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DEVELOPMENT OF AN INSTRUMENT FOR THE EVALUATION OF THE TWO MODEL DEGREE PROGRAMS WITH BUSINESS OPTION IN COMPUTER EDUCATION

University of Cincinnati Ed.D. 1986

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DEVELOPMENT OF AN INSTRUMENT FOR THE EVALUATION OF THE TWO MODEL DEGREE PROGRAMS WITH BUSINESS OPTION IN COMPUTER EDUCATION

A Dissertation Submitted to the
Division of Graduate Studies
of the University of Cincinnati

in partial fulfillment of the
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of the College of Education

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by

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entitled Development of an Instrument for the Evaluation of Two Model Degree Programs with Business option in Computer Education.

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Approved by:

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ABSTRACT

DEVELOPMENT OF AN INSTRUMENT FOR THE EVALUATION OF THE TWO MODEL DEGREE PROGRAMS IN COMPUTER EDUCATION WITH BUSINESS OPTION

Duggal, Sudesh M., Ed.D. University of Cincinnati, 1986. 197 Pp. Chairperson: Charles R. Weilbaker

Information Systems programs are rapidly emerging in colleges and universities in response to the intense demand by organizations for information systems professionals. Two different curriculum recommendations have been introduced by the Association for Computer Machinery (ACM), called MIS, and by the Data Processing Management Association (DPMA), called CIS. In developing information systems curriculum at an institution, the question arises concerning which of the two curriculum recommendations stated above should be followed to correctly meet the demand of the industry. A valid and reliable instrument is needed to evaluate the two model degree programs in information systems.

Purpose of the study. The purpose of the study was to develop an instrument for the evaluation of the two model degree programs as stated above.

Development of the instrument. The instrument was developed with the help of six experts in the field of information systems, three representing the ACM and the other three representing the DPMA.

Validity of the instrument. The content validity of the instrument was obtained by critical analysis of each item of the instrument by these six experts. Two sequential evaluations of the instrument were performed, and consensus of agreement was reached on the items to be included in the instrument.

Reliability of the instrument. The instrument was evaluated for interevaluator reliability by four educators in the field of information systems, two representing the ACM, and the other two representing the DPMA.

Conclusions. The instrument developed in this study is a major step in the evaluation of the degrees curriculum of the colleges and universities offering degree in information systems. Further refinement of the instrument may be needed.

CHAPTER I

INTRODUCTION

There is much confusion among students about the new and most popular field of study of the decade i.e. Computer Education. Students are not the only ones who have difficulty in understanding the difference between the various degree programs available in computer education today. Even parents, high school counselors, college and university counselors, educators, administrators and recruiters have a difficult time seeing the differences among them.

History of Computer Education

The development of computer education programs has not been in a systematic manner. The colleges and universities started offering different courses in various

departments, and for the students, these were simply the "Computer Courses". As these courses were in demand, more and more courses were added, and as such several degree programs emerged under different names and from various academic disciplines. At present there are 50 to 60 different names and classifications for Computer Education programs, as stated by Hamblen (28) in his study on Computer Manpower - Supply and Demand - by States 1975. Hamblen (28) lists 22 frequently used titles for educational programs in Computer Education, these are summarized in Table 1.1, Appendix C, page 166.

The broad range of the academic disciplines and departments offering these degree programs add more to the confusion. Hamblen (28) also lists 15 names of disciplines or departments not duplicating those already given as degree titles, as shown in Table 1.2, Appendix C, page 167.

Basic Undergraduate Degree Programs in Computer Education

Tom Athey (7) clarifies the difference in basic undergraduate programs in Computer Education. He states

that "Despite the confusion over degree names, there are basically three major segments of the Electronic Data Processing market that educational programs should be aiming toward at the undergraduate level. These different markets are: Computer Engineering Technology; Computer Science; and Business Data Processing / Information Systems." Athey(9) defines these different markets as follows.

Computer Engineering Technology

This program is designed primarily to prepare graduates for employment in positions directly related to the hardware of the computer systems. Traditionally, these graduates work for computer manufacturers and are either responsible for the initial design of computer hardware or are concerned with maintenance. According to Athey(7) this degree program should be housed in the School of Engineering.

Computer Science

As this program is traditionally taught, Computer Science graduates are primarily prepared for the area of software design. Graduates usually are recruited by hardware manufacturers and are then involved in the design of vender supplied software such as Compilers, Operating Systems, Utility programs, etc. It is Athey's(7) view that this degree program should be housed in the School of Science.

Business Data Processing / Information Systems

Unlike the first two degree programs, the traditional business data processing / information systems graduate is usually associated with the end user rather than the hardware manufacturer. He is responsible for the design and development of user-oriented computer programs. Graduates of this program usually enter the workplace as application programmers or programmer / analysts or system analysts. The School of Business would be home for this degree program as Athey(7) would recommend.

STATEMENT OF THE PROBLEM

Colleges and universities who are on the threshold of offering the degree program in computer education, need to decide which program to offer at their institutions. Obviously the Computer Engineering Technology program should follow the curriculum designed and recommended by the curriculum committee of the Institute of Electrical and Electronic Engineers (IEEE) (30), and the Computer Science program should follow the curriculum designed and recommended by the curriculum committee on computer science of the Association for Computing Machinery (ACM) (11).

But what about those institutions who want to offer the Business Data Processing / Information System program. Which curriculum recommendations should they follow? There are two different suggested curricula as given below:

1. A program designed and recommended by the curriculum committee on computer education for management of the Association of Computing Machinery (ACM) (37), called MIS.

2. A program designed and recommended by the curriculum committee on educational foundations of the Data Processing Management Association (DPMA) (2), called CIS .

THE PROBLEM FOR SUCH INSTITUTIONS IS WHICH RECOMMENDATION SHOULD THEY FOLLOW - ACM'S MIS CURRICULUM OR DPMA'S CIS CURRICULUM?

To help these institutions, an instrument is needed to evaluate the two available Model Degree Programs in Computer Education with Business Options, namely: (1) the ACM model called MIS, and (2) the DPMA model called CIS.

PURPOSE OF THE STUDY

The purpose of this study was to develop an instrument for the evaluation of the two model degree programs in computer education with business options, i.e. Computer Information Systems, hereafter called CIS, and Management Information Systems, hereafter called MIS.

RATIONALE OF THE STUDY

The main function of the educational institution is to prepare students to meet the job entry requirements of the industry. Thus, it is the responsibility of the colleges and universities to offer a curriculum which meets the needs of the industry.

With the availability of the two different degree programs in Business data processing / Information Systems: (1) the ACM model called MIS and (2) the DPMA model called CIS, schools are in a state of confusion and are having a difficult time to decide which program they should offer at their institutions.

Apart from this, students are also having a difficult time deciding which degree program will help them to find a suitable job after the completion of their studies. The instrument developed in this study can be used by any college or university to evaluate the two competing model degree programs guided by the preference of the area employers. The results of such an evaluation will help the students to decide in which program to enroll, as well as helping the educational institutions to

decide which program is favored by the area industry for the purpose of hiring their graduates.

LIMITS TO THE STUDY

In this study, an instrument was developed for the evaluation of the two model degree programs in computer education with business option. Such development required establishment of the validity and reliability of the instrument. The following delimitations and limitations were imposed in the development of the instrument.

Delimitations of the study

1. The items included in the survey instrument were representative of the choices of the six experts in the field of Information Systems.

2. Evaluators were limited to four educators, two being the representatives of ACM, and the other two that of DPMA.

Limitations of the study

1. The items included in the survey instrument were representative of the choices of the six experts and not the entire group of experts in the field of Information Systems.

2. Evaluators were also restricted to only two schools, one representing the ACM curriculum and the other representing the DPMA curriculum.

3. ACM / DPMA curriculum guidelines used for the development and for the evaluation of the instrument were the latest guidelines available at that time. Any later release of new curriculum guidelines by either group would require some modifications in the instrument before it could be used.

ORGANIZATION OF THE REMAINDER OF THE STUDY

Chapter II reviews the related literature and the applicability of the study.

Chapter III presents the methodology used in the study, the design of the study, and details surrounding the instrument development.

Chapter IV provides a description of the data analysis.

Chapter V summarizes the study and offers implications and suggestions for further investigation.

A bibliography, containing a list of related literature, follows the last chapter. Appendix A follows the bibliography and contains curriculum guidelines for the ACM and the DPMA degree programs as given by Cotterman (15). Appendix B contains all the correspondence with the panel of experts and the evaluators. Appendix C contains all the supporting tables used in the data analysis. Appendix D contains the final version of the survey instrument and the user's manual for its evaluation.

CHAPTER II

REVIEW OF THE LITERATURE

The history of the development of computer education leading to the information systems curricula is reviewed in this chapter. The brief description of the ACM Information Systems Curriculum Recommendations for the 80's and of the DPMA Model Curriculum for the Computer Information Systems is given. The reports of the surveys done by the ACM and DPMA for each curriculum are discussed, and the comparative analysis of information systems curricula is provided.

Development of the Different Computer Education Curricula

The history of the development of computer courses dates back to the early '50s when computers were first introduced, and there were no computer courses being offered in colleges and universities.

Introduction to the Development of Computer Courses

Faculty from different departments, self educated themselves, developed certain computer courses and started offering these courses at their institutions throughout the country. As the number of such institutions that offered computer courses was very small, enough people were not being trained. There was a great shortage of trained computer personnel during the late '50s and early '60s.

As one of the most knowledgeable persons on the history of computer education, John Hamblen (28), after having researched the subject of computers in higher education for several years, states in his study on Computer Manpower & Supply and Demand by States from 1964 to 1979 that "the cause of many of the problems associated with computer usage is the 'over-utilization of under-educated people' ... The reason being, of course, that properly educated people have not been available. Bootstrapping by training existing personnel and pirating whatever other centers had trained was the only way that staff could be obtained during the late '50s and early '60s. The late '60s saw the tremendous growth in the one-

and two-year [educational] programs aided by large infusions of federal monies ... The '70s might well become known as the decade of the recognition of the value of the college graduate to effective and efficient computer usage."

Introduction to the Development of Computer Education Programs

In the mid '60s, several colleges and universities throughout the country started developing computer education programs as a part of their curricula offering. This development and growth of the computer education programs was not orderly or standardized. The colleges and universities started offering different courses in various departments. As these courses were in demand, more and more courses were added, and so several such degree programs emerged under different names and from various academic disciplines. The broad range of the academic disciplines or the departments offering these degrees created much confusion among the students, parents, educational counselors, and the recruiters.

Introduction of Computer Science Curriculum

To ease this problem, the ACM Curriculum Committee on Computer Science Curriculum (1), introduced the "Recommendations for Academic Programs in Computer Science : Curriculum 68". This helped the colleges and universities to develop a standardized computer science undergraduate program. These recommendations, according to Austing(11), were revised in 1978.

History leading to the Introduction of ACM Information Systems Curriculum

During the '70s, there was a large demand for Information Systems graduates. As reported by Deutsch (26), the findings of the survey done by the human resources consulting firm states that, "Data Processing jobs are among the most difficult to fill." Why are Data Processing jobs hard to fill? The report further stated that. "The demand for programmers and system analysts, like engineers and scientists, exceeds supply, for one

thing, for another, qualified people are not available at the right price. Further, the turnover rate is high because data processing skills are highly transferable to other companies."

The main points developed above may be translated as follows. First, 'demand exceeds supply, because there were not many schools training the students in Data Processing or what is also called Information Systems; and second, 'qualified people were not available, because most of the students were directed to the computer science program rather than Information Systems.

Demand for Commercial Data Processing / Information Systems Graduates

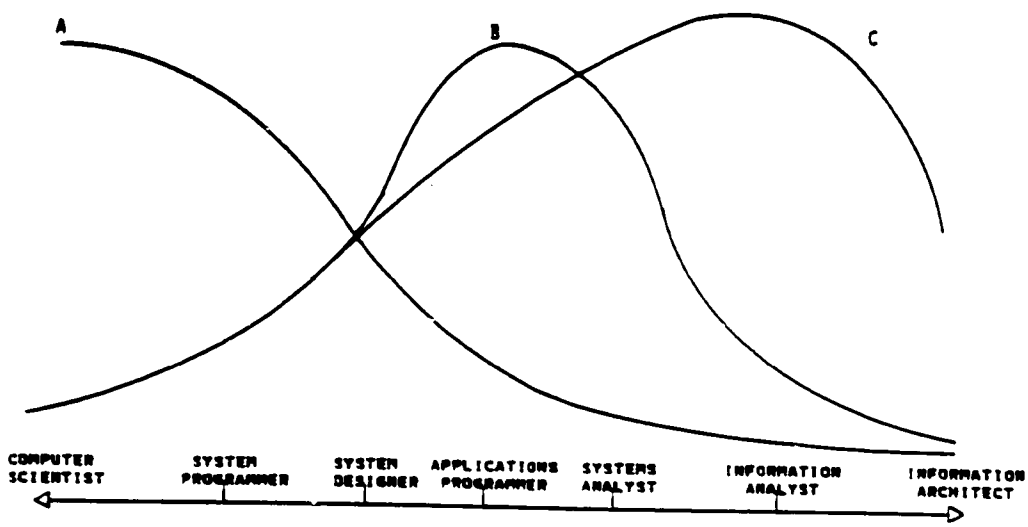
French(27) states that "Most universities computer science programs are not producing graduates with the expertise needed in the commercial data processing environment. Furthermore, most graduates of such programs lack the ability to apply Data Processing in areas that aid in decision making, operations control, and forecasting for future growth." It further indicates

that, "undergraduate business education should be stressed as a second area of study, because computer science graduates need more familiarization with accounting and general business procedures."

This fact is also supported by Cotterman (15) as shown in the figure 1 below.

Figure 1

Demand and Supply of Computer Related Occupations



Source : Cotterman (15)

According to Cotterman (15), "Curve A is the estimated shape of the supply curve of college graduates appropriately trained for positions on the computer-related continuum of occupations. Curve B is an estimate of the shape of the demand curve for college graduates to fill positions on the continuum. And curve C represents the future demand for college graduates for positions on the computer-related continuum".

The above comments clearly suggest that most university's computer science programs are not producing graduates with the expertise needed in the commercial data processing environment. A Computerworld editorial(24) states that, "Most computer science programs do not intend to produce data processing experts. While many computer science students do graduate with data processing skills and most computer science graduates - at the bachelor degree level - do seek data processing jobs, data processing is not computer science any more than carpentry is architecture."

The editorial also suggests the solution for this problem as follows: "In many ways it is unfair to criticize computer science programs for not being Applied Data Processing. There is a need and a place for computer

science as well - it is just that computer science should not be confused with business data processing. Instead of criticizing already good computer science programs, business and other concerned people should lobby for better - but different - programs that teach data processing as part of a more general discipline such as business, medicine, law or even liberal arts."

Introduction of ACM Information Systems Curriculum

According to Couger (16), ACM introduced the Curriculum Recommendations for Undergraduate Programs in Information Systems in 1973. Some colleges and universities followed these recommendations to develop a standardized undergraduate program in Information Systems. These recommendations, according to Nunamaker(37), were revised in 1981. The summary form of these recommendations as stated by Cotterman (15) are given in Appendix A, pages 103-113.

