many more of what have been traditionally designated upper division courses in their plan of study. This fact has significant bearing on the development of undergraduate programs in Tulsa.

The University Center at Tulsa, established in 1982, draws upon educational resources of Langston University, Northeastern Oklahoma State University, Oklahoma State University and the University of Oklahoma to provide needed courses at the third and forth year of undergraduate study and at the master's level. Tulsa Junior College and Rogers State College have jurisdiction over all lower division work. When more than one public institution offers work in a given field, proximity as well as level of accreditation is considered in determining which institution will provide the program.

Priority was given to the establishment of educational programs which were in high demand. Public and private institutions plan together for the articulation of students so that the mix of courses available from both public and private institutions can be utilized most efficiently.

A student pursuing a bachelor of science degree through state supported institutions in Tulsa might enroll concurrently at an area junior college and at the University Center at Tulsa pursing a degree through Langston University or Northeastern State University.

Quality public higher education programs have been made available through the University Center at Tulsa and others will be added as needs are determined and resources permit.

The University Center at Tulsa student is typically older than traditional students, works full time, is married, and has extensive prior college study. Students are more serious in their study and they want programs that will provide immediate benefit in their work environment. More than 60% of the Spring 1985 upper division enrollment was in business courses. University Center students demographics reflect national trends indicating adults are returning to college in record numbers. The majority are part time learners and do not find that curricula developed for traditional college students meet their needs.

The advent of the "micro" computer has escalated computer sales and the applications of computers in homes and businesses. The demand for education has moved toward the application of computers.

The technological advancement of the computer follows closely that of the telephone. Generic software packages are today's parallel to the dial phone.

Data processing professionals are concerned over the

technological change and feel priority problem areas are educational issues which fall into three main areas: user education, data processing management education and education in microcomputers, networks, database concepts, and decision support systems. Professional organizations concerned with curriculum development indicate an increasing demand in the public and private sector for information systems technology.

Information management personnel will have a major impact on corporate environments in the coming decade and colleges and universities are beginning to respond . The University of Missouri at Columbia has implemented a Management Information Systems degree program in response to the demand and the Data Processing Management Association (DPMA) 1984 directory includes a list of 236 colleges and universities which have implemented all or part of their undergraduate computer information systems curriculum.

The computer has become a management tool as well as an operational tool and the computer information specialist needs a greater understanding of business processes. The American Assembly Collegiate Schools of Business accreditation has set standards for business curricula which include courses in marketing, production, finance, economics, law, accounting, quantitative methods, informations systems, organizational theory, communications, and management. Management Information Systems curriculum developed in response to current and projected needs have in

common a core which includes traditional business courses and computer courses.

Determining courses appropriate for the Tulsa area was the focus of this study. The methodology for this study used telephone and in-person interviews conducted with college and university educators from the Tulsa area working in the field of business computer applications. The population sample was selected from business and computer science students enrolled at public supported post secondary educational institutions in Tulsa.

The instrument was a questionnaire devised by the researcher and based on information from interviews and the Data Processing Management Association (DPMA) preliminary 1986 curriculum model. The proposed DPMA model was being developed at the time of the study. DPMA curriculum guidelines were designed primarily for four year undergraduate programs offering a concentration of business courses. These guidelines recognize the need for articulation between two and four year programs.

The method of collecting the data was the in-person distribution of questionnaires in classes at the University Center at Tulsa and Tulsa Junior College. Results were tabulated and displayed in tables.

Of the 115 business students completing the questionnaire, 93 were employed. The average age was 29 and the median age was 30. Computer majors and/or minors numbered 52 and a total of 90 participants indicated that

they would like more information on a major or minor in computers. A total of 46 participants indicated that they would be willing to participate in an advisory capacity in the development and implementation of a Management Information Systems curriculum. A total of 48 indicated that they had attained an associate degree 35 of which were earned at Tulsa Junior College.

When asked to indicate which emphasis area was in most demand in today's business environment, 24% responded with Systems Analysis while 21% selected Information Management. Participants were asked to indicate which emphasis area would be in most demand in 1990's business environment and 34% selected Information Management.

Table IX is a summary of the numeric data contained in Table VIII with course and percentage information displayed only for instances where at least 50% indicated the course to be necessary to an emphasis area core.

Lines are drawn within the table to indicate the business, mathematics, and computer subdivisions in that order. A break within each subdivision was used to indicate courses falling below a 50% level. The 50% break point is arbitrary and only serves as the researcher's base in the evaluation of the data.

TABLE IX

REQUIRED COURSES SELECTED BY
50% OR MORE OF RESPONDENTS

BUSINESS COURSES	AVERAGE PERCENT	SYS. ANALYST	PROG.	OFFICE SYS.	FINANCE	DATA COMM.	INFO. MGMT.
Principles of Management	83	84	80	85	79	81	89
Management Information Systems	83	84	83	81	77	84	88
Business Communications	82	81	78	80	77	90	83
Managerial Accounting	67	66	69	65	69	64	67
Principles of Finance	62	62	59	60	73	60	60
Financial Accounting	61	57	64	58	76	57	56
Business Statistics	59	65	60	55	57	56	59
Introduction to Business	57	54	57	58	54	57	59
Business Law	54	52	53	54	57	54	57
Organizational Behavior	51	50	50	59		51	53
Production and Operations Management		50 *		54 *			55 *
Quantitative Methods in Business			53 *				
Corporate Finance					66 *		
MATHEMATICS COURSES							
College Algebra	98	97	98	97	98	100	99
Business Calculus	75	73	70	77	77	75	75
COMPUTER COURSES							
Intro. to Computer Information Systems	83	82	82	84	86	82	82
Systems Analysis and Design	73	86	73	71	70	68	68
Program Design and Development	60	63	65	58	59	58	59
Data Structures and Databases	55	60	57	54	51	57	52
Microcomputer Applications in Business	54	52	55	59	55	54	50
Software: Selection & Development	51	52	63			50	
Computer Problem Solving	50	55	56		50		
Problem Solving With Programs		50 *	53 *				
Hardware And Architecture		50 *	56 *				
Advanced Programming			50 *				
Techniques - Data Communications						55 *	
Computer Control and Audit					61 *		