History leading to Introduction of DPMA Information Systems Curriculum

As recently as the late 70's, the industry still felt an acute shortage of technically trained people in the field of Data Processing and / or Information Systems. As reported by Schultz (39), a Computerworld staff reporter, "The U. S. lacks a sufficient number of university programs in data processing, according to a draft report of an Association for Computing Machinary (ACM) Committee."

The report also adds that, "A survey of U. S. academic programs oriented toward producing applications programmers, information systems (IS) specialists and data base managers found that about one-fourth of bachelor's degree programs and more than one-third of master's degree programs do not meet curriculum guide lines as presented by the ACM curriculum committee in 1973."

Demand for Separate Information Systems Department

The report by Schultz (39) also stated that, "The U. S. has nearly five computer science departments for every IS department, according to a recent study not connected with the ACM investigation." The report further stated that, "The nation has a much higher demand for personnel such as Information Systems graduates, who have a combination of technical and organizational skills, than for computer science graduates with 'solely' technical skills. ... The shortage of people with organizational training has triggered a migration of people with heavy technical but virtually no organizational training into jobs that call for extensive organizational expertise." The report further warned that, "the nation may face an acute shortage of desperately needed computer personnel able to work well with top management." Consequently some educators, business and other concerned people realized that we need a degree program different from computer science, that teaches data processing as part of a more general discipline.

Athey(9) also observed that "No longer the 'silent majority', business data processing and information systems educators are telling employers as well as curriculum planners that there are and should be significant differences between 'pure' computer science/ engineering and business information systems."

In August, 1979 a two-day national curriculum workshop sponsored by the information systems department of California State Polytechnic University, Pomona, was called. Educators from U.S. and foreign universities, community colleges and proprietary schools attended this workshop.

The primary function of the meeting was organizational, but it also stressed the need for business Data Processing / Information Systems educators to go on the offensive in defining needs and sharing of resources with computer science departments. The major purpose was to establish Business Data Processing / Information Systems as a separate, but viable education field, and to start developing a model curriculum for the same.

At the conference Athey(9) presented a paper on the differences in computer education degree programs, which are explained in chapter 1. Also as previously mentioned, the overall conclusion of the workshop was that, "There are and should be significant differences between the 'pure' curriculum of computer engineering, computer science and business information systems. Therefore, while much good work has been done by ACM and IEEE in defining the requirements for college degree programs in the computer field, the majority of the recommendations from these two professional organizations neither apply to nor aid educators developing business information systems curricula."

Once the participants established that business information systems were a separate field, there was a need to further define business information system education as it relates to the major educational groups - proprietary schools, community colleges and universities.

Based on the success of this first conference, California State Polytechnic University agreed to host another national conference / workshop early in 1980. According to Beeler(13), the Second Annual Business

Information Systems Curriculum Development workshop, cosponsored by California State Polytechnic University and the Data Processing Management Association (DPMA) was held for two reasons:

* To decide what standards undergraduate business data processing programs should meet in preparing their students for jobs as systems analysts and programmers.

* To establish the business information system field as a formal educational discipline, equal in standing to computer science instruction.

According to Athey(10), Don Price, president of the DPMA Education Foundation, led off the Second Annual National Business Information Systems Curricula Development Conference / workshop by stressing the need for a model curriculum. Price stated that colleges and universities are not teaching what industry needs in traditional computer science programs. Industry wants individuals with a broad business background.

Price further added that, "Industry has been screaming for graduates with skills in computing that will be immediately applicable upon employment in the business world. It is important that educational institutions adopt instructional programs that will prepare entry-level programmers and programmer / analysts to meet industry needs for the development of information systems. Most computer science programs do not provide this preparation or training and, indeed, were not designed to."

Introduction of DPMA Information Systems Curriculum

As a result, according to Adams (2), DPMA introduced the Model Curriculum for Undergraduate Computer Information Systems Education in 1981. The summary format of these recommendations as stated by Cotterman (15) are given in Appendix A, pages 114-122.

The development of the curriculum activities described above as summarized by Cotterman (15) are given below in Figure 2. Underlined dates in Figure 2 indicate activities specifically directed to Information Systems.

Figure 2

Curriculum Activities

1968 Curriculum 68 (ACM)

1972 Curriculum Recommendations for Graduate Professional Programs in Information Systems (ACM)

1973 Curriculum Recommendations for Undergraduate Programs in Information Systems (ACM)

1974 An International Curriculum for Information Systems Designers (IFIP)

1979 Curriculum 78 (ACM)

1981 DPMA Model Curriculum for Undergraduate Computer Information Systems Education (DPMA)

1981 ACM Masters Curriculum in Computer Science (ACM)

1981 Recommendations and Guidelines for an Associate Level Degree Program in Computer Programming (ACM)

1981 Educational Programs in Information Systems (ACM Survey)

1982 Curriculum Recommendations for Software Engineering (IEEE)

1982 Information Systems Curriculum Recommendations for the 80'S: Undergraduate and Graduate Programs (ACM)

Source : Cotterman (15)

Survey Reports of the ACM and DPMA Curricula

As indicated earlier, the purpose of this study was to develop an instrument for the comparative evaluation of the two degree programs, MIS and CIS, from the point of view of the industry. The MIS degree program has been around for about 12 years. Couger(16) states that, "The curriculum committee on computer education for management of Association of Computer Machinery proposed its recommendations for the Management Information Systems degree program in December 1973." According to Nunnamaker(37) these recommendations were revised in November 1982. Whereas the CIS degree program has been introduced recently. According to Adams(2), " The curriculum committee on education foundations of the Data Processing Management Association, introduced its recommendations for the Computer Information Systems degree program in May 1981". In other words the CIS degree program has been around for only five years. During this time, there have only been a few articles in which experts in the field have expressed their opinions about these two degree programs.

ACM Survey Report of the MIS Program

Nunamaker (36) states that a survey was conducted in June 1979 by an ACM Committee of schools of Business Administration, Departments of Computer Science, Engineering Colleges, and academic units offering programs in Information Systems, to ascertain the extent to which they had implemented the 1973 ACM Curriculum recommendations. The survey material was mailed to 205 business schools meeting American Assembly of Collegiate Schools of Business (AACSB) on accreditation standards; 149 Computer Science department heads, and 159 Collegiate chapters of the ACM.

There was a 53 percent response rate from the AACSB schools, a 49 percent response rate from the computer science departments, and an 11 percent response rate from the ACM chapters.

The committee report indicates that from the original list of 124 reported Information Systems programs, there were 37 different names associated with the field. The two most common by far were: "Management

Information Systems" (27 of the 124 programs) and simply "Information Systems" (18 programs).

The curriculum committee found that the 91 U.S. colleges and universities offered some form of Information Systems study courses. The 91 colleges and universities offered 70 programs at the bachelor's level. The result indicated that only 53 out of 70 undergraduate programs satisfied the minimum criteria for classification as an Information Systems program based on the ACM curriculum.

The Colleges of Business or Management were found to be the home for a majority of Information Systems programs. Of the 53 satisfactory undergraduate programs, 42 were components of business or management colleges, and the remaining 11 were offered by Computer Science departments or Engineering colleges.

DPMA Survey Report of the CIS Program

According to Souder (42), The Tracking and Evaluation Committee of DPMA Education foundation, undertook a survey of colleges and universities. The

committee was interested in a number of things. Which schools had adopted an educational philosophy consistent with the DPMA Model Curriculum and which schools had made or are making curriculum changes that parallel the DPMA recommendations? What was the current status of CIS programs within schools following the DPMA guidelines?

A total of 4,106 questionnaires were mailed, from which 467 were returned during a four month period. Of 441 usable, non duplicate questionnaires, 103 represented four year public institutions, 85 represented private four-year institutions and the remaining 253 were comprised of community and junior colleges. Because the DPMA Model Curriculum was designed and developed principally as a four-year program, the four-year private and public institutions were of primary interest in the survey. Of the 188 four-year institutions responding, 90 percent of them offered only one computer education program, while 69 offered two programs, 25 offered three programs and four or more programs. In summary, there were 321 programs in the four-year institutions.

According to the results of the survey, 79 of the four-year institutions have fully implemented the DPMA core or had partially implemented the core and plan to

fully implement it at a later date. An additional 79 had partially implemented the DPMA Model Curriculum core and planned to supplement the guidelines.

Approximately 93.6 percent of all respondents were utilizing or planning to partially utilize the DPMA Model Curriculum as a foundation for their computer education program.

Comparative Analysis of Information Systems Curricula

In his recent article Cotterman(15) has done the comparative analysis of the available curriculum of all the basic undergraduate programs in computer education. And the results of his analysis shows that there is a great demand in the industry for the graduates of Business Data Processing / or Information Systems.

According to Cotterman (15), the DPMA's MIS and ACM's CIS Information Systems Curricula both included some type of analyst position as a potential occupation for graduates of their programs as indicated in figure 3 given on next page.

Figure 3

A Comparison of Curricula

PROGRAM OCCUPATION TARGETS

DPMA " To provide graduates with the knowledge, abilities and attitudes to function effectively as application programmer / analyst, and with the educational back ground and desire for lifelong professional development."

ACM "The graduate of a professional IS program should be equipped to function in an entry level position and should have a basis for continued career growth... In general the entry level positions are: 1. System Analyst 2. Application Programmer or Programmer Analyst 3. Information Systems Specialist.

Source : Cotterman (15)

Cotterman (15) states that it is certainly a point of commonality in the two curricula which describes themselves as "Information Systems".

According to Cotterman(15), the 1972 ACM Curriculum Recommendations in Information Systems categorized its thirteen courses into four groups.

Course Group A: Analysis of Organizational Systems

Course Group B: Background for Systems Development

Course Group C: Computer and Information Technology

Course Group D: Development of Information Systems

The two courses in Course Group B are :

B1. Operations Analysis and Modeling; and

B2. Human and Organizational Behavior.

Group B is thus closely related to Course group A. This grouping can be summarized by describing information systems as the study of

ORGANIZATIONS

COMPUTER AND INFORMATION TECHNOLOGY, And

PROCESSES OF INFORMATION SYSTEMS DEVELOPMENT.

This has become an increasingly common definition of the information systems discipline.

The statement regarding necessary knowledge and skills in the reports of the two information systems curricula indicate virtually complete acceptance of the above definition. Figure 4 presents key statements from those reports.

Figure 4

Knowledge and Skills Required of Different Curricula

DPMA "... needed competencies dictate that the programmer / analyst receive education and training in at least three different areas - (1) in systems development methodologies, which provide the fundamental problem-solving approaches used in the profession; (2) in technical computer skills, which provides the tools for implementing those problem solutions; and (3) in business theory, which provides an understanding of the context within which the systems are implemented."

ACM "the nature of the work to be performed by information systems graduates therefore establishes three major knowledge requirements: (1) Information systems technology; (2) Information systems concepts and processes and (3) Organization, functions, and management (including interpersonal and organizational behavior)."

Source : Cotterman (15)

Cotterman (15) states that this agreement is equally clear in the topic recommendations of both curricula.

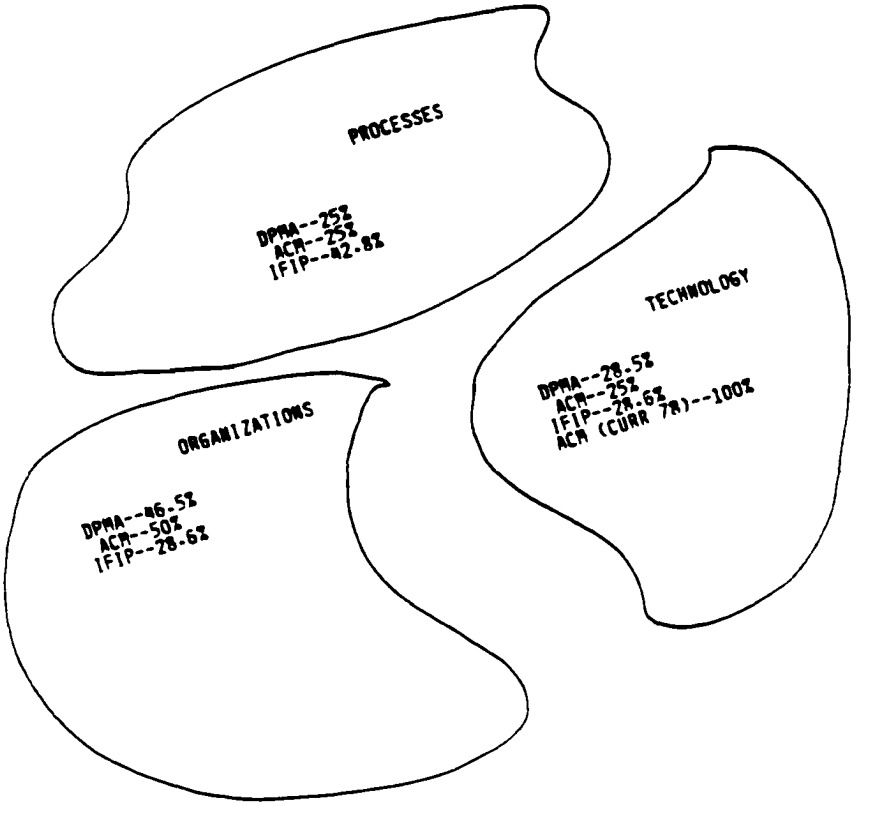
In the DPMA curriculum, for example, four of the core courses (CIS-1, CIS-2, CIS-3, and CIS-6) can be considered as directed primarily to computer and information systems technology. Of the eight elective courses, three (CIS-8, CIS-11, and CIS-12) are directed similarly. The total curriculum consists of eighteen courses of which four of the core and a likelihood of 1.125 courses calculated for the electives(CIS-9, CIS-11, CIS-12; 3/8 x 3 = 1.125) provides a likelihood that 5.125 courses (28.5%) of the total curriculum will be devoted to computer and information systems technology. Similarly, 4.5 courses (including CIS-10, CIS-13, CIS-14, CIS-18 of the electives) or 25% of the total curriculum is likely to be devoted to processes of information system development and 46.5% to organizations.

In order to make similar calculations with the ACM information systems curriculum we ignore the prerequisites and note that in the "Undergraduate level IS Curriculum Structure" shown in the report all IS designated courses occur in the junior and senior years. Also, the ACCSB standards call for the equivalent of at least one year of

work. If we assume that the AACSB year also occurs in the junior and senior year then we can calculate that organization (AACSB) accounts for 50% of the course work, while computer and information systems technology accounts

Figure 5

Percentage Comparison of Organizations, Processes and Technology in Different Curricula



Source : Cotterman (15)

for four of eight IS courses occupying the other year (25%). Thus processes of information systems development also account for 25%.

The percentages described above are shown in figure 5. The ACM computer science curriculum has been added for purposes of contrast. Figure 5 also makes it clear that there is general agreement between the ACM information systems curriculum and the DPMA model curriculum.

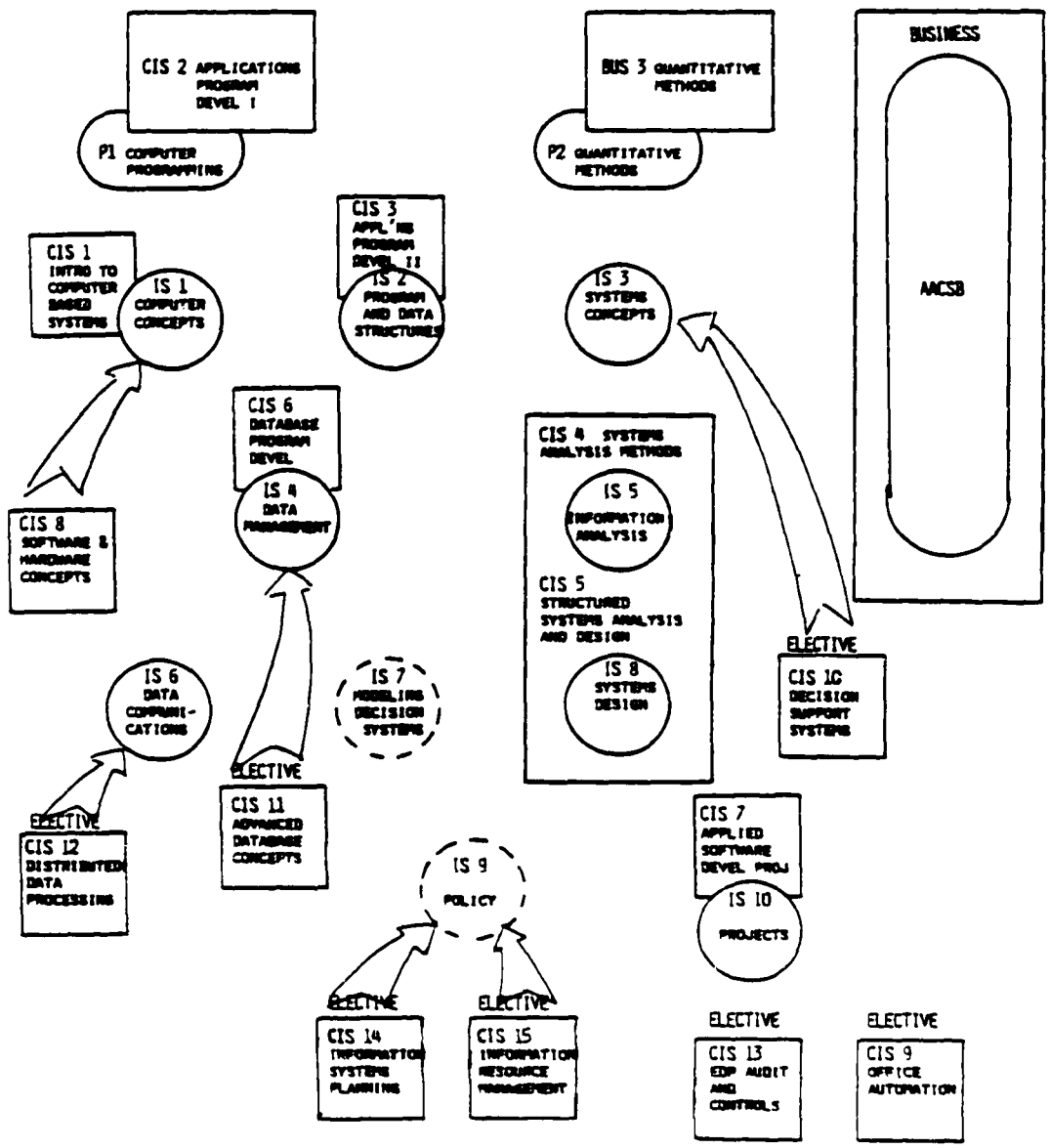
Figure 6 is a comparison of the ACM and DPMA curricula by subject areas. The diagram follows the basic structure of the ACM curriculum, and courses in the ACM curriculum are indicated by rounded symbols. The dashed circles indicates the two courses (IS7) and (IS9) which are graduate only. The squared figures are courses from the DPMA curriculum. Course matching is based on the topic content of the courses as described in the respective reports.

ACM courses P1, IS1, IS2, IS4, IS5, IS8, and IS10 are covered by required DPMA courses CIS2, (CIS1 and CIS8), CIS3, CIS6, BUS3, CIS4, CIS5, and CIS7, respectively. The remaining ACM courses, IS3 and IS6, may be covered by CIS10 and CIS12. The business requirement

Figure 6

A Comparison of the ACM and DPMA Curricula

by Subject Area



Source : Cotterman (5)

in the DPMA curriculum and the AACSB requirements in the ACM curriculum are the same. In terms of topics, the two curricula are very similar and, with the selection of two particular electives in the DPMA curriculum, become virtually identical. There is a difference between the two curricula in the placement (upper division or lower division) within a four year program. With the exception of the two prerequisites, all of the ACM recommended courses are found in the junior or senior year. In the DPMA curriculum, four of the core courses are placed at the freshman / sophomore level while the three remaining core courses and the three electives are found at the junior/senior level. While it could be argued that the information systems courses in the ACM curriculum are able to assume a more mature student in terms of reasoning ability and both general and business background. but it is not an important difference.

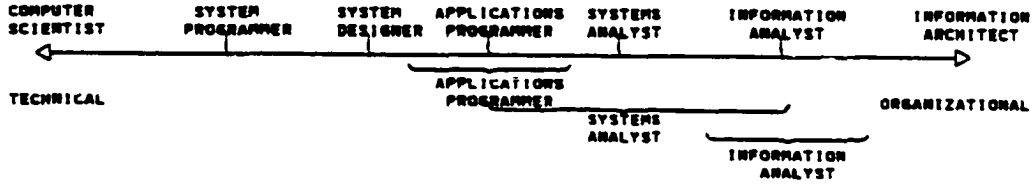
As suggested by Cotterman (15), Figure 7 presents a variety of Information System occupations on a continuum representing relative requirements for organizational and technical knowledge. The left extreme of the continuum indicates computer-related occupations which require a great deal of technical knowledge and virtually no organizational knowledge.

The right extreme of the continuum is marked with the position information architect, intended to mean a position concerned with information needs and the overall information flow within the organization. The position requires a great deal of knowledge about organizations and a relatively light knowledge of technology.

The occupations of systems programmer, systems designer, applications programmer, systems analyst, and information analyst have been placed on the continuum accordingly. Cotterman (15) states that, "An occupation

Figure 7

Different Computer Occupations on a Continuum



Source : Cotterman (15)

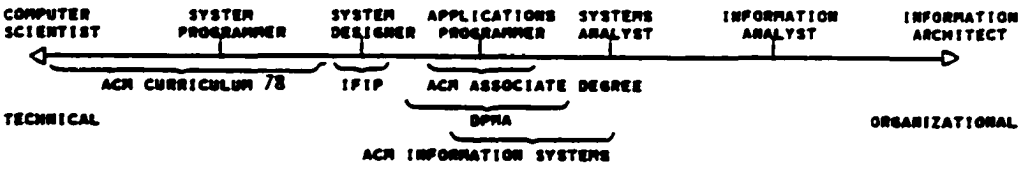
is not really one point on this continuum but a segment of the continuum, and it is likely that various segments overlap. Thus the occupation described as systems analyst might actually refer to a segment of the continuum which overlaps the point marked applications programmer as well as the point marked information analyst. Of course, these in turn, would actually refer to segments rather than points."

Cotterman (15) further suggests that, "A standard curriculum would mark off a segment of the continuum and act as a guide for the construction of curricula within that segment. Current curricula would seem to reference segments of the continuum as indicated in Figure 8. (The ACM curriculum 78, IFIP, and ACM Associate Degree programs are included only for contrast, but are not the part of this study.)

The above comparison showed the similarities between the ACM and the DPMA curriculum. Figure 1 indicated the demands (curve A) and supply (curve B) of different programs in computer related fields. Figure 8 given below indicates that the programs in big demand and short supply are the ones, which are recommended by the ACM and the DPMA Information Systems curriculum guidelines.

Figure 8

Different Computer Programs on a Continuum



Source : Cotterman (15)

Both of the Information System Curricula MIS and CIS, as also stated earlier in this chapter, included some type of analyst position as a potential occupation for their graduates. This is also clear from Figure 4, but Figure 8 also indicates that a more component of the analyst is included in the ACM's MIS curriculum as compared to DPMA's CIS curriculum.

To find out, if the two model degree programs curriculum, actually differ, a valid and reliable instrument was needed to evaluate the two competitive curricula. The instrument developed and tested in this study was designed for this purpose.

CHAPTER III

DESIGN AND METHODOLOGY

DESIGN OF THE STUDY

The principal effort of this study was the development and testing of an instrument. The purpose of the instrument was the evaluation of the two Model Degree Programs in Computer Education with business option, i.e. Computer Information Systems (CIS) and Management Information Systems (MIS). A modified Delphi approach was employed for the development effort.

Data Collection

For the identification of the questions in the survey instrument, a panel of six experts was formed. The panel consisted of equal number of representatives from

the ACM's Management Information Systems and DPMA's Computer Information Systems. The list of the members of the panel is given in appendix B, pages 124-126.

The first three represented ACM's Management Information Systems, and were actively involved in the development and revision of the Management Information Systems curriculum. The other three were representatives of DPMA's Computer Information Systems, and were participants in the development of the Computer Information Systems curriculum. Each group of three representatives had two members from the field of Education and one from the Industry.

Each member of the panel was first contacted by telephone for his consent. After his approval, a letter (see appendix B, letter # 1, pages 128-129) was mailed to each of them containing (1) The dissertation proposal and (2) ACM / or DPMA curriculum guidelines (as given in Appendix A, pages 103-122). Each was requested to submit a list of ten or more questions to be included in the survey instrument. Each member was advised to direct his questions to his organization's model degree curriculum. Also the questions should identify the strong points of the degree curriculum, and how these points help the

graduates in obtaining an entry level position. The entry level positions considered in this study were (1) Training Application Programmer, (2) Programmer Analyst, (3) System Analyst, and (4) Information Systems Specialist.

Sixty eight of the potential survey questions or items thus obtained were analyzed and refined. Analyzing and refining the original sixty eight questions involved rejecting some questions and rewording others. The questions were rejected if they did not correspond to the functions of the four categories of the entry level positions considered in the study, that is, (1) Training Application Programmer, (2) Programmer analyst, (3) System Analyst, and (4) Information Systems Specialist.

PROCEDURE FOR VALIDITY AND RELIABILITY

The procedure used in treating the collected data for examining the content validity and interevaluator reliability is given below.

Content Validity

In its simplest form, validity is the degree to which the assessment measures what it is supposed to measure. According to Thorndike (44), "The most important classifications of types of validity as established by the American Educational Research Association Committee are : Content validity, construct validity, predictive validity, and concurrent validity."

According to Kerlinger (32), content validity is, "the representativeness or sampling adequacy of the content -- the substance, the matter, the topics -- of a measuring instrument". Kerlinger also states that " content validity consists essentially of judgement ...'and is guided by the question' is the substance or content of this measure representative of the content or universe of content of the property being measured". This study established the content validity of the instrument by the method described below.

Procedure for Determining Content Validity

The initial survey instrument (Appendix B, pages 144-154) containing 68 questions was presented to the six member panel mentioned earlier for analysis and refinement (see letter # 2 in appendix B, pages 130-1131. Each panel member was asked to evaluate each question of the survey instrument using the following code: A question is acceptable as stated; ; B question is not in the universe of the entry level positions; C question is in the universe, however, it is not logically stated or is not in agreement with other questions. After careful review of the analysis by the panel, the survey instrument was refined using the following criteria:

1. Items receiving three or more B's were eliminated

2. Items receiving all A's and C's were retained

3. Items receiving one or more C's were modified

The reduced survey instrument in its semifinal version was evaluated again by the same six member panel appendix B, letter # 3, pages 132-134), using the same grading criteria as used before. The questions of the survey instrument were also clustered into eight separate and distinct categories as given below:

I. Communications Skills
II. General Studies
III. Hardware and Software
IV. Application Programming
V. Application Systems Analysis and Design
VI. Team Approach
VII. New Technology
VIII. Job Levels

This provided the content validity to the questions of the survey instrument. The survey instrument in its final version is given in appendix B, pages 183-192.

Instrument Reliability

This measure indicates the consistency with which a given assessment score can be obtained. Reliability is usually a serious issue for estimates that depend on observations or evaluations.

The question of interrelation arises when judgements are made by evaluators, and since this study uses an assessment tool which utilizes descriptive questions . Therefore, the interevaluator reliability should fall into a pattern of agreement. The instrument reliability was achieved by the method given below:

Procedure for determining interevaluator reliability

The procedure used to determine the interevaluator reliability is described below:

1. The survey instrument was mailed to four educators. (see Appendix B, pages 137-143) who had not previously seen the instrument. The

list of the evaluators is given in the appendix B, page 135-136.

2. Two of these evaluators were from a school or university offering the degree program as recommended by the ACM curriculum committee. This pair evaluated the instrument using the curriculum recommended by the ACM curriculum committee.

3. The other two evaluators were from a school or university offering the degree program as recommended by the DPMA curriculum committee. This pair evaluated the instrument using the curriculum as recommended by the DPMA curriculum committee.

Procedures for Analyzing the Data

1. The raw scores are presented in tables 3.1 and 3.2, See appendix C, pages 168-171.

2. The scores were analyzed as given below:

   a. Discrepancies were tallied between the ACM evaluators, the DPMA evaluators, and the ACM versus the DPMA evaluators.

   b. Variance of ratings were calculated for the ACM evaluators, the DPMA evaluators, and the ACM versus the DPMA evaluators.

   c. The F-test was used to determine the significance of variance.

   d. The items with least agreement were identified.

   e. The differences in average ratings were analyzed.

NULL HYPOTHESIS

There are no differences between the performance of the evaluation of the ACM and the DPMA evaluators using the instrument designed in this study for the evaluation of the two model degree programs in computer education with business option.

MAJOR QUESTIONS

The major questions asked in the study are :

1. What is the interevaluator consistency for the ACM, the DPMA, and ACM versus DPMA evaluators.

2. What are the items with least agreement.

3. What is the average ratings given by each pair of evaluators.

CHAPTER IV

ANALYSIS OF THE DATA

FINDINGS

The results obtained in content validity and interevaluator reliability are given below:

Content Validity

The initial survey instrument consisted of 68 questions (Appendix B, pages 144-154). Each item in the initial survey instrument was critically analyzed by the six experts in the field in the first round of evaluation. The items which duplicated the functions already described by another question were eliminated. Also questions which were not clearly stated were eliminated or reworded. One new question was also added.

The reduced survey instrument in its semi-final version (Appendix B, pages 155-164) containing 48 questions, was evaluated again by the same six member panel, and consensus was reached with the return of the second evaluation. One new question was included after the second evaluation. The final version of the survey instrument is presented in Appendix D, pages 183-192.