An asterisk is used to highlight those courses found to be uniquely important within each emphasis area. Although these courses fell below the 50% level in the overall average, they equaled or surpassed the 50% level when considered within the specific emphasis area.

Conclusions

Among the business courses, production and operations management was considered to be a unique requirement in Systems Analysis, Integrated Office Systems, and Information Management emphasis areas. Quantitative methods in business was a unique selection within the Systems/Software Programmer emphasis area while corporate finance was selected by 66% of the participants as being of unique importance to the Financial Systems and Auditing emphasis area.

Overall, those business courses exceeding the 50% level satisfied American Assembly of Collegiate of Business accreditation with the exception of marketing and economics.

Respondents indicated college algebra and business calculus to be of major importance within all emphasis areas while no other mathematics courses were considered to be uniquely required.

Within the computer category, the problem solving with programs and hardware and architecture courses were considered as uniquely important. Advanced programming was uniquely important within the Programming emphasis while computer control and audit was considered important by 61% of the respondents. Techniques - data communications was considered important (55%) when referring to the Data Communications emphasis area. However, the course was considered of low priority within the other emphasis areas.

No computer courses within the Integrated Office

Systems and Information Management Systems emphasis areas were considered to be of unique importance when using the 50% break.

Implications

Adult education aspects of the population seeking undergraduate business degrees through the University Center at Tulsa requires that students participate in the curriculum development process. Forty-six of the 115 surveyed indicated a willingness to participate in the program development as advisors. Adult students are very aware of their educational needs and should be included as an important part of all program development. Student acceptance would be greatly enhanced by their involvement.

There is an ongoing necessity for coordinated program development among the colleges participating in the University Center at Tulsa and area junior colleges. The well established junior college programs provide a solid foundation which often includes courses traditionally offered at the junior and senior level. University Center programs can capitalize on the junior college strength by providing additional elective courses which could lead to degrees with more than one major emphasis.

Preliminary findings support the need for a Management Information Systems program at the undergraduate level within the Tulsa public supported educational system. Determination should be made within University Center at

Tulsa policies and guidelines as to which participating institution is best qualified to support a Management Information Systems curriculum.

Recommendations

Preliminary data from this research were made available to persons conducting the Data Processing Management Association (DPMA) 1986 national study. The DPMA 1986 model was subsequently revised and the course listing from the second draft dated April 12, 1985, is shown in Appendix D.

The questionnaire used in this survey should be revised to reflect changes in the DPMA 1986 model and the study should be replicated using a larger sampling within a broader statistical base. Responses should be gathered from business and computer science educators, business management and administrative personnel within the private sector, and those adult students working within the field of business computer applications. A study of this magnitude would provide a sound basis for comparison of the perceptions of those providing the education, those receiving the education, and the business community needing Management Information Systems professionals.

There should be coordinated effort among participating educational institutions to determine which colleges or universities might best provide courses within the Management Information Systems curriculum.

Frequent contact should be made with representatives of

the American Assembly of Collegiate Schools of Business and the North Central Association of Colleges and Schools to assure final curriculum decisions are consistent with accreditation standards.

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APPENDICES

APPENDIX A

PRELIMINARY DRAFT (2/1/85) -- DPMA 1986

APPENDIX A

PRELIMINARY DRAFT (2/1/85) -- DPMA 1986

List of Courses

1. Computers and Organizations
2. Computer Problem Solving
3. Problem Solving With Programs
4. Program Design and Development
5. Data Structures, Data Models, and Databases
6. System Analysis and Design
7. Systems Project
8. Microcomputer Applications for Business
9. Advanced Office Systems
10. Integrated Systems for Administration and and Management
11. Introduction/Survey of Computer Graphics
12. Decision Support and Expert Systems
13. Introduction to Artificial Intelligence
14. Hardware, System Software, and Architecture
15. Advanced Project: Implementing a System in a Database Environment
16. Computer Control and Audit
17. Techniques for Data Communication--A Survey
18. Survey of Programming Languages
19. Software: Principles, Selection, and Development
20. Information Center Management
21. Information Resource Planning
22. Information Resource Management
23. Advanced Programming
24. Principles of Computer Information Systems (CIS) Project Management
25. Computer Information System Reporting and Documentation

Core Course Descriptions

1. Computers and Organizations - A survey of computer applications, of information needs in business, of microcomputers, and of information systems that meet all these needs. Emphasis in reviewing computers will be on capabilities rather than operating features. Stress will be placed on the development and care of data assets in the form of files and databases. The idea that collections of data become models of the computer-using organization will be introduced and developed. File and database organization structures and capabilities will be covered. Also to be stressed will be the transaction-drive nature of businesses. That is, a business exists to conduct specific types and volumes of transactions with identified, targeted markets or entities. Transaction objectives are the driving force that leads to the creation and ongoing existence of a business. Once transaction targets are established, a business organizes itself to conduct those transactions. Thus, organizations structures and job descriptions for all employees relate directly to the transactions for which a business exists. Accounting, production, and other systems on which organization depends are, in turn, structured to support the same, basic transaction patterns. Entrepreneurial and managerial motivations within transaction-driven business will be explored. Computers will then be cast in their real role: They are transaction processors and information generators that support the missions of the organizations that use them. Emphasis will be on application packages rather than on program development. Students will use special, pedagogical software packages for microcomputers. This hands-on experience will include work with a word processor, an integrated accounting application, a database program, and a spreadsheet package. Students will go through a series of application practice sessions at the introductory level only. That is, they will follow instruction manuals rather than being expected to participate in application design and development.

2. Computer Problem Solving - This will be an introduction to the principles of computer systems. As a qualification, this is not a course in systems analysis and design. Rather, the course is an in-depth look, aided by extensive case materials and microcomputer applications, at what computer systems are, how they go together, and what they do. The systems life cycle will be introduced. This is not the systems development life cycle, but the basic pattern of birth, growth, decline, and disuse common in all information systems. One of the main achievements of the course will be to introduce students to the requirements for managerial problem solving and decision making. Then, students will master processes, or procedures, for solving

problems and making decisions. Differences between structured, unstructured, and semi-structured decision situations will be introduced, followed by explanations that computer lend themselves to structured and semi-structured situations. Thus, computers would not be good tools for creating advertising or promotions campaigns. But computers would be excellent aids in selecting shipping routes for finished goods. Basic functions, or modules, or computer programs that can be combined into systems will be identified and introduced. It will be shown that virtually any business information system can be constructed from such elements as data capture routines, data validation routines, data entry programs, file creation routines, sort utilities, file updating programs, detail reporting programs, summary reporting programs, and file management systems. Students will do a few rudimentary exercises involving construction of systems from such basic modules. This body of knowledge, it is felt, constitutes a basis of programming readiness that introduces a new dimension to computer information systems studies. Programmers who start from this base are bound to learn more than rudimentary coding skills.

3. Problem Solving With Programs - This will be an introductory course in program design and development. Students will work to a structured, multi-phase program development process. The process involves five phases for understanding, design, specification, coding, and checking programs. The process is responsive to business and system needs and is independent of specific programming languages. This course, then, will encompass phases of the process through the preparation of pseudo code that can be implemented in any high level language. Instructors will then be free to ask students to code programs in a language or languages chosen by the instructor or at the option of the student. Examples within supportive materials for the course can illustrate coding in multiple languages. Instructors can also use reference manuals from computer manufactures as a guide for coding--as long as they have solid concepts to use for planning and design activities. This approach, it is felt, will encourage a healthy trend toward multilingual capabilities among future CIS professionals.

4. Program Design and Development - This will be the advanced programming course within the curriculum. It should stress the building of skills in one language. Subject to responses to surveys preceding introduction of the curriculum, the logical tentative choice appears to be COBOL. Stress will be placed on such topics as clear documentation for the maintainability of programs, efficient use of computing equipment, test file development, module and program testing, full system test, and other advanced professional topics.

5. Data Structures, Data Models, and Databases - This course will be organized for continuity with the first four courses in the DPMA 1986 curriculum. At the same time, this course stresses the need for academic recognition of the prevalence of databases in the world of computing. At present, database techniques are beyond the scope of most programming courses. This course will stress application development through fourth and fifth generation programming techniques. These advanced techniques are designed to take advantage of database capabilities and are built upon an assumption of the prevalence of database systems within the computer using universe. In a world in which millions of microcomputers apply database and spreadsheet programs, it is not acceptable for programmers to leave four year college programs without being able to fit into a database environment. Content of the course will stress basic knowledge in data structures, normalization of data, data modeling, and database methods. Students will learn the rudiments of construction of database schema.

6. System Analysis and Design - The emphasis upon systems concepts and systematic thinking throughout the curriculum will make it possible to cover the basic tools and methods of systems development in a single semester. This course will stress use of modular programming techniques and information center methods for building systems in direct collaboration between users and analysts. Emphasis will be on modern, time compressed techniques. However, traditional life cycle methods, along with data flow analysis and other methodologies that emerged from the 1970s will also be covered. In this way, the course will represent a connection between the new and older methods that students may still encounter in some systems shops.

7. Systems Project - This will be a capstone course. Emphasis will be on present day productivity tools. Students will be encouraged to use microcomputers and commercial software packages to construct complete, operational systems within the span of a single semester. In the past, with emphasis on large systems, it was virtually impossible for students to work through a complete life cycle approach and to implement a set of programs for large system use during a single semester. Thus, use of minicomputers will add dimension to student experiences. To the extend possible, instructors will be advised to guide students into projects that involve interaction between microcomputers and large systems, possible information utilities. Thus, basic files for a student project might be derived through telephone access to a database system. To the extent possible, students should also be encouraged to develop systems using database and/or DSS or expert system software.

Elective Course Descriptions

8. Microcomputer Applications for Business - This survey of microcomputer hardware and software uses in business discusses processing needs and opportunities from the perspective of the individual user. The course also reviews standard software packages available to support a microcomputer based executive work station. Included are descriptions of and hands-on work with word and text processors, electronic spreadsheets, file and database management systems, graphics packages, and accounting and other common application packages. Students will acquire the technical tools and knowledge applicable to the remaining courses in their academic programs. Practice set materials covering realistic business situations should be included, along with commercial and instructional software to provide hands-on experience.