Interevaluator Reliability

To facilitate the use of the tables presented in this study, the reader is reminded that the survey instrument had eight categories, as follows: (I) Communication Skills, (II) General Studies, (III) Hardware and Software, (IV) Application Programming, (V) Application Systems Analysis and Design, (VI) Team Approach, (VII) New Technology, and (VIII) Job Levels. The items in the categories are divided as follows:

Category 1	Items 1.1 - 1.4	4 items
Category 2	Items 2.1 - 2.9	9 items
Category 3	Items 3.1 - 3.6	6 items
Category 4	Items 4.1 - 4.10	10 items
Category 5	Items 5.1 - 5.9	9 items
Category 6	Items 6.1 - 6.3	3 items
Category 7	Items 7.1 - 7.5	5 items
Category 8	Items 8.1 - 8.3	3 items

Also, the ACM pair of evaluators were represented as evaluators 1 and 2 in the data, whereas the DPMA pair of evaluators were represented as evaluators 3 and 4.

The raw scores and the supporting tables referenced in the text are presented in appendix C. pages 168-171.

The study of interevaluator reliability is presented by stating the major questions and relating the analysis of the data to the questions.

Question #1

Question #1 asked what is the interevaluator consistency for the pair of ACM evaluators, the pair of DPMA evaluators, and for the ACM evaluators versus the DPMA evaluators.

To answer this question, the following steps were taken in the analysis of the data.

Step I - Discrepancies of ratings were tallied.
Step II - Variance of discrepancies were calculated and tested for significance.
Step III- Agreement among ratings were studied.

Step I - Discrepancies of ratings

Table 4.1 represents the discrepancies between the ACM evaluators 1 and 2.

Positive and negative discrepancies were used in the tables in order to indicate whether there were consistent

TABLE 4.1

DISCREPANCIES BETWEEN ACM EVALUATORS

Discrepancies	ACM CURRICULUM	TOTAL	TOTAL PER CENT
4		0	0.0 %
3		0	0.0 %
2	//	2	4.1 %
1	/////	5	10.2 %
0	///// ///// ///// ///// ///// //	27	55.1 %
-1	///// ///// ///	13	26.5 %
-2	//	2	4.1 %
-3		0	0.0 %
-4		0	0.0 %
		49	

biases in the rating, that is, whether one evaluator over- or under-rates as compared with the other evaluator.

For the practical use of the instrument exact agreement was desirable. But for the purpose of this study the differences of one scale point (on a five points scale rating) on the rating of a single item would be acceptable.

It is indicated by this table, that the ACM evaluators had 92 per cent of the ratings on single items within a limit of one-point discrepancy, and only 8 per cent of rating had more than one-point discrepancy. For the practical use of the tool, exact agreement was desirable, but it was decided that the differences of one scale point on the rating of a single item would be acceptable.

Table 4.1a (Appendix C, page 172) represents the discrepancies between the DPMA evaluators 3 and 4. The DPMA evaluators had 98 per cent of the ratings within acceptable limits, and only 2 per cent of the ratings were unacceptable.

Table 4.1b (Appendix C, pages 173) represents the discrepancies between the ACM evaluators versus the DPMA evaluators. 98 per cent of the ratings fell in the acceptable range. Compared with the ACM evaluators, the DPMA evaluators under-rated 39 per cent of the items and over-rated 61 per cent of the items.

Step 2 - Variance of discrepancies

The variance of discrepancies were calculated for each item for the ACM evaluators, the DPMA evaluators, and the ACM versus DPMA evaluators using the formula:

Where x = discrepancies and n = number of evaluators. The item variances were then added for the different categories and for all categories.

The number of degrees of freedom for each category equaled the number of items rated by each evaluator. If the evaluators agree perfectly on an item, the item

variance is 0. If they disagree by one-step on the five-point scale, then the item variance is 0.5. As one-point difference has been defined as acceptable, so the item variance of 0.5 was acceptable.

Acceptable limits for the summed item variances can be obtained for each category and for the total instrument by multiplying the number of items in a category by 0.5 (Variances of an item on which evaluators disagree by one-point) by the number of items in each category. Thus, the acceptable sum of the item variances for each category and the total instrument are shown in Table 4.2.

Table 4.2a represents the summed variances of the discrepancies between ACM , DPMA and ACM versus DPMA evaluators. Table 4.2b, Table 4.2c, Table 4.2d (appendix C, pages 174-179) represents the summed variances of the discrepancies for ACM, for DPMA, and for ACM versus DPMA evaluators.

TABLE 4.2

ACCEPTABLE LIMITS FOR THE SUMMED VARIANCES

BY CATEGORY AND TOTAL INSTRUMENT

Category	Number of items	Summed Variances
1	4	2.0
2	9	4.5
3	6	3.0
4	10	5.0
5	9	4.5
6	3	1.5
7	5	2.5
8	3	1.5
Total	49	24.5

TABLE 4.2a

SUMMED VARIANCES OF DISCREPANCIES FOR

ACM , DPMA & ACM vs DPMA EVALUATORS

Category	ACM Evaluator	DPMA Evaluator	ACM vs DPMA Evaluators**
1	1.5	0.5	0.500
2	1.0	3.0	1.750
3	3.0	0.5	1.375
4	3.0	1.5	1.625
5	2.5	1.5	2.500
6	0.5	5.5*	0.250
7	4.5*	0.5	1.750
8	1.0	1.0	0.750
Total	17.0	14.0	10.500

* Unacceptable Variance

** Average rating of ACM evaluators 1 and 2 compared with average rating of DPMA evaluators 3 and 4.

Assuming that the summed variances equivalent to a one-point difference on each item, Table 4.2a indicates that the summed variances of the discrepancies between ACM evaluators were acceptable except on category 7 and that of DPMA evaluators were acceptable except on category 6. It also indicates that the variances of discrepancies between the ACM evaluators versus the DPMA evaluators were acceptable for all categories and for the whole instrument

The F-test for significance was used to determine if the ACM evaluators agreed with each other significantly more frequentiy than did the DPMA evaluators.

TABLE 4.3

SUMMED ITEM VARIANCES OF DPMA VERSUS ACM EVALUATORS

Sum of item variance DPMA/ACM	f	df	level of sign* $p < .05$	$p < .025$
14.0/17.0	0.82	49/49	1.69	1.98

* One-tailed test

Table 4.3 showed that the DPMA evaluators were as consistent as the ACM evaluators, at both the $p<.0.05$ and $p<0.025$ levels of significance for the total instrument.

TABLE 4.3a

SUMMED ITEM VARIANCES OF DPMA VERSUS ACM EVALUATORS BY CATEGORIES

Category	Sum of item variance DPMA/ACM	f	df	level of sign* p<.05	level of sign* p<.025
1	0.5/1.5	0.67	4/4	6.39	9.36
2	3.0/1.0	3.00	9/9	3.18	4.03
3	0.5/3.0	0.17	6/6	4.28	5.82
4	1.5/3.0	0.50	10/10	2.98	3.72
5	1.5/2.5	0.60	9/9	3.18	4.03
6	5.5/0.5	11.00**	3/3	9.28	15.44
7	0.5/4.5	0.11	5/5	5.05	7.15
8	1.0/1.0	1.00	3/3	9.28	15.44

* One-tailed test

** DPMA evaluators were not as consistent as ACM evaluators at $p<0.05$.

Table 4.3a indicated that the DPMA evaluators were as consistent as the ACM evaluators at both the $p<0.05$ and $p<0.025$ level of significance for each category of the instrument except on category 6, where ACM evaluators agreed more than the DPMA evaluators at the $p< 0.05$ level of significance.

Step 3 - Analysis of agreement among ratings

The interevaluator consistency for the ACM and DPMA curriculum evaluators is presented below. The interevaluator consistency, defined as exact agreement of evaluators, indicates that all disagreement considered as inconsistent regardless of the difference of disagreement. In other words, no distinction was made between a one-step disagreement (between a rating of 4 and of 5) and a four-step disagreement (a rating of 1 and one of 5).

The exact agreement for each pair of evaluators for each item are presented in table 4.4. If the evaluators (each pair) agreed perfectly, the total possible scores for each category and for the total instrument were as follows:

Category 1	1 x 4	items = 4
Category 2	1 x 9	items = 9
Category 3	1 x 6	items = 6
Category 4	1 x 10	items = 10
Category 5	1 x 9	items = 9
Category 6	1 x 3	items = 3
Category 7	1 x 5	items = 5
Category 8	1 x 3	items = 3

Total scores for the instrument		=49

TABLE 4.4

INTEREVALUATOR CONSISTENCY FOR EACH ASSESSMENT ITEM

i.e NUMBER OF EXACT AGREEMENTS

item	ACM pair 1 & 2	DPMA pair 3 & 4	item	ACM pair 1 & 2	DPMA pair 3 & 4
1.1	1	0	4.7	1	0
1.2	0	1	4.8	1	1
1.3	0	1	4.9	0	1
1.4	0	1	4.10	1	1
2.1	1	1	5.1	0	1
2.2	1	0	5.2	0	0
2.3	1	0	5.3	1	1
2.4	1	0	5.4	0	0
2.5	0	0	5.5	1	1
2.6	0	1	5.6	1	1
2.7	1	0	5.7	0	1
2.8	1	1	5.8	1	0
2.9	1	0	5.9	1	1
3.1	1	1	6.1	1	0
3.2	0	0	6.2	1	0
3.3	1	1	6.3	0	0
3.4	0	1			
3.5	1	1	7.1	1	0
3.6	0	1	7.2	1	1
			7.3	0	1
4.1	0	1	7.4	0	1
4.2	1	1	7.5	0	1
4.3	1	1			
4.4	1	0	8.1	1	0
4.5	1	0	8.2	0	1
4.6	0	1	8.3	0	0

What are the chances of exact agreement between a pair of evaluators on a five-point rating scale? The exact agreement between the two evaluators, using all five points on the scale equally frequently, over long run occurs 20% of the time (and one, two, three, and four-step disagreements each occurring 20% of the time). These can be stated, in other words as, that the probability of agreement is 0.2 and the probability of disagreement is 0.8.

To find out whether or not the actual distribution of rating approximated the chance distribution (20% for each of one of the five rating), the actual distribution of ratings used by the evaluators was tallied.

Table 4.5 presents interevaluator consistency for each pair of evaluators (ACM # 1 & 2) and (DPMA # 3 & 4), summed for each category and for the total of 49 items of the instrument.

The ACM evaluators agreed substantially better than the chance (20%) except on category 1, category 7, and category 8, still equal or better than the chance (20%).

TABLE 4.5

INTEREVALUATOR CONSISTENCY (% AGREEMENT) SUMMED FOR EACH CATEGORY AND FOR THE TOTAL 49 ITEMS ASSESSMENT INSTRUMENT

	ACM pair 1 & 2		DPMA pair 3 & 4	
Category 1	1	25%	3	75%
Category 2	7	78%	3	33%
Category 3	3	50%	5	83%
Category 4	7	70%	7	70%
Category 5	5	56%	6	66%
Category 6	2	67%	0	0%
Category 7	2	40%	4	80%
Category 8	1	33%	1	33%
Total	28	57%	29	59%

The DPMA evaluators agreed substantially better than the chance (20%) except on category 2, category 6, and category 8, still better than the chance (20%),except on scale 6 where it was 0 %.

But the ACM and DPMA evaluators agreed substantially better than the chance (20%) on the whole instrument (57% and 59% respectively).

Question #2

Ouestion # 2 asks what are items with the least agreement?

Table 4.1 indicated that the ACM evaluators had 92 per cent of the rating on single items within a limit of one-point discrepancy, and only 8 per cent of rating had more than one-point discrepancy. In other words, out of 49 items in the survey instrument, only 4 items had more than one-point discrepancy by the ACM evaluators.

The inspection of the raw score table 3.1 (Appendix C, pages 168-169) for disagreement of the ACM evaluators, indicated that the following items need to be inspected for possible ambiguity:

Category 3 - item 3.2

Category 4 - item 4.1

Category 7 - items 7.4, 7.5

Table 4.1a (Appendix C, page 172) also indicated that the DPMA evaluators had 98 per cent of the rating on a single item within a limit of one-point discrepancy, that is, only 2 per cent of the ratings had more than one-point discrepancy. In other words, out of 49 items in the survey instrument, only one item had more than one-point discrepancy by the DPMA evaluators.

Similar inspection of the raw score table 3.2 (Appendix C, pages 170-171) for the disagreement of the DPMA evaluators indicated that only one item needed to be inspected for possible ambiguity, i.e. :

Category 6 - item 6.3

Items with least agreement in rating

The list of items of the survey instrument having least agreement are given below:

Item 3.2 - Explain the principles and uses of common business applications software.

Item 4.1 - Design and code programs in at least one business-oriented, higher-level programming language, preferably COBOL.

Item 6.3 - Participate as a member of a project team in the development of a major business application systems.

Item 7.4 - Explain and illustrate design considerations for developing decision support systems.

Item 7.5 - Utilize a fourth generation language to implement problem-specific decision support systems.

Question # 3

Question # 3 asks what is the average rating given by each pair of evaluators. Table 4.6 represents the average rating for categories 1 to 8 and total scores by each pair of evaluators.

TABLE 4.6

AVERAGE RATINGS BY EACH PAIR OF EVALUATORS

BY CATEGORIES AND TOTAL SCORES

Category	ACM Evaluator	DPMA Evaluator	Instrument Average Score
1	11.5	12.5	12.0
2	26.0	27.0	27.0
3	19.0	14.5	18.0
4	30.0	31.5	30.0
5	28.5	32.5	27.0
6	9.5	11.5	9.0
7	15.5	15.5	15.0
8	12.0	12.0	9.0
Total	152.0	158.5	147.0

Comparing the evaluation of each category of the instrument indicates that ACM evaluators rated the MIS curriculum a little lower than the average for category 1 (communication skills) and category 2 (General Studies). Whereas the DPMA evaluators rated the CIS curriculum a little higher or equal to the average for these two categories.

Category 3 (Hardware and Software) was the only category over-rated by ACM evaluators as compared to the DPMA evaluators. Also the ACM evaluators rated this category above the average and the DPMA evaluators rated lower than the average.

Category 4 (Application Programming), Category 5 (Applications System Analyst and Design), category 6 (Team Approach), and category 7 (New Technology), all were rated equal to or above average by both the ACM and DPMA evaluators. But all these categories were underrated for the MIS curriculum as compared to the CIS curriculum, which clearly indicated that the average of these topics in MIS curriculum was not more than in the CIS curriculum.

Comparison of category 8 (Job Levels) was done on each item of the category. The items in the category 8 are:

1. Application Programmers
2. Programmer / Analyst
3. Systems Analyst

Table 4.6 indicates that the ACM evaluators over-rated item 1 and item 2 and underrated item 3 as compared to the DPMA evaluators. DPMA evaluators rated all items

TABLE 4.7

AVERAGE RATINGS BY EACH PAIR OF EVALUATORS

BY ITEMS IN CATEGORY 8

Item	ACM Evaluator	DPMA Evaluator	Item Average Score
1	5.0	4.5	3.0
2	4.5	4.0	3.0
3	2.5	3.5	3.0
Total	12.0	12.0	9.0

better than average whereas the ACM evaluators rated item 1 and item 2 above average and item 3 below average.

On the total for all items in category 8, both the ACM evaluators and the DPMA evaluators rated the survey instrument equal to or better than the average, but the ACM evaluators rated lower than the DPMA evaluators on the total scores. The ACM evaluators tend to under-rate all categories compared with the DPMA evaluators except on category 3, where the ACM evaluators over-rated as compared to the DPMA evaluators.

Acceptance or rejection of the null hypothesis

The hypothesis was accepted as stated. The analysis of the data showed that the ACM evaluators were as consistent in their evaluation as the DPMA evaluators on the whole instrument. Both the group of ACM evaluators as well as DPMA evaluators, were consistent on each category of the survey instrument.

Summary of the chapter

The development of the survey instrument for the evaluation of the two model degree programs in computer education with business option was presented. Also presented in this chapter was the evaluation of the instrument for the content validity and interevaluator reliability. The analysis of the data was also explained.

It was concluded that there was no difference in the evaluation of the survey instrument between the ACM evaluators and the DPMA evaluators. It was also found that both groups of evaluators, ACM, as well as DPMA, agreed on each category of the instrument except for category 6, where the DPMA evaluators did not agree with each other in their evaluations.

CHAPTER V

SUMMARY, FINDINGS, AND IMPLICATIONS

This chapter consists of three sections. The first section contains a summary of the study as presented in the first four chapters. The second section presents a discussion of the findings of the study and the conclusions that may be drawn from them. The third section discusses the implications for practice and makes suggestions for further study.

SUMMARY OF THE STUDY

The purpose of this study was to develop an instrument for the evaluation of the two model degree programs in computer education with business options. The survey instrument was developed with the help of six experts in the field of Information Systems, three representing the ACM group and the other three representing the DPMA group.

The content validity of the instrument was obtained by the critical analysis of each item of the instrument by these six experts. Two sequential evaluations of the instrument were performed, and a consensus of agreement was reached.

The survey instrument was evaluated by four educators in the field of information systems. Two represented the ACM curriculum and the other two were from the DPMA curriculum.

Data analysis included the following steps:

1. The raw scores of the evaluations were presented in tables.

2. The scores were analyzed by:

    a. Tallying discrepancies between the ACM evaluators, the DPMA evaluators, and the ACM versus DPMA evaluators,

    b. Calculating the variance of rating for the ACM evaluators, the DPMA evaluators, and the ACM versus the DPMA evaluators.

c. The F-test was used to determine the significance of variance.

d. Identifying the items with least agreement.

e. Computing the differences in average ratings for each pair of evaluators by category and total scores.

FINDINGS

The findings of the study were presented, as follows:

Discrepancies of ratings

a. The ACM evaluators had 92 per cent of the ratings within acceptable limits, and only 8 per cent of the ratings were unacceptable.

b. The DPMA evaluators had 98 per cent of the ratings within acceptable limits, and only 2 per cent of the ratings were unacceptable.

c. The ACM versus the DPMA evaluators had 98 per cent of the ratings within acceptable limits, and only 2 per cent of the ratings were unacceptable. The DPMA evaluators under-rated 39 per cent of the items, and over-rated 61 per cent of the items.

Variance of discrepancies

a. The DPMA evaluators were as consistent as the ACM evaluators, at both the $p<0.05$ and $p<0.025$ level of significance for the total instrument.

b. The DPMA evaluators were as consistent as the ACM evaluators at both the $p<0.05$ and $p<0.025$ level of significance for each category of the instrument except on category 6, where the ACM evaluators agreed more than the DPMA evaluators at the $p<0.05$ level of significance.

Analysis of agreement among ratings

a. On category 1, the per cent of exact agreement in evaluation for the ACM evaluators was 25 %, and for the DPMA evaluators was 75%, compared with the chance expectancies of agreement of 25%.

b. On Category 2, the per cent of exact agreement for the ACM evaluators was 78%, and 33% for the DPMA evaluators.

c. On Category 3, the per cent of exact agreement for the ACM evaluators was 50%, and 83% for the DPMA evaluators.

d. On Category 4, the per cent of exact agreement for the ACM evaluators was 70%, and 70% for the DPMA evaluators.

e. On Category 5. the per cent of exact agreement for the ACM evaluators was 56%, and 66% for the DPMA evaluators.

f. On Category 6, the per cent of exact agreement for the ACM evaluators was 67%, and 0% for the DPMA evaluators.

g. On Category 7, the per cent of exact agreement for the ACM evaluators was 40%, and 80% for the DPMA evaluators.

h. On Category 8, the per cent of exact agreement for the ACM evaluators was 33%, and 33% for the DPMA evaluators.

Items with least agreement

a. When evaluated by the ACM evaluators, category 3 had one item with least agreement, category 4 had one, and category 7 had two.

b. When evaluated by the DPMA evaluators, Category 6 had one item with least agreement.

c. The ACM evaluators had more items with less agreement than the DPMA evaluators.

Discussion on Items with Least Agreement in Ratings

The decision on how these items may be improved before the survey instrument can be used in future evaluations are provided below.

Item 3.2 : Explain the principles and uses of common business application software.

The ACM evaluators have a two-point discrepancy in the grading of this question, whereas the DPMA evaluators have a one-point discrepancy. Both the ACM and the DPMA model curriculum have the same amount of coverage of the business applications software in their course outlines. This discrepancy in the grading can be simply a chance. Another evaluation is recommended before any change should be made to this question.

Item 4.1 : Design and code programs in at least one business-oriented, high-level programming language, preferably COBOL.

There is a two-point discrepancy in the grading of this question by the ACM evaluators. The DPMA evaluators have exact agreement, and a grading of 4 on a 5 point scale. The possible reason can be that this question stresses that the programming language should be preferably COBOL, whereas the ACM curriculum is not particular about the COBOL language. The ACM curriculum in a course IS 2 - Program, Data, and File Structures states that, "An advanced programming course using a high-level business data processing language (PL/1 or COBOL)". Thus question 4.1 can be modified by restating as " Design and code programs in at least one business-oriented higher-level programming language, preferably COBOL or PL/1.

Item 6.3 : Participate as a member of a project team in the development of a major business application system.

The DPMA evaluators had only one item, in which the discrepancy was more than one-point, and that being this question. It had a discrepancy of three-points.

The possible reason can be that this question as stated requires the development of a major application

system, whereas the course CIS-7 Applied Software Development Project, of the DPMA curriculum suggests, "realistic systems of moderate complexity". The function of the survey instrument developed in this study, is to evaluate the ACM and the DPMA degree curriculum, which prepares the students for an entry level positions. The development of the major application system is not a function of the entry level job. It is a function of a well experienced systems analyst. Thus this question is not in the range of entry level jobs for the information systems graduates. To modify this question, it can be reworded as "Participate as a member of a project team in the development of a business application systems of moderate complexity.

Item 7.4 : Explain and illustrate design considerations for developing decision support systems.

There is a two-point discrepancy in grading this question by the ACM evaluators, whereas the DPMA evaluators have exact agreement. The possible reason being that the DPMA model curriculum requires three elective courses out of a list of 8 courses. The whole course CIS-10 Decision

support Systems deals with this question. Whereas only 10% of the ACM course IS 3 Information Systems in Organizations, deals with it. Thus a grading of 3 and 1 is possible for this question. In the view of one evaluator a 10 % of a course is enough for the topic of Decision Support Systems, whereas the other evaluator knowing the new trends and demands in the market feels that it is not enough.

Item 7.5 : Utilize a fourth generation language to implement problem-specific decision support systems.

This question also has a discrepancy of a two-point grading by the ACM evaluators, and exact agreement by the DPMA evaluators. This question, like question 7.4 also deals with the topic of Decision Support Systems. Thus the same analysis as that for item 7.4 is true for this item.

There is no possible solution for item 7.4 and item 7.5, unless the new revision of the ACM curriculum has more coverage of this topic, or these two items can be deleted or replaced by other items in the survey instrument.

The analysis of the data showed that the ACM evaluators were as consistent in their evaluations as the DPMA evaluators on the whole instrument. Both the group of evaluators ACM as well as DPMA were also consistent on each category of the survey instrument. Also both, the ACM evaluators and the DPMA evaluators, tended to rate the survey instrument on the whole a little above average.

The informal evaluation of the survey instrument by the same evaluators, of the curriculum used at their institutions, substantiated the findings stated above. (see Tables 4.6a and 4.7a, Appendix C, pages 180-181)

IMPLICATIONS

Implications of the study were :

1. Since there were fewer consistencies among the ACM evaluators in category 1, category 7, and Category 8, and among the DPMA evaluators in category 2, category 6,and category 9, it is suggested that the questions in these categories be revised.

2. The ACM evaluators had a tendency to under-rate.

3. If the instrument is used in its present form, the user cannot have faith in the reliability of the instrument unless the items with the least agreement are refined.

4. The survey instrument developed in this study provided the educational community with an instrument which made systematic assessment of the two different curriculum in information systems a possibility.

5. The survey instrument may also be used by the local area employers to evaluate the curriculum of the colleges and universities from which they hire their employees.

SUGGESTIONS FOR FURTHER STUDY

The suggestions for further study are:

1. The instrument needs further development. The formal and informal tests of efficacy indicates the direction of the refinement.

2. More than one pair of evaluators should be used in the evaluation of the each degree program, and Kendall's degree of concordance for each group should be considered as a means for establishing agreement.

3. Since the field of information systems is changing rapidly, the latest available curriculum should be used for the replication of the study.

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APPENDIX A

CURRENT CURRICULA IN INFORMATION SYSTEMS

Information Systems Curriculum Recommendations for the 80's: Undergraduate and Graduate programs

Information Systems Curriculum Recommendations for the 80'S: Undergraduate and Graduate programs

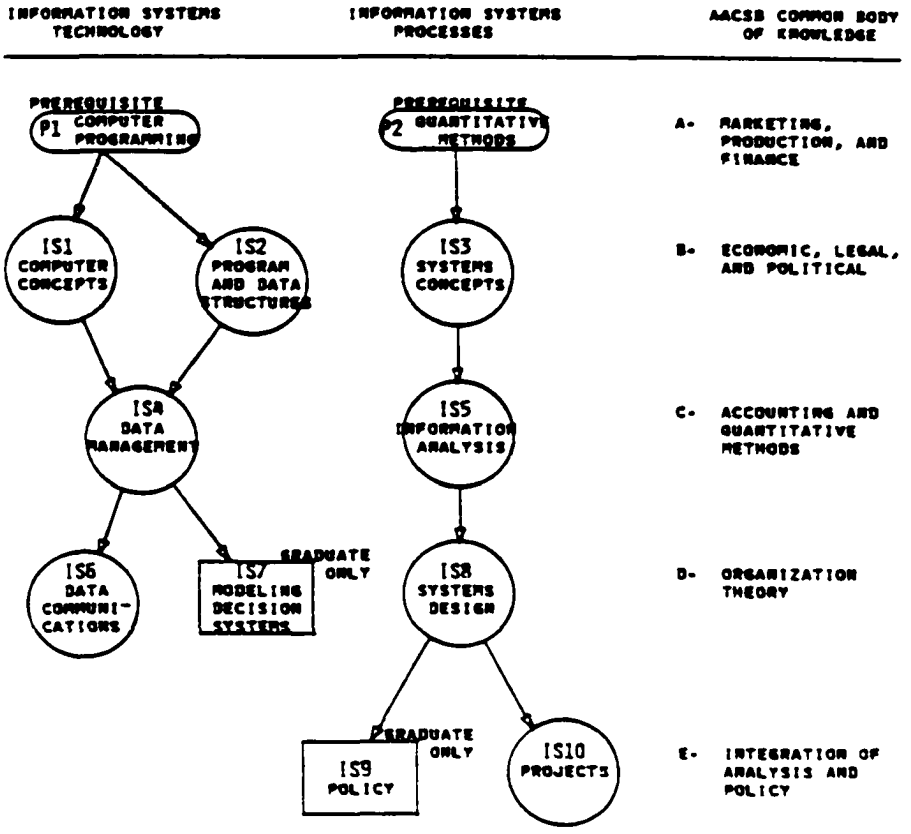
A Report of the ACM Curriculum Committee on Information Systems

Figure 9 provides a visual summary of the ACM curriculum recommendations. The oblong symbol indicates a prerequisite course, the circle indicates a recommended course at the undergraduate or graduate level (not covered in this paper) and the square indicates a recommended course at the graduate level only (also not covered in this paper). The connecting lines indicate course progression and prerequisite structure.

The curriculum is intended to apply to both undergraduate and master's level programs (not related to this paper). The undergraduate program omits IS7 Modeling Decision Systems and IS9 policy. In addition, the courses common to both undergraduate and graduate programs differ in the time spent on each topic and its level of instructions. This paper will deal exclusively with the undergraduate program.

Figure 9

General Structure of Information Systems Curriculum (ACM)



Source: Cotterman (5)

The prerequisite courses in this program are lower division (sophomore year), and the courses satisfying the AACSB common body of knowledge are not specified. The remainder of the courses are intended to be upper division courses. The prerequisite courses are:

P1 Computer Programming

An introductory programming course dealing with algorithm development, programming and computer concepts. Emphasis in the course is on the techniques of algorithm development and programming style. Language Specification is"...a high level algorithmic programming language that is widely used." It is intended that this course will have been preceded by a general prerequisite of elementary computer programming.

P2 Quantitative Methods

This course deals with model formulation and application and a study of mathematical programming algorithms and their computer implementations. Problem areas include allocation problems, scheduling, queueing models and inventory models. This course will have been preceded by general prerequisites in finite mathematics and elementary statistics.

The degree program in information systems has three components:

1. IS technology
2. IS concepts and processes
3. Organization functions and management.

Four courses are recommended in the area of information systems technology:

IS 1 Computer Concepts

This course is an introduction to fundamental concepts and terminology of computer architecture, operating systems, and their interrelationships.

IS 2 Program, Data, and File Structures

An advanced programming course using a high level business data processing language (PL/1 or COBOL). Topics include structured programming concepts, data organization and accessing (45%) and design techniques (15%).

IS 4 Database Management Systems

This course deals with the application, logical structure, and physical implementation of database systems. Topics include data structures,

operating system topics, database management systems, logical data models, internal data models, database management system facilities, database administration, DBMS evaluation, and distributed databases.

IS 6 Data Communication Systems and Networks

An introduction to the concepts and terminology of data communications, network design and distributed information systems. Topics include communication systems components (25%), networks and control (15%), common carrier services (10%), and design of communication networks (10%), and network management and distributed environment (25%).

Four courses are recommended in the area of information systems concepts and processes.

IS 3 Information Systems in Organization

This course introduces fundamental concepts of systems, information, and information systems. More important, it is a foundation course in that it establishes the role of information systems in organizations. Topics include information systems and organizations (30%), representation and an analysis of system structure (20%), systems, information and decision theory (10%) , and information systems applications (35%).