9. Advanced Office Systems - Until the late 1970s, everyday office operations appear to have existed on a bypass apart from the mainstream of the ongoing computer revolution. Computers processed and transformed data. They did this work copiously and with some degree of excellence. Portions of the office work force detail with data conveying documents came into the orbit of centralized, often monolithic, computer systems. On the other hand, the large segment of the office, administrative, and executive populations responsible for dealing with textual materials were either left or had to content themselves with inadequate, electromechanical substitutes. While data processing specialists had their 360s and 370s, text based office applications struggled with magnetic tape and magnetic card devices of limited productivity and value. This course puts a perspective on the needs, potentials, and urgencies of systems to support modern office functions. Particular emphasis is given to the need for ultimate coordination and integration of text and data based processing systems. This integration is a pressing need that will be met. In the process, the programs that emerge can have a profound effect on the work assignments and careers of CIS professionals.

10. Integrated Systems for Administration and Management - This course represents a continuation of the content explored in 9. Advanced Office Systems. Given that data and text based systems are evolving separately, planning must begin soon, and implementation programs must follow, to establish coordination between office based and centralized information systems. Consider: There may be thousands of people in a large company with expenditure authorizations sufficient to buy their own microcomputers. Companies may have hundreds of database or spreadsheet

programs preparing reports for what should be coordinated plans. This is already happening. Something has to be done in the near future before anarchy takes over. Another aspect lies in the changing legal climate which makes it critical to find a means of taking control over the basic act of letter writing. Sales and service personnel with large companies regularly write letters of memos to customers that commit their employers to millions of dollars in expenditures, all without benefit of corporate policy or authorization. This course will establish the problem in the belief that awareness on the part of students will contribute to future solutions. Research and case studies will be used to demonstrate potential solutions to identified problems.

11. Introduction/Survey of Computer Graphics - Graphics are becoming a major factor in the computing world. At this writing, major implementation emphasis is in the CAD/CAM field. However, business applications for graphics are drawing considerable interest from users. Software houses are developing major offerings of graphics aimed at business presentations, training, and communication. The course will identify needs an applications for graphics in business, highlighting such developments as laser printers and advanced displays techniques. Also to be highlighted will be the principles behind the software packages being used to generate graphics. Hardware innovations, such as video imaging into computer graphics systems, will also be covered, as will advanced light pen, mouse, and other input techniques. Imaging methods and on-line composition involving text and graphics will be covered.

12. Decision Support and Expert Systems - This course is about the manager's responsibilities for problem solving and decision making and about those areas in which computers can be used as informational tools to support selection of alternatives to meet needs or solve problems. It has been a tenet of the computer age that the ability to develop information helps to solve problems and reach decisions. However, the systems covered in this course go beyond traditional file and information manipulation. A decision support or expert system follows a reasoned, logical pattern established by the designer. The system assembles and organizes data on its own, returning to the user for added information required to produce an analysis. Interaction can also be from user to system. That is, on request from the user, the system will disclose the logical path followed in arriving at any offered diagnosis and recommendation. Decision support systems are gaining great acceptance at top levels in business organizations. To date, the most common and successful expert systems are used for medical diagnosis. Both types of systems are explored in this course. To the extent possible, students will be provided with rudimentary software and encouraged to apply the

software to solve problems.

13. Introduction to Artificial Intelligence - This will be a survey course surveying the thinking and some of the pioneering efforts in the area of artificial intelligence (AI). The problems associated with emulating even the most rudimentary human behavior will be covered. One example to be used will be the efforts currently under way to decode and enter speech through computers. Although voice recognition is happening, the limitations and potential problems blocking additional progress are many. The point to be made is that really intelligent machines, if they are to be developed, will probably not be products of the twentieth century. However, great strides are being made in such areas as robotics, diagnosis, problem solving, and decision making.

14. Hardware, System Software, and Architecture - This course presents a functional, systems-level review of computing equipment and the organization of components and devices into architectural configurations. The effect is an in-depth understanding of how computers go together. But presentations stop short of engineering-level details of component design and fabrication. Students also learn the principles of system software and build an understanding of combinations of hardware and software within architectural designs. Students gain an understanding of data pathing, or data flows through hardware/software configurations.

15. Advanced Project: Implementing a System in a Database Environment - The student will design and implement a system to run on a microcomputer in a database environment. The project to be undertaken may be less massive than that in the capstone course (CIS/86-7). The purpose of this course is to provide practical experience with the selection, initialization, modification, and implementation of software packages. The student will design (or be assigned,) a project involving a database to run on a microcomputer. The student can select (or be given) a software package. The challenge will lie in designing the schema for organizing and navigating the database. (A relational database will probably be used.) The student will then load the database and put the system to use to generate realistic outputs. (This course will replace CIS 86-11 in Curriculum '81, which is described as an advanced database course but does not require a project.)

16. Computer Control and Audit - This course will be virtually identical to the CIS/86-13 offering in Curriculum "81. Emphasis is on the designing and application of controls within computer information systems to achieve overall reliability and also to meet audit examination requirements and objectives.

17. Techniques for Data Communication--A Survey - This is undoubtedly an area for great future expansion within the concept of the intent for maintaining a dynamic curriculum, as DPMA is committed to do. At this writing, however, the data communications field is evolving so rapidly that it would be almost meaningless to prescribe a set body of knowledge to be mastered. Rather, course descriptions will specify that students learn about local area networks; telecommunication networks; networks using satellites, microwaves, optical cables, or laser technologies, and direct combination of microcomputers and telephone instruments. It is anticipated that additional courses will be added as the new developments align themselves into application areas.