IS 5 Information Analysis

The first course in system analysis and design. The course is directed to information analysis and the logical specification of the system and includes application and development strategies, application system development life cycle, application systems development management, individual behavior and group dynamics in the development process, problem need identification and feasibility assessment.

information requirements determination, and requirements analysis and logical specification (30%).

IS 8 Systems Design Process

The second course in systems analysis and design. Topics include quality assurance review of logical design, the application software make or buy decision, planning to accommodate change, detailed logical design (25%), physical design (25%), hardware and systems software selection, and program development and testing.

IS10 Information Systems Projects

This is a capstan course. The course uses projects to draw together the concepts of the preceding information system development courses.

In the area of organization functions and management, the report simply recommends that an information systems program satisfy the accreditation standards of the American Assembly of Collegiate Schools of Business relative to the coverage of the common body of knowledge.

The AACSB accreditation standards specify that degree programs in business and administration include in their course of instruction the equivalent of at least one year of work comprising the following areas:

a) a background of the concepts, processes, and institutions in marketing and distribution, production, and financing functions of business enterprise;

b) a background of the economic and legal environment of business enterprise along with consideration of the social and political influences on business;

c) a basic understanding of the concepts and methods of accounting, quantitative methods, and information systems;

d) a study of organization theory, interpersonal relationships, control and motivation systems, and communications;

e) a study of administration processes under conditions of uncertainty including integrating analysis and policy determination at the overall management level.

This is the "common body of knowledge."

DPMA Model Curriculum for Information Systems

DPMA Model Curriculum for Information Systems

Prepared by DPMA Education Foundation Committee
on Curriculum Development

Figure 10 provides a visual summary of the DPMA Model Curriculum. The apparent three-dimensional figures represent the required courses. The flat rectangles indicate recommended electives, while the circle indicate necessary business support courses. The connecting lines indicate course progression and prerequisite structure. CIS-1 through CIS-4 are lower division while the remainder of the CIS courses are upper division.

The seven required core courses are:

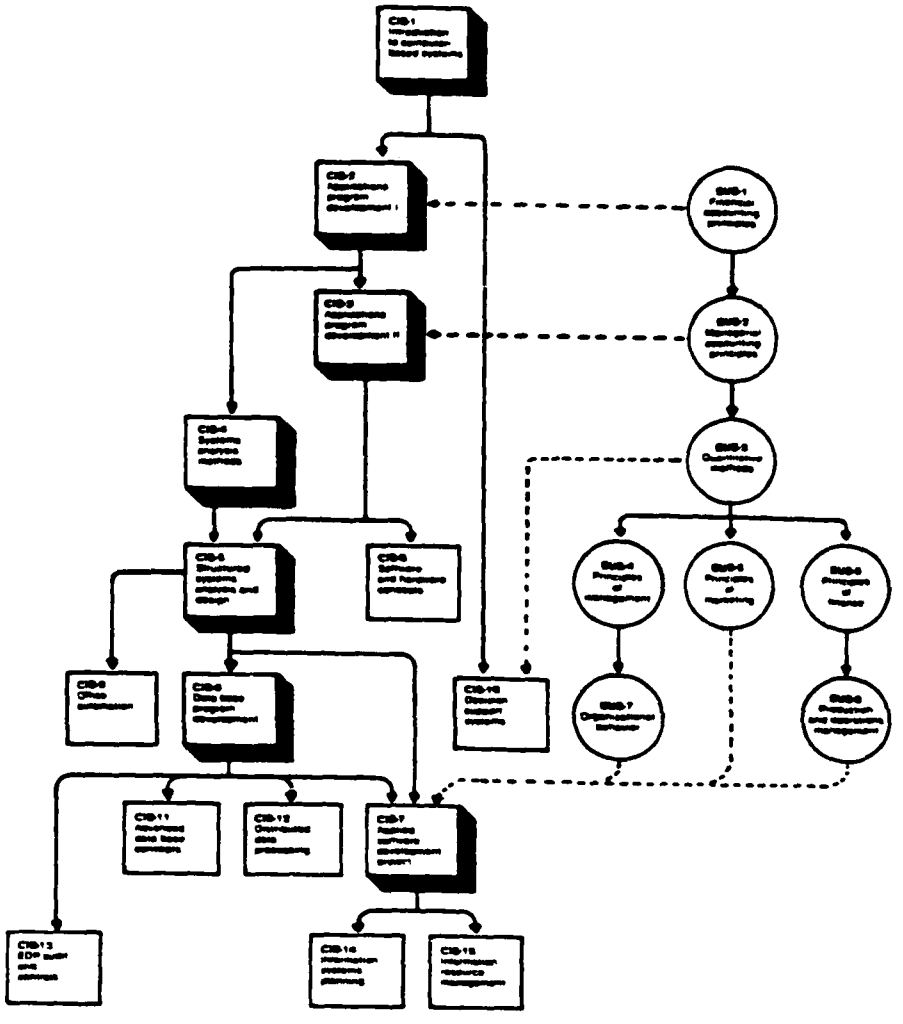
CIS-1 Introduction to Computer-based Systems

This course is what is sometimes called the "computer literacy" course. 50% of the course is

Figure 10

Structure of DPMA Model Curriculum for

Computer Information Systems



Source: Cotterman (15)

devoted to introductory hardware, software, processing and data communications concepts, 10% to the future of computers in society.

CIS-2 Application Program Development I

An introductory programming course using COBOL. Emphasis throughout the course is on business applications and programming techniques relevant to those applications.

CIS-3 Application Program Development II

An advanced programming course with 35% of the course devoted to design concepts. The language is still COBOL.

CIS-4 Systems Analysis Methods

The first course in systems development. Emphasis in the course (60%) is on documentation tools and techniques with the reminder of the course

dealing with an overview of the systems development life cycle, derivation of the logical system and information gathering and reporting.

CIS-5 Structured Systems Analysis and Design

An advanced course in systems development with emphasis on structured techniques. 25% of the course deals with documenting the current physical system and derivation of the current logical system, and 60% deals with modeling the new logical system, derivation of the new physical system, and detailed design.

CIS-6 Database Program Development

An introduction to program development in a data base environment. 45% of the course deals with alternative data models, 20% with file organization, 10% with data structure and 10% with data-base administration .

CIS-7 Applied Software Development Project

This is a capstan course which utilizes the team approach to analyze , design and document "realistic systems of moderate complexity." Project management concepts (20%) and communications (15%) such as interviewing and writing skills are included.

In addition to the seven core courses described above, the model curriculum requires that three courses be chosen from the following set of eight recommended electives courses.

CIS-8 Software and Hardware Concepts

A survey of concepts including computer systems components (10%), main storage organization (10%), instruction sets and data representation (20%), operating systems (20%) and secondary storage (10%). Emphasis is on the relationship of these concepts to applications software.

CIS-9 Office Automation

CIS-10 Decision Support Systems

This course deals with high level information systems which support the management user. The course includes systems and information concepts, systems planning , systems architecture, taxonomy of information systems appropriate for management and a specific consideration of decision support systems(25%).

CIS-11 Advanced Data Base Concepts

A case study based course dealing with data base management systems. Topics include requirements analysis and the design of a data base, data base technology, selection and acquisition of a data base management system and future trends in such systems.

CIS-12 Distributed Data Processing

This course includes coverage of data communications principles (10%), DDP networks (20%), distributed data base structures (10%), and related

hardware and software (10%). 20% of this course is devoted to the case studies.

CIS-13 EDP Audit and Controls

CIS-14 Information Systems Planning

CIS-15 Information Resource Management

This course includes coverage of information systems management (20%), organization and control (10%), information systems development (20%), and stages of computer information systems growth (10%).

Finally, the model curriculum requires the minimum set of business support courses:

BUS-1 Financial Accounting Principles
BUS-2 Managerial Accounting Principles
BUS-3 Quantitative Methods
BUS-4 Principles of Management
BUS-5 Principles of Marketing

BUS-6 Principles of Finance

BUS-7 Organizational Behavior

BUS-8 Production and Operations Management

The report notes that "at schools that are accredited by AACSB, the common body of knowledge in business satisfies these criteria."

APPENDIX B

PANEL OF EXPERTS

NAMES AND ADDRESSES

PANEL OF EXPERTS

Name and Address

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   University of Arizona
   Tucson, AZ 85271

2. Dr. Gordon B. Davis
   School of Management
   University of Minnesota
   Minneapolis, MN 55455

3. Dr. Benjamin Diamant
   IBM Corporation
   360 Hamilton Ave
   White Plains, NY 10601

PANEL OF EXPERTS (Continued)

Name and Address

4. Dr. David R. Adams
Associate Professor, Chairman
Computer Information Systems
Northern Kentucky University
Highland Heights,KY 41076

5. Dr. Donald B. Medley
Professor, Chairman
Computer Information Systems
California State Polytechnic
Pomona, CA 91768

6. Mr. Terry Boyer
Ist National Bank of Cincinnati
Technical Project Manager
Cincinnati, OH 45201

LETTERS TO THE PANEL OF EXPERTS

Panel of experts

Letter # 1

March 8, 1985

Dr. xyz

Dept. of ABC

Univ of xxx

Town Name, State xxxxx

Dear Dr. XYZ

This is to follow up our telephone conversation in which you have consented to be one of the members of a team of six experts, who will develop the survey questionnaire and also help to refine it in the two subsequent revisions.

Enclosed please find (1) The dissertation proposal and (2) ACM / DPMA curriculum guidelines.

Please submit a list of ten questions to be included in the survey questionnaire. The questions format should be so that they can be answered in yes or no or on a scale of 1 to 5. Each question should be directed to. how the

ACM / DPMA model curriculum will help its graduates to be better qualified in obtaining an entry level position in the industry. The entry level positions considered are (1) Training Application Programmer, (2) Programmer analyst, (3) System Analyst, and (4) Information Systems Specialist.

Your participation in this study is greatly appreciated. I am looking forward to receiving reply and the list of ten questions by May 1, 1985.

If you have any question, please feel free to contact me.

Sincerely,

Sudesh M. Duggal

PS: Any suggestions for the development and testing of this instrument will be greatly appreciated.

Panel of Experts

Letter # 2

September 11, 1985

Dr. XYZ

Dept of ABC

Univ of XXX

Town Name, State xxxxx

Dear Dr. XYZ

This is a second letter of the series. First of all let me thank you for your help for submitting questions for the formation of the survey instrument. After minor alternations, these questions have been grouped in eight different categories. A copy of the survey instrument is enclosed.

For the purpose of the instrument validity I need your help again. Please evaluate the instrument questions using the following code: a grade of A if the question is acceptable as stated; a grade of B if the question is not in the universe of the entry level positions; a grade of C if the question is in the universe, however, it is not

logically stated or is not in agreement with other questions. Just put your evaluation grade letter in the space provided by the side of each question.

I am very grateful for your help in this study. A self-addressed stamped-envelope for your reply is enclosed. Please mail the list of questions after evaluation as soon as possible. An early reply will be very much appreciated.

Thanks for your cooperation.

Sincerely

Sudesh M. Duggal

Note: A copy of the first letter is attached for your reference.

Panel of Experts

Letter # 3

January 31, 1986

Dr. XYZ

Dept of ABC

Univ of XXX

Town Name, State xxxxx

Dear Dr. XYZ

This is a third letter of the series. First of all let me thank you for your kind help in the formation of the survey instrument and its evaluation.

Depending on panel's evaluation of the survey instrument, it has been refined using the following criteria:

1. items receiving three or more B's have been eliminated.

2. items receiving all A's and C's have been retained.

3. items receiving one or more C's have been modified.

The refined and reduced survey instrument is enclosed for your final approval. Please go over the semifinal version of the instrument for the final refinement, and grade it the same way as done in the second pass i.e. a grade of A if the question is acceptable as stated; a grade of B if the question is not in the universe of the entry level position; a grade of C if the question is in the universe, however, it is not logically stated or is not in agreement with other questions.

Please fell free to change statements. Your assistance is also requested in terms of comments in proper grouping of these items in different categories.

I am very thankful to you for your help in this study. A self-addressed stamped-envelope for your reply is enclosed. Please mail the survey instrument after refinement as soon as possible. An early reply will be very much appreciated.

Thanks for your cooperation.

Sincerely

Sudesh M. Duggal

Note: A copy of the first and second letter is attached for your reference.

PANEL OF EVALUATORS

NAME AND ADDRESS

PANEL OF EVALUATORS

Name and Address

1. Dr. Eleanor Jordon
   Department of General Business
   University of Texas at Austin
   Austin, TX 78712

2. Dr. Rick Byers
   Department of General Business
   University of Texax at Austin
   Austin, TX 78712

3. Dr. Thomas Ho, Chairman
   Department of Computer Technology
   Purdue University
   W. Lafayette, IN 47907

4. Dr. Lonnie Bently
   Department of Computer Technology
   Purdue University
   W. Lafayette, IN 47907

LETTERS TO EVALUATORS

DPMA Curriculum Evaluator

April 11, 1986

Dr. Lonnie Bently
Dept of Computer Technology
Knoy Hall, Room # 242
Purdue University
W. Lafayette, IN 47907

Dear Dr. Bently

This is to follow up our telephone conversation in which you have consented to be one of the member of a team of 4 evaluators of the instrument comparing the two model degree programs in computer education with business option.

Enclosed please find 1) two copies of the survey instrument, 2) copy of the Information Systems Curriculum Recommendations for the Undergraduate Programs by DPMA, and 3) a self-addressed stamped envelope for the return of the evaluated survey instrument.

The survey instrument consists of 49 questions divided into eight different categories. Each question is

directed to a particular skill, which should be acquired by the graduate of the degree program in Computer Education with Business option.

Please evaluate the first copy of the survey instrument titled "Curriculum as recommended by DPMA", based on your perception of the level of the coverage of the skill in each question as suggested in the Information Systems Curriculum Recommendation for the Undergraduate Programs by DPMA. And the second copy titled "Curriculum as followed at your school", is to be evaluated based on your perception of the level of the coverage of the skill in each question according to the curriculum for undergraduate Computer Information Systems Education program as followed at your school.

Each question of the survey instrument in both the evaluations should be evaluated using the 5 point Likert scale given below:

5 = Excellent coverage of the topic

4 = Above average coverage of the topic

3 = Average coverage of the topic

2 = Below average coverage of the topic

1 = poor coverage of the topic

Thank you very much for your cooperation. Your perceptions are vital to the study. I look forward to receiving your completed survey instrument by May 2, 1986.

If you have any questions , please feel free to contact me.

Sincerely

Sudesh M. Duggal

ACM Curriculum Evaluator

April 11, 1986

Dr. Rick Byars
Dept of General Business
University of Texas at Austin
Austin, TX 78712

Dear Dr. Byars

This is to follow up our telephone conversation in which you have consented to be one of the member of a team of 4 evaluators of the instrument comparing the two model degree programs in computer education with business option.