18. Survey of Programming Languages - This course would involve a comparative review, including program writing practice, in a series of different languages. Emphasis would be on "modern," or structured, languages that are being introduced in some profusion for microcomputers. Examples might include Pascal, Modular 2, C, Fourth, and principles of fourth- and fifth-generation techniques. In principle, this course would be structured in a manner similar to a course in linguistics.

19. Software: Principles, Selection, and Development - This course would be aimed at building a process and establishing a set of principles that students could use in selecting among a plethora of available software packages. The course would be built around a series of hypothetic systems and/or managerial requirements. Students would then apply a decision making procedure to identify and evaluate alternatives, and to select the best package for each situation. Students would also learn about use of structured techniques for modification of packages as necessary to tailor them to specific situations. Students should also learn some basic principles that can be applied in determining whether to modify existing packages or to develop sets of programs from scratch.

20. Information Center Management - An information center, as the term applies within the context of this course, is a specialized facility that makes available hardware and powerful software tools from which new systems can be assembled and tested by prospective users. Information center techniques can and do replace traditional, life-cycle development methodologies. In addition to hardware and software tools, information centers often provide the services of qualified systems personnel to consult about and assist with the assembly and testing of systems components and alternatives. The course will deal with the creation of information center techniques will not work in every case. Alternate methods should be identified and positioned within the CIS systems development spectrum.

21. Information Resource Planning - This course will begin with a comprehensive look at needs and methods applied in corporate planning. Types of corporate plans, their scopes and maintenance, will be used as a framework in which to describe the need for, constraints upon, and methods appropriate to CIS planning within the corporate planning environment. Elements of planning to be covered include facilities, equipment, personnel, technical skills and specialities, continuing education, training, replacement of equipment, interdepartmental collaboration and priorities, and management information requirements.

22. Information Resource Management - This course parallels CIS/86-21, dealing with management aspects of the same topics. In effect, CIS/86-21 deals with formation of plans while CIS/86-22 goes on into implementation of those plans. An important reason for having a separate course is that some of the processes, or methodologies, of management must be studied and understood. Just as a CIS plan must dovetail with a corporate plan, a CIS management style and technique must fit in with the higher level methods and approaches of the organization as a whole. This course deals with corporate and departmental level implications of running a CIS function.

23. Advanced Programming - This course will offer a third semester of learning opportunity for students who want to become application programming or software development specialists. Curriculum '81 has been criticized because it fails to provide opportunities for persons who want to move ahead in the programming area. This curriculum provides an assortment of courses that enable an interested student to go beyond two semesters of training in programming. The advanced course will include professional "tricks," or shortcuts, that can save time and money. Also to be covered in greater depth than is possible in standard introductory or survey courses will be standards of documentation and methods to enhance maintainability of programs. No specific language will be specified for this course. As a matter of fact, one of the areas to be covered could well be language transitions: When is it profitable to reprogram in a language that will do a job more efficiently?

24. Principles of Computer Information Systems (CIS) Project Management - This offering will supplement coursework in systems analysis and design and in the capstone course involving a systems development project. Emphasis will be on the principles of project management as a separate process to be understood and mastered. Topics to be covered will include scheduling, work assignment, time and results reporting, user interaction, interaction with and reporting to management, post implementation followup, and other aspects associated specifically with

responsibilities of system project leaders, managers of user functions, and others with project management and development responsibility.

25. Computer Information System Reporting and Documentation - This course will deal with the preparation and delivery of documents and oral reports within the entire environment encompassed by CIS activities. Topics will include the identification of audiences and specification of needs and comprehension capabilities of different groups. Instruction will deal with methods for individualizing documents and oral presentations to make them understandable and meaningful for their intended audiences. Use of language (style and vocabulary level), formatting techniques, graphic support for presentations, oral presentations, brainstorming, question and answer sessions, and other situations or methods will be covered.

APPENDIX B

QUESTIONNAIRE

Management Information Systems

Undergraduate Curriculum Needs Assessment Questionnaire

NAME: _____ MAJOR: _____ MINOR: _____

STREET ADDRESS: _____ CITY: _____ ZIP CODE: _____

PHONE NUMBER: (____) _____-_____ EMPLOYER: _____

YOUR POSITION TITLE: _____ YOUR AGE: _____ STATUS: Jr. ___ Sr. ___ Grad. ___ Other ___

PREVIOUS COLLEGE OR UNIVERSITY: _____ HIGHEST DEGREE ATTAINED: _____

WOULD YOU BE INTERESTED IN PARTICIPATING IN AN ADVISORY CAPACITY IN THE DEVELOPMENT OF A COMPUTER CURRICULUM? Yes ___ No ___

WOULD YOU LIKE TO RECEIVE INFORMATION ON A COMPUTER MAJOR PROGRAM? Yes ___ No ___ A COMPUTER MINOR PROGRAM? Yes ___ No ___

Management Information Systems curricula combine computer applications courses and business courses. This page of the questionnaire relates to business and mathematics. The other side of the questionnaire relates to computer courses.

BUSINESS COURSES

CHECK EIGHT (8) COURSES YOU FEEL SHOULD BE INCLUDED AS REQUIRED IN THE BUSINESS CORE OF THE M.I.S. DEGREE - (i.e. required in all emphasis areas)

CODE			CODE	
1	_____	Business Communications	11	_____ Business Statistics
2	_____	Principles of Management	12	_____ Introduction to Business
3	_____	Principles of Marketing	13	_____ Macro-Economics
4	_____	Principles of Finance	14	_____ Micro-Economics
5	_____	Production and Operations Management	15	_____ Money and Banking
6	_____	Business Law	16	_____ Entrepreneurship and Small Business Management
7	_____	Managerial Accounting	17	_____ Corporate Finance
8	_____	Financial Accounting	18	_____ Management Information Systems
9	_____	Quantitative Methods in Business	19	_____ Other _____
10	_____	Organizational Behavior	20	_____ Other _____

OF THE COURSES ## NOT CHECKED ## ABOVE; ENTER, IN ORDER OF IMPORTANCE, THE NUMERIC CODE OF THE BUSINESS COURSES YOU FEEL SHOULD BE REQUIRED IN EACH EMPHASIS AREA. (Enter at least one code for each emphasis area.)

Systems Analysis	_____	_____	_____	_____	_____
Systems/Software Programming	_____	_____	_____	_____	_____
Integrated Office Management Systems	_____	_____	_____	_____	_____
Financial Systems and Auditing . . .	_____	_____	_____	_____	_____
Data Communications	_____	_____	_____	_____	_____
Information Management	_____	_____	_____	_____	_____

MATHEMATICS COURSES

CHECK MATHEMATICS COURSES YOU FEEL SHOULD BE REQUIRED IN THE CORE FOR ALL EMPHASIS AREAS.

CODE			CODE	
40	_____	College Algebra	46	_____ Calculus I
41	_____	Discrete Mathematical Structures	47	_____ Calculus II
42	_____	Plane Trigonometry	48	_____ Calculus III
43	_____	Finite Mathematics	49	_____ Differential Equations
44	_____	Numerical Analysis	50	_____ Other _____
45	_____	Business Calculus	51	_____ Other _____

OF THE COURSES ## NOT CHECKED ## ABOVE; ENTER, IN ORDER OF IMPORTANCE, THE NUMERIC CODE OF THE MATHEMATICS COURSES YOU FEEL SHOULD BE REQUIRED IN EACH EMPHASIS AREA. (If any)

Systems Analysis	_____	_____	_____	_____	_____
Systems/Software Programming	_____	_____	_____	_____	_____
Integrated Office Management Systems	_____	_____	_____	_____	_____
Financial Systems and Auditing . . .	_____	_____	_____	_____	_____
Data Communications	_____	_____	_____	_____	_____
Information Management	_____	_____	_____	_____	_____

** PLEASE COMPLETE THE OTHER SIDE **

COMPUTER APPLICATIONS COURSES

CHECK THE AREA (Check only one) OF EMPHASIS THAT WOULD BE OF PRIMARY INTEREST TO YOU.

50 _____	Systems Analysis	54 _____	Financial Systems and Auditing
51 _____	Systems/Software Programming (Software Engineering)	55 _____	Data Communications
52 _____	Integrated Office/Management Systems	56 _____	Information Management

ENTER THE NUMERIC CODE FOR THE EMPHASIS AREA THAT YOU FEEL IS IN MOST DEMAND IN TODAY'S BUSINESS ENVIRONMENT: _____

ENTER THE NUMERIC CODE FOR THE EMPHASIS AREA THAT YOU FEEL WILL BE IN MOST DEMAND IN 1990'S BUSINESS ENVIRONMENT: _____

CHECK EIGHT (8) COURSES YOU FEEL SHOULD BE INCLUDED AS REQUIRED IN THE COMPUTER CORE - (i.e Required in all emphasis areas)

CODE		CODE	
70 _____	Introduction to Computer Information Systems	85 _____	Advanced Project: Database System Implementation
71 _____	Computers and Organizations	86 _____	Computer Control and Audit
72 _____	Computer Problem Solving	87 _____	Techniques for Data Communications - A Survey
73 _____	Problem Solving With Programs	88 _____	Survey of Programming Languages
74 _____	Program Design and Development	89 _____	Software: Principles, Selection, and Development
75 _____	Data Structures, Data Models, and Databases	90 _____	Information Center Management
76 _____	Systems Analysis and Design	91 _____	Information Resource Planning
77 _____	Systems Project	92 _____	Information Resource Management
78 _____	Microcomputer Applications for Business	93 _____	Advanced Programming
79 _____	Advanced Office Systems	94 _____	Information Systems Project Management
80 _____	Integrated Systems for Management	95 _____	Information Systems Reporting and Documentation
81 _____	Introduction/Survey of Computer Graphics	96 _____	Other _____
82 _____	Decision Support and Expert Systems	97 _____	Other _____
83 _____	Introduction to Artificial Intelligence	98 _____	Other _____
84 _____	Hardware, System Software, and Architecture	99 _____	Other _____

OF THE COURSES ## NOT CHECKED ## ABOVE; ENTER, IN ORDER OF IMPORTANCE, THE NUMERIC CODE OF THE COMPUTER COURSES YOU FEEL SHOULD BE REQUIRED IN EACH EMPHASIS AREA. (Enter at least one code for each emphasis area.)

Systems Analysis	_____	_____	_____	_____	_____
Systems/Software Programming	_____	_____	_____	_____	_____
Integrated Office Management Systems	_____	_____	_____	_____	_____
Financial Systems and Auditing . . .	_____	_____	_____	_____	_____
Data Communications	_____	_____	_____	_____	_____
Information Management	_____	_____	_____	_____	_____

PLEASE ENTER, IN ORDER OF PREFERENCE, THE NUMERIC CODE (From above) OF SIX COMPUTER COURSES THAT YOU MIGHT TAKE IF THEY WERE AVAILABLE AS ELECTIVES IN YOUR MAJOR.