Enclosed please find 1) two copies of the survey instrument, 2) copy of the Information Systems Curriculum Recommendations for the 80's: Undergraduate Programs by ACM, and 3) a self-addressed stamped envelope for the return of the evaluated survey instrument.

The survey instrument consists of 49 questions divided into eight different categories. Each question is directed to a particular skill. which should be acquired

by the graduate of the degree program in Computer Education with Business option.

Please evaluate the first copy of the survey instrument titled "Curriculum as recommended by ACM", based on your perception of the level of the coverage of the skill in each question as suggested in the Information Systems Curriculum Recommendation for the 8080's: Undergraduate Programs by ACM. And the second copy titled "Curriculum as followed at your school", is to be evaluated based on your perception of the level of the coverage of the skill in each question according to the curriculum for undergraduate Computer Information Systems Education program as followed at your school.

Each question of the survey instrument in both the evaluations should be evaluated using the 5 point Likert scale given below:

5 = Excellent coverage of the topic

4 = Above average coverage of the topic

3 = Average coverage of the topic

2 = Below average coverage of the topic

1 = poor coverage of the topic

Thank you very much for your cooperation. Your perceptions are vital to the study. I look forward to receiving your completed survey instrument by May 2, 1986.

If you have any question, please feel free to contact me.

Sincerely

Sudesh M. Duggal

INITIAL SURVEY INSTRUMENT

INITIAL SURVEY INSTRUMENT

The curriculum in Information Systems prepares students in the following:

Note: 1. (**) at the end of the question indicates that the question was deleted from the final version of the survey instrument.

2. Numbers in parenthesis at the end of each question indicates the question number in the final version of the survey instrument.

I. Communications Skills

-- 1.1 Knowledge of oral communication. (**)

-- 1.2 Knowledge to competently interact with a variety of people, understand their concerns and requirements. (1.1)

-- 1.3 Knowledge to take directions, plan the necessary work, and carry out the assignment. (1.2)

-- 1.4 Knowledge to adequately communicate results and / or concerns to management in a manner that elicits understanding and the necessary agreement and support. (1.3)

-- 1.5 Knowledge to adequately understand the interrelationship of informal requirements and organizational objectives. (1.4)

-- 1.6 Knowledge to adequately understand the dependencies of informal requirements and organizational objectives. (**)

II. General Studies

-- 2.1 Knowledge in finite mathematics (2.1)

-- 2.2 Knowledge in elementary statistics. (2.2)

-- 2.3 Knowledge in quantitative methods. (2.3)

-- 2.4 Knowledge of business functions. (**)

-- 2.5 Knowledge of business organizations. (2.4)

-- 2.6 Knowledge of business management. (2.5)

-- 2.7 Knowledge of the functional area of an organization's operation. (2.6)

-- 2.8 Knowledge of the functional area of an organizational's finance. (2.7)

-- 2.9 Knowledge of the functional area of an organization's marketing. (2.8)

-- 2.10 Knowledge of the functional area of an organization's accounting. (2.9)

-- 2.11 Knowledge of the principles of office automation. (**)

-- 2.12 Knowledge of the concepts of office automation. (**)

III. Hardware and Software

-- 3.1 Knowledge of basic hardware. (3.1)

-- 3.2 Knowledge of basic software. (3.2)

-- 3.3 Knowledge of operating systems. (3.3)

-- 3.4 Knowledge of the relationship between hardware and software. (3.4)

-- 3.5 Knowledge of the development of computer hardware technologies. (3.5)

-- 3.6 Knowledge of basic computer architecture. (3.6)

IV. Programming

-- 4.1 Knowledge of writing programs in at least one business-oriented higher-level language, preferably COBOL. (4.1)

-- 4.2 Knowledge to produce application system specifications. (4.2)

-- 4.3 Knowledge to implement the application system. (4.3)

-- 4.4 Knowledge to produce test data for the application system. (4.4)

-- 4.5 Knowledge to identify the necessary control procedures. (4.5)

-- 4.6 Knowledge to implement the necessary control procedures. (4.5)

-- 4.7 knowledge to develop the specifications for a major information system. (4.6)

-- 4.8 Knowledge to breakdown the specifications into manual or computer-based system. (**)

-- 4.9 Knowledge of machine-level language. (4.7)

-- 4.10 Knowledge of structured programming. (4.9)

-- 4.11 Knowledge of several structured methodologies. (4.10)

V. Systems Analysis and Design

-- 5.1 Knowledge of using structured systems analysis strategies and techniques. (5.1)

-- 5.2 Knowledge of systems development life cycle concepts. (5.2)

-- 5.3 knowledge for understanding and analyzing information systems. (**)

-- 5.4 Knowledge for developing application systems. (**)

-- 5.5 Knowledge to design representative business systems through use of structured systems design tools and techniques. (**)

--5.6 Knowledge of the fundamentals of top down design techniques for solving business problems. (**)

-- 5.7 Knowledge of the structured program design techniques for solving business problems. (5.3)

-- 5.8 Knowledge to apply the tools, techniques, and concepts of classical analysis in application system development. (5.4)

-- 5.9 Knowledge to apply the tools, techniques, and concepts of structured analysis in application system development. (**)

-- 5.10 Knowledge of system design process that includes quality assurance, make or buy, planning to accommodate change, logical design, physical design, and program development. (**)

-- 5.11 Knowledge of the issues surrounding systems planning. (5.5)

-- 5.12 Knowledge of the issues surrounding systems management. (5.6)

-- 5.13 Knowledge of successfully converting application programs specifications into an adequate design that will not unduly stress the computing center equipment. (5.7)

-- 5.14 Knowledge of successfully converting an application program's objectives into adequate system and program specifications considering the reliability factor. (5.8)

-- 5.15 Knowledge of successfully converting an application program's objectives into adequate system and program specifications considering the delectability factor. (5.8)

-- 5.16 Knowledge of successfully converting an application program's objective into adequate system and program specifications considering the security factor. (5.8)

-- 5.17 Knowledge of successfully converting an application program's objectives into adequate system and program specifications considering the disaster recovery factor. (5.9)

VI. Team Approach

-- 6.1 Knowledge of a team approach to application software development. (6.1)

-- 6.2 Knowledge of project management. (6.2)

-- 6.3 To participate as a member of a team in the design of large application. (6.3)

VII. New Technology

-- 7.1 Knowledge of programming within a database environment. (7.1)

-- 7.2 Knowledge of data communication networks components. (7.2)

-- 7.3 Knowledge of data communication technology. (7.2)

-- 7.4 Knowledge of voice communication technology. (7.2)

-- 7.5 Knowledge of distributed data processing concepts. (7.3)

-- 7.6 Knowledge of data structures concepts. (**)

-- 7.7 Knowledge of file structures concepts. (**)

-- 7.8 Knowledge of designing decision support systems. (7.4)

-- 7.9 Knowledge of data modeling concepts. (**)

VIII. Job Levels

-- 8.1 Can be hired as entry level application programmer position. (8.1)

-- 8.2 Can be hired as entry level programmer / analyst position. (8.2)

-- 8.3 Can be hired as entry level system analyst position. (8.3)

-- 8.4 Can be hired as entry level information systems specialist position. (**)

SEMI-FINAL SURVEY INSTRUMENT

SEMI-FINAL SURVEY INSTRUMENT

The curriculum in Information Systems prepares students to be able to:

Note: Numbers in parenthesis at the end of each question indicates the question number in the final version of the survey instrument.

I. Communications Skills

-- 1.1 Competently interact with a variety of management- and operational-level people and to understand their concerns and requirements. (1.1)

-- 1.2 Take directions, plan the necessary work, and carry out the assignment. (1.2)

-- 1.3 Communicate effectively, both orally and in writing, results and / or concerns to management in a manner that elicits understanding and the necessary agreement and support. (1.3)

-- 1.4 Adequately understand the interrelationship of informal job requirements and organizational objectives. (1.4)

II. General Studies

-- 2.1 Understand and apply the principles of finite mathematics (2.1)

-- 2.2 Understand and apply the principles of elementary statistics. (2.2)

-- 2.3 Understand and apply the principles of quantitative methods. (2.3)

-- 2.4 Explain and illustrate the principles and operations of business organizations. (2.4)

-- 2.5 Explain and illustrate the principles and concepts of business management. (2.5)

-- 2.6 Explain and illustrate the principles and concepts of production operation. (2.6)

-- 2.7 Explain and apply the principles and concepts of business finance. (2.7)

-- 2.8 Explain and illustrate the principles and concepts of marketing. (2.8)

-- 2.9 Explain and apply the principles and concepts of financial and managerial accounting. (2.9)

III. Hardware and Software

-- 3.1 Explain the principles and uses of common computer hardware components. (3.1)

-- 3.2 Explain the principles and uses of common business application software. (3.2)

-- 3.3 Explain the principles and uses of computer systems software. (3.3)

-- 3.4 Explain the relationships between computer hardware, systems software,and business applications software. (3.4)

-- 3.5 Trace the development of computer hardware and software technologies. (3.5)

-- 3.6 Describe the fundamentals of computer architectures. (3.6)

IV. Applications Programming

-- 4.1 Design and code programs in at least one business-oriented, higher-level programming language, preferably COBOL. (4.1)

-- 4.2 Produce application system specifications. (4.2)

-- 4.3 Explain and illustrate the implementation of applications systems. (4.3)

-- 4.4 Produce and use test data for application system. (4.4)

-- 4.5 Identify and implement necessary application system control procedures. (4.5)

-- 4.6 Develop programming specifications for a major business information system. (4.6)

-- 4.7 Program in machine-level language. (4.7)

-- 4.8 Program in assembly-level language. (4.8)

-- 4.9 Apply structured programming techniques in the design and coding of business application programs. (4.9)

-- 4.10 Explain and illustrate several different structured methodologies for program development. (4.10)

V. Systems Analysis and Design

-- 5.1 Use structured systems analysis strategies and techniques in the development of a business application systems. (5.1)

-- 5.2 Explain and illustrate a systems development life cycle. (5.2)

-- 5.3 Use structured systems design strategies and techniques in the development of business application systems. (5.3)

-- 5.4 Use classical systems analysis and design strategies and techniques in the development of business application systems. (5.4)

-- 5.5 Explain and illustrate the principles and practices of systems planning. (5.5)

-- 5.6 Explain and illustrate the principles and practices of systems management. (5.6)

-- 5.7 Explain and illustrate the principles and practices of system conversion that will not unduly disturbtive to computer center operations or system users. (5.7)

-- 5.8 Understand the systems development methodologies that lead to business application systems that are reliable, attachable, and secure. (5.8)

-- 5.9 Explain and illustrate disaster recovery procedures. (5.9)

VI. Team Approach

-- 6.1 Explain and illustrate the benefits and problems in applying a team approach to systems development. (6.1)

-- 6.2 Explain and illustrate project management principles and techniques. (6.2)

-- 6.3 Participate as a member of a project team in the development of a major business application system. (6.3)

VII. New Technology

-- 7.1 Program in a database environment. (7.1)

-- 7.2 Use voice and data communication networks. (7.2)

-- 7.3 Explain and illustrate distributed data processing concepts and principles. (7.3)

-- 7.4 Explain and illustrate design considerations for developing decision support systems. (7.4)

VIII. Job Levels

-- 8.1 Successfuly apply for jobs as entry-level application programmers. (8.1)

-- 8.2 Successfuly apply for jobs as entry-level programmer / analyst. (8.2)

-- 8.3 Successfuly apply for jobs as entry-level systems analyst. (8.3)

APPENDIX C

TABLES

TABLE 1.1

FREQUENTLY USED TITLES OF EDUCATIONAL PROGRAMS IN COMPUTING

* Business Data Processing
* Business Information Systems
* Computer Engineering
* Computer Information Science
* Computer Information Systems
Computer Programming
* Computer Science
* Computer Science and Engineering
* Computer Technology
* Data Processing
* Electronic Data Processing
* Information and Computer Science
* Information Processing
* Information Science
* Information Systems
* Information Systems Analysis and Design
* Management Information Systems
* Management Systems
* Systems Analysis
* Systems Engineering
* Systems and Information Sciences
* Systems Sciences

Source: Hamblen (29)

TABLE 1.2

FREQUENTLY USED NAMES OF DEPARTMENTS AND DISCIPLINES OFFERING COMPUTER DEGREES , EXCLUDING THOSE IN THE PREVIOUS LIST

* Business Administration
* Business Commerce
* Computer and Communication Science
* Education
* Electrical Engineering
* Electrical Engineering Technology
* Engineering
* Environmental Sciences
* Industrial Engineering
* Life Science
* Mathematics
* Physical Sciences
* Social Sciences
* Statistics and Computer Science

Source: Hamblen (28)

TABLE 3.1

RAW SCORES OF ACM EVALUATORS

Item	ACM Curriculum Evaluator #1	ACM Curriculum Evaluator #2	School Curriculum Evaluator #1	School Curriculum Evaluator #2
1.1	3	3	3	3
1.2	4	3	5	5
1.3	3	2	4	4
1.4	3	2	4	3
2.1	3	3	3	3
2.2	3	3	3	3
2.3	3	3	3	3
2.4	3	3	3	4
2.5	3	2	3	4
2.6	3	2	3	4
2.7	3	3	3	4
2.8	3	3	3	3
2.9	3	3	3	4
3.1	4	4	3	3
3.2	2	4	4	2
3.3	3	3	4	2
3.4	4	3	4	2
3.5	3	3	4	1
3.6	3	2	3	1
4.1	3	5	5	5
4.2	4	4	4	4
4.3	3	3	4	4
4.4	3	3	4	4
4.5	3	3	4	2
4.6	4	3	5	3
4.7	1	1	1	1
4.8	1	1	1	1
4.9	4	5	5	5
4.10	3	3	3	3

TABLE 3.1 (continued)

RAW SCORES OF ACM EVALUATORS

Item	ACM Curriculum Evaluator #1	ACM Curriculum Evaluator #2	School Curriculum Evaluator #1	School Curriculum Evaluator #2
5.1	4	3	5	4
5.2	3	4	5	4
5.3	4	4	5	4
5.4	2	3	4	2
5.5	3	3	4	3
5.6	3	3	4	2
5.7	4	3	4	2
5.8	4	3	3	3
5.9	2	2	2	1
6.1	3	3	5	5
6.2	3	3	4	4
6.3	3	4	5	3
7.1	4	4	4	5
7.2	4	4	2	1
7.3	4	3	3	1
7.4	3	1	3	1
7.5	3	1	4	5
8.1	5	5	5	5
8.2	4	5	5	4
8.3	3	2	3	3

TABLE 3.2

RAW SCORES OF DPMA EVALUATORS

Item	DPMA Curriculum Evaluator #3	DPMA Curriculum Evaluator #4	School Curriculum Evaluator #3	School Curriculum Evaluator #4
1.1	4	3	4	4
1.2	3	3	4	4
1.3	3	3	4	4
1.4	3	3	3	3
2.1	2	2	2	2
2.2	3	2	3	3
2.3	3	2	2	3
2.4	4	3	3	3
2.5	4	3	3	4
2.6	3	3	3	4
2.7	4	3	3	4
2.8	3	3	3	4
2.9	4	3	4	4
3.1	3	3	3	4
3.2	3	2	3	3
3.3	2	2	2	3
3.4	2	2	2	3
3.5	3	3	2	3
3.6	2	2	2	3
4.1	4	4	4	4
4.2	4	4	4	4
4.3	3	3	2	2
4.4	3	2	2	2
4.5	3	2	2	2
4.6	4	4	4	4
4.7	1	2	1	1
4.8	2	2	2	2
4.9	4	4	4	4
4.10	4	4	3	2