_____ _____ _____ _____ _____ _____

COMMENTS AND SUGGESTIONS: _____

PLEASE RETURN THIS FORM TO: University Center at Tulsa
Computer Science
ATTN: Jim Lauderback
440 South Houston
Tulsa, OK 74127

Phone: (918) 587-7890
Home: 341-6933

** THANK YOU ! **

Management Information Systems

PURPOSE OF SURVEY AND COURSE DESCRIPTIONS

This survey is being conducted to determine Management Information Systems course requirements at the undergraduate level in the Tulsa area.

Management Information Systems curricula combine computer applications courses and business courses. This page of the questionnaire relates to business and mathematics. The other side of the questionnaire relates to computer courses.

DEFINITION OF MANAGEMENT INFORMATION SYSTEMS EMPHASIS AREAS

Systems Analysis - Needs analysis and specification documentation of computer information systems.

Systems/Software Programming - Coding and documentation of per system specifications.

Integrated Office Management Systems - Office automation specialist.

Financial Systems and Auditing - EDP auditing and financial specialist.

Data Communications - Planning and implementation or networks and telecommunications systems.

Information Management - Information center operations. Training and coordination of computer systems implementation.

BUSINESS COURSES - COURSE DESCRIPTIONS

CODE

1 Business Communications - Oral and written communication in a business environment.

2 Principles of Management - Practical management with emphasis on the role of the manager/supervisor in the organization.

3 Principles of Marketing - Realistic appreciation of what marketing is and its importance to society.

4 Principles of Finance - Comparison of the forms of business organization. Emphasis on the financial characteristics of modern American corporations.

5 Production and Operations Management - Plant location and design, plant layout and materials handling, methods, motions, and time standards, quality control, inspection, and production control.

6 Business Law - Principles of law involved in ordinary business transactions. Study of court systems, general contracts, negotiable instruments and bailments.

7 Managerial Accounting - Gathering of data for planning, control, and management.

8 Financial Accounting - Gathering of financial data for financial decision making.

9 Quantitative Methods in Business - Mathematical models, set theory, linear functions, and introduction to differential and integral calculus.

10 Organizational Behavior - Business applications of behavioral science concepts. Interpersonal relations.

11 Business Statistics - Averages, dispersion, skewness, probability, sampling and statistical quality control.

12 Introduction to Business - Basic principles, forms and practices involved in administration of a business.

13 Macro-Economics - Causes of inflation and recession, national income accounts, employment levels, banking and monetary theory, economic development, and governmental tax and fiscal policy.

14 Micro-Economics - Market structure and functioning, cost and supply relationships, consumer behavior, demand theory, product and resource pricing, revenue and profit relationships, and international specialization and trade.

15 Money and Banking - Commercial and non-commercial banking institutions, including theories of money supply, interest rates and credit policies.

16 Entrepreneurship and Small Business Management - Elements of small business operations.

17 Corporate Finance - Financial management of business concerns. Cash flows, profitability of funds commitments, decisions with respect to structure of debt financing and debt/equity mix.

18 Management Information Systems - Uses of the computer in management with emphasis on selection of systems for computerization, database management, and decision support systems.

MATHEMATICS COURSES - COURSE DESCRIPTIONS

40 College Algebra - Quadratic equations, functions and graphs, inequalities, theory of equations, permutations and combinations.

41 Discrete Mathematical Structures - Mathematical applications to computing and information sciences are emphasized. Sets, computability elementary graph logic, Boolean algebra, and circuit design.

42 Plane Trigonometry - Trigonometric functions applying to engineering.

43 Finite Mathematics - Probability, vectors, and matrices and linear programming.

44 Numerical Analysis - Algorithms and error analysis, solutions of equations, interpolation and approximation theory.

45 Business Calculus - Selected calculus applications to include: exponential and logarithmic functions, differential and integral calculus.

46 Calculus I - Derivatives, integrals and their applications, including introductory analytic geometry.

47 Calculus II - Multivariate calculus, series and applications.

48 Calculus III - Indeterminate forms, infinite series, multiple integrals, and partial derivatives.

49 Differential Equations - Differential equations of the first order and first degree, first order and higher degree, differential equations of order higher than the first.

COMPUTER APPLICATIONS COURSES - COURSE DESCRIPTIONS

CODE

70 Introduction to Computer Information Systems - Emphasis is on computer requirements, history, hardware functions, and computer applications.

71 Computers and Organizations - Computer applications, information needs in business, microcomputers and information systems that meet business needs.

72 Computer Problem Solving - Systems principles, case projects in problem solving using microcomputers. System cycle concepts, structured and unstructured environments. Course provides a sound base for programming courses.

73 Problem Solving With Programs - Introductory course in program design and development. Learners work to a structured, multi-phase program development process.

74 Program Design and Development - Advanced programming building language skills. Stress will be placed on such topics as clear documentation, module and program testing and efficient use of equipment.

75 Data Structures, Data Models, and Databases - Stress is on fourth and fifth generation programming techniques and database applications. Data structures, data modeling, and database methods.

76 Systems Analysis and Design - Systems concepts are covered throughout the curriculum. This course will stress use of modular programming and information center methods for building systems.

77 Systems Project - Present-day productivity tools. Learners will be encouraged to use microcomputers and commercial software packages to construct complete systems within the span of a single semester.

78 Microcomputer Applications for Business - Microcomputer hardware and software uses in business discusses processing needs and opportunities from the perspective of the individual user.

79 Advanced Office Systems - Perspective on the needs, potentials, and urgencies of systems to support modern office functions.

80 Integrated Systems for Management - Coordination between office-based and centralized informations systems.

81 Introduction/Survey of Computer Graphics - Emphasis is on Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM). Business applications for graphics aimed at presentations and communications.

82 Decision Support and Expert Systems - Management problem solving and decision making using software tools.

83 Introduction to Artificial Intelligence - Survey course on the pioneering efforts in artificial intelligence. Speech coding and voice recognition.

84 Hardware, System Software, and Architecture - Systems level review of computing equipment and the organization of components and devices into architectural configurations. In-depth understanding of how computers go together.

85 Advanced Project: Database System Implementation - Provide practical experience in selection, initialization, modification, and implementation of software packages. Learners will design and implement a system to run in a database environment.

86 Computer Control and Audit - Designing controls within computer information systems to achieve overall reliability and meet audit examination requirements and objectives.

87 Techniques for Data Communications - Survey of the rapidly growing field of networks, telecommunications, satellites, microwaves, optical cables and laser technologies.

88 Survey of Programming Languages - Comparative review of current and popular languages. Pascal, Modular 2, C, Forth, APL, etc.

89 Software: Principles, Selection, and Development - Establishing a set of principles for use in selecting software packages. Hypothetical systems and/or managerial requirements are presented and appropriate software selected.

90 Information Center Management - Introduction to the information center that makes available hardware and software tools from which new systems can be assembled and tested by prospective users. Creation of centers, consulting and training.

91 Information Resource Planning - Needs and methods applied in corporate planning for information systems. Facilities, equipment, personnel, technical skills and specialties, training, priorities and information requirements.

92 Information Resource Management - Formation and implementation of system development plans.

93 Advanced Programming - Third semester of learning opportunity for those who want to become application programmers or software development specialists.

94 Information Systems Project Management - Coursework in systems analysis and design and the capstone course in systems development. Principles of project management including, Critical Path Method (CPM), reporting to management, and user interaction will be covered.

95 Information Systems Reporting and Documentation - Preparation and delivery of documents and oral reports. Audience identification, language style, formatting techniques, graphic support, brainstorming and methods will be covered.

APPENDIX C

TRANSMITTAL LETTER

TO: Business Course Instructors

FROM: Jim Lauderback
Computer Science Instructor
Langston University

COMPUTER CURRICULUM

We are offering a computer minor to Business and Business Education majors. In order to assure that the minor contain the appropriate courses; we are conducting a survey which will take 10 to 15 minutes to complete.

The survey will also be the basis for the possible development of a Management Information Systems (MIS) curriculum. A MIS curriculum combines business, mathematics, and computer applications courses.

This curriculum plan has six areas of emphasis:

Systems Analysis - Needs analysis and specification documentation of computer information systems.

Systems/Software Programming - Coding and documentation of per system specifications.

Integrated Office Management Systems - Office automation specialist.

Financial Systems and Auditing - EDP auditing and financial specialist.

Data Communications - Planning and implementation or networks and telecommunications systems.

Information Management - Information center operations. Training and coordination of computer systems implementation.

Business students are asked to make selections as to the courses they feel should be included in the core. (i.e. required for MIS majors, regardless of emphasis area. Additionally, they are asked to make selections indicating the additional courses they feel should be required in each emphasis area. Participants are asked to review the course descriptions prior to making selections.

The two pages of the survey include the questionnaire itself and an information sheet which provides course descriptions.

Please ask the students to see Mike Murphy or Jim Lauderback if they are interested in adding a computer minor to their degree plan.

Thank you for your cooperation!

Sincerely,

Jim Lauderback
Computer Science

APPENDIX D

SECOND DRAFT (4/12/85) DATA PROCESSING MANAGEMENT ASSOCIATION CURRICULUM MODEL COURSE LISTING

Data Processing Management Association

Curriculum 1986 -- Second Draft

April 12, 1986

List of Courses

1. Microcomputer Applications in Business
2. Introduction to Business Application Programming
3. Intermediate Business Application Programming
4. Data Files and Databases
5. Systems Development Methodologies: A Survey
6. Systems Development: The Information Center Approach
7. Computer Hardware, System Software, and Architecture
8. Systems Development Project
9. Advanced Office Systems
10. Computer Graphics in Business
11. Decision Support and Expert Systems
12. Artificial Intelligence: Application in Management
13. Advanced Project: Implementing a System in a Database Environment
14. Computer Control and Audit
15. Data and Voice Communication: Equipment and Applications
16. Survey of Programming Languages
17. Software: Principles, Selection, and Development
18. Information Resource Planning and Management
19. Advanced Business Applications Programming
20. Principles of Computer Information Systems Project Management
21. Computer Information Systems Reporting and Documentation

VITA

James Harold Lauderback

Candidate for the Degree of

Master's of Science

Thesis: PERCEPTIONS OF BUSINESS COMPUTER APPLICATION CURRICULUM NEEDS FOR PUBLIC UNDERGRADUATE EDUCATION INSTITUTIONS IN TULSA, OKLAHOMA

Major Field: Occupational and Adult Education

Biographical:

Personal Data: Born in Tulsa, Oklahoma, in 1944. Married Jean in 1971 and have two daughters, Jancy and Rene.

Education: Graduated from Nathan Hale High School, Tulsa, Oklahoma, in May, 1962; received Bachelor of Arts and Sciences degree in Accounting from the University of Tulsa in May, 1967; Completed requirements for the Master's of Science degree at Oklahoma State University in July, 1985.

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