TABLE 3.2 (continued)

RAW SCORES OF DPMA EVALUATORS

Item	DPMA Curriculum Evaluator #3	DPMA Curriculum Evaluator #4	School Curriculum Evaluator #3	School Curriculum Evaluator #4
5.1	4	4	5	5
5.2	5	4	5	5
5.3	4	4	3	3
5.4	4	3	5	5
5.5	4	4	3	3
5.6	4	4	3	4
5.7	3	3	2	2
5.8	3	3	2	3
5.9	3	2	2	3
6.1	4	3	4	4
6.2	4	3	3	3
6.3	5	2	5	5
7.1	4	3	4	5
7.2	3	3	2	2
7.3	3	3	3	3
7.4	3	3	2	2
7.5	3	3	3	3
8.1	5	4	4	5
8.2	4	4	4	5
8.3	4	3	4	5

TABLE 4.1a

DISCREPANCIES BETWEEN DPMA EVALUATORS

Discrepancies	DPMA CURRICULUM	TOTAL	TOTAL PER CENT
4		0	0.0 %
3		0	0.0 %
2			0.0 %
1	/	1	2.1 %
0	///// ///// ///// ///// ///// ////	29	59.1 %
-1	///// ///// ///// ///	18	36.7 %
-2		0	0.0 %
-3	/	1	2.1 %
-4		0	0.0 %
		49	

TABLE 4.1b
DISCREPANCIES BETWEEN ACM VERSUS DPMA EVALUATORS

Discrepancies	ACM vs DPMA CURRICULUM	TOTAL	TOTAL PER CENT
4.0		0	0.0 %
3.5		0	0.0 %
3.0		0	0.0 %
2.5		0	0.0 %
2.0		0	0.0 %
1.5		0	0.0 %
1.0	///// /////	10	20.0 %
0.5	///// ///// ///	13	27.0 %
0.0	///// //	7	14.0 %
-0.5	///// ///// ////	14	29.0 %
-1.0	////	4	8.0 %
-1.5	/	1	2.0 %
-2.0		0	0.0 %
-2.5		0	0.0 %
-3.0		0	0.0 %
-3.5		0	0.0 %
-4.0		0	0.0 %
		49	

* average rating for each item of ACM evaluators versus average rating of DPMA evaluators.

TABLE 4.2b
SUMMED VARIANCES OF DISCREPANCIES FOR ACM EVALUATORS

Item	ACM Curriculum Evaluators 1	2		ACM School Curriculum Evaluators 1	2		Total
1.1	3	3	0.0	3	3	0.0	0.0
1.2	4	3	0.5	5	5	0.0	0.5
1.3	3	2	0.5	4	4	0.0	0.5
1.4	3	2	0.5	4	3	0.5	1.0
			1.5			0.5	2.0
2.1	3	3	0.0	3	3	0.0	0.0
2.2	3	3	0.0	3	3	0.0	0.0
2.3	3	3	0.0	3	3	0.0	0.0
2.4	3	3	0.0	3	4	0.5	0.5
2.5	3	2	0.5	3	4	0.5	1.0
2.6	3	2	0.5	3	4	0.5	1.0
2.7	3	3	0.0	3	4	0.5	0.5
2.8	3	3	0.0	3	3	0.0	0.0
2.9	3	3	0.0	3	4	0.5	0.5
			1.0			2.5	3.5
3.1	4	4	0.0	3	3	0.0	0.0
3.2	2	4	2.0	4	2	2.0	4.0
3.3	3	3	0.0	4	2	2.0	2.0
3.4	4	3	0.5	4	2	2.0	2.5
3.5	3	3	0.0	4	1	4.5	4.5
3.6	3	2	0.5	3	1	2.0	2.5
			3.0			12.5	15.5
4.1	3	5	2.0	5	5	0.0	2.0
4.2	4	4	0.0	4	4	0.0	0.0
4.3	3	3	0.0	4	4	0.0	0.0
4.4	3	3	0.0	4	4	0.0	0.0
4.5	3	3	0.0	4	2	2.0	2.0
4.6	4	3	0.5	5	3	2.0	2.5
4.7	1	1	0.0	1	1	0.0	0.0
4.8	1	1	0.0	1	1	0.0	0.0
4.9	4	5	0.5	5	5	0.0	0.5
4.10	3	3	0.0	3	3	0.0	0.0
			3.0			4.0	7.0

TABLE 4.2b (continued)
SUMMED VARIANCES OF DISCREPANCIES FOR ACM EVALUATORS

Item	ACM Curriculum Evaluators 1	2		ACM School Curriculum Evaluators 1	2		Total
5.1	4	3	0.5	5	4	0.5	1.0
5.2	3	4	0.5	5	4	0.5	1.0
5.3	4	4	0.0	5	4	0.5	0.5
5.4	2	3	0.5	4	2	2.0	2.5
5.5	3	3	0.0	4	3	0.5	0.5
5.6	3	3	0.0	4	2	2.0	2.0
5.7	4	3	0.5	4	2	2.0	2.5
5.8	4	3	0.5	3	3	0.0	0.5
5.9	2	2	0.0	2	1	0.5	0.5
			2.5			8.5	11.5
6.1	3	3	0.0	5	5	0.0	0.0
6.2	3	3	0.0	4	4	0.0	0.0
6.3	3	4	0.5	5	3	2.0	2.5
			0.5			2.0	2.5
7.1	4	4	0.0	4	5	0.5	0.5
7.2	4	4	0.0	2	1	0.5	0.5
7.3	4	3	0.5	3	1	2.0	2.5
7.4	3	1	2.0	3	1	2.0	4.0
7.5	3	1	2.0	4	5	0.5	2.5
			4.5			5.5	10.0
8.1	5	5	0.0	5	5	0.0	0.0
8.2	4	5	0.5	4	5	0.5	1.0
8.3	3	2	0.5	4	3	0.5	1.0
			1.0			1.0	2.0
TOTAL			17.0			36.5	53.5

TABLE 4.2c
SUMMED VARIANCES OF DISCREPANCIES FOR DPMA EVALUATORS

Item	DPMA Curriculum Evaluators			DPMA School Curriculum Evaluators			Total
	3	4		3	4		
1.1	4	3	0.5	4	4	0.0	0.0
1.2	3	3	0.0	4	4	0.0	0.0
1.3	3	3	0.0	4	4	0.0	0.0
1.4	3	3	0.0	3	3	0.0	0.0
			0.5			0.0	0.0
2.1	2	2	0.0	2	2	0.0	0.0
2.2	3	2	0.5	3	3	0.0	0.5
2.3	3	2	0.5	2	3	0.5	1.0
2.4	4	3	0.5	3	3	0.0	0.5
2.5	4	3	0.5	3	4	0.5	1.0
2.6	3	3	0.0	3	4	0.5	0.5
2.7	4	3	0.5	3	4	0.5	1.0
2.8	3	3	0.0	3	4	0.5	0.5
2.9	4	3	0.5	4	4	0.0	0.5
			3.0			2.5	5.5
3.1	3	3	0.0	3	4	0.5	0.5
3.2	3	2	0.5	3	3	0.0	0.5
3.3	2	2	0.0	2	3	0.5	0.5
3.4	2	2	0.0	2	3	0.5	0.5
3.5	3	3	0.0	2	3	0.5	0.5
3.6	2	2	0.0	2	3	0.5	0.5
			0.5			2.5	3.0
4.1	4	4	0.0	4	4	0.0	0.0
4.2	4	4	0.0	4	4	0.0	0.0
4.3	3	3	0.0	2	2	0.0	0.0
4.4	3	2	0.5	2	2	0.0	0.5
4.5	3	2	0.5	2	2	0.0	0.5
4.6	4	4	0.0	4	4	0.0	0.0
4.7	1	2	0.5	1	1	0.0	0.5
4.8	2	2	0.0	2	2	0.0	0.0
4.9	4	4	0.0	4	4	0.0	0.0
4.10	4	4	0.0	3	2	0.5	0.5
			1.5			0.5	2.0

TABLE 4.2c (continued)
SUMMED VARIANCES OF DISCREPANCIES FOR DPMA EVALUATORS

Item	DPMA Curriculum Evaluators 3	4		DPMA School Curriculum Evaluators 3	4		Total
5.1	4	4	0.0	5	5	0.0	0.0
5.2	5	4	0.5	5	5	0.0	0.5
5.3	4	4	0.0	3	3	0.0	0.0
5.4	4	3	0.5	5	5	0.0	0.5
5.5	4	4	0.0	3	3	0.0	0.0
5.6	4	4	0.0	3	4	0.5	0.5
5.7	3	3	0.0	2	2	0.0	0.0
5.8	3	3	0.0	2	3	0.5	0.5
5.9	3	2	0.5	2	3	0.5	1.0
			1.5			1.5	3.0
6.1	4	3	0.5	4	4	0.0	0.5
6.2	4	3	0.5	3	3	0.0	0.5
6.3	5	2	4.5	5	5	0.0	4.5
			5.5			0.0	5.5
7.1	4	3	0.5	4	5	0.5	1.0
7.2	3	3	0.0	2	2	0.0	0.0
7.3	3	3	0.0	3	3	0.0	0.0
7.4	3	3	0.0	2	2	0.0	0.0
7.5	3	3	0.0	3	3	0.0	0.0
			0.5			0.5	1.0
8.1	5	4	0.5	4	5	0.5	1.0
8.2	4	4	0.0	4	5	0.5	0.5
8.3	4	3	0.5	4	5	0.5	0.5
			1.0			1.5	2.5
TOTAL			14.0			9.0	23.0

TABLE 4.2d
SUMMED VARIANCES OF DISCREPANCIES FOR ACM vs DPMA EVALUATORS

Item	ACM Evaluators	DPMA Evaluators	
1.1	3.0	3.5	0.125
1.2	3.5	3.0	0.125
1.3	2.5	3.0	0.125
1.4	2.5	3.0	0.125
			0.500
2.1	3.0	2.0	0.500
2.2	3.0	2.5	0.125
2.3	3.0	2.5	0.125
2.4	3.0	3.5	0.125
2.5	2.5	3.5	0.500
2.6	2.5	3.0	0.125
2.7	3.0	3.5	0.125
2.8	3.0	3.0	0.000
2.9	3.0	3.5	0.125
			1.750
3.1	4.0	3.0	0.500
3.2	3.0	2.5	0.125
3.3	3.0	2.0	0.500
3.4	3.5	2.0	1.125
3.5	3.0	3.0	0.000
3.6	2.5	2.0	0.125
			1.375
4.1	4.0	4.0	0.000
4.2	4.0	4.0	0.000
4.3	3.0	3.0	0.000
4.4	3.0	2.5	0.125
4.5	3.0	2.5	0.125
4.6	3.5	4.0	0.125
4.7	1.0	1.5	0.125
4.8	1.0	2.0	0.500
4.9	4.5	4.0	0.125
4.10	3.0	4.0	0.500
			1.625

TABLE 4.2d (continued)
SUMMED VARIANCES OF DISCREPANCIES FOR ACM vs DPMA EVALUATORS

Item	ACM Evaluators	DPMA Evaluators	
5.1	3.5	4.0	0.125
5.2	3.5	4.5	0.500
5.3	4.0	4.0	0.000
5.4	2.5	3.5	0.500
5.5	3.0	4.0	0.500
5.6	3.0	4.0	0.500
5.7	3.5	3.0	0.125
5.8	3.5	3.0	0.125
5.9	2.0	2.5	0.125
			2.500
6.1	3.0	3.5	0.125
6.2	3.0	3.5	0.125
6.3	3.5	3.5	0.000
			0.250
7.1	4.0	3.5	0.125
7.2	4.0	3.0	0.500
7.3	3.5	3.0	0.125
7.4	2.0	3.0	0.500
7.5	2.0	3.0	0.500
			1.750
8.1	5.0	4.5	0.125
8.2	4.5	4.0	0.125
8.3	2.5	3.5	0.500
			0.750
TOTAL			10.500

TABLE 4.6a

AVERAGE RATINGS BY EACH PAIR OF EVALUATORS
BY CATEGORIES AND TOTAL SCORES
FOR ACM AND DPMA SCHOOLS CURRICULA

Category	ACM Evaluator	DPMA Evaluator	Instrument Average Score
1	15.5	15.0	12.0
2	29.5	28.5	27.0
3	16.5	16.5	18.0
4	34.0	27.5	30.0
5	30.5	31.5	27.0
6	13.0	12.0	9.0
7	14.5	14.5	15.0
8	12.5	13.5	9.0
Total	166.0	159.0	147.0

TABLE 4.7a

AVERAGE RATINGS BY EACH PAIR OF EVALUATORS

BY ITEMS IN CATEGORY 8

FOR ACM AND DPMA SCHOOLS CURRICULA

Item	ACM Evaluator	DPMA Evaluator	Item Average Score
1	4.5	5.0	3.0
2	4.5	4.5	3.0
3	4.5	3.0	3.0
Total	13.5	12.5	9.0

APPENDIX D

SURVEY INSTRUMENT

FOR THE EVALUATION OF THE TWO MODEL DEGREE PROGRAMS

WITH BUSINESS OPTION IN COMPUTER EDUCATION

Table of Contents

I. Communications Skills

II. General Studies

III. Hardware and Software

IV. Application Programming

V. Applications Systems Analysis and Design

VI. Team Approach

VII. New Technology

VIII. Jobs Levels

SURVEY INSTRUMENT

The curriculum in Information Systems prepares students to be able to:

I. Communications Skills

-- 1.1 Competently interact with a variety of management- and operational-level people and to understand their concerns and requirements.

-- 1.2 Take directions, develop an action plan, and carry out the assignment.

-- 1.3 Communicate effectively, both orally and in writing, result and / or concerns to management in a manner that elicits understanding and the necessary agreement and support.

-- 1.4 Adequately understand the interrelationship of informal job requirements and organizational objectives.

II. General Studies

-- 2.1 Understand and apply the principles of finite mathematics.

-- 2.2 Understand and apply the principles of elementary statistics.

-- 2.3 Understand and apply the principles of quantitative methods for business.

-- 2.4 Explain and illustrate the structure, process and theory of business organizations.

-- 2.5 Explain and illustrate the principles and concepts of business management.

-- 2.6 Explain and illustrate the principles and concepts of production operations.

-- 2.7 Explain and apply the principles and concepts of business finance.

-- 2.8 Explain and illustrate the principles and concepts of marketing.

-- 2.9 Explain and apply the principles and concepts of financial and managerial accounting.

III. Hardware and Software

-- 3.1 Explain the principles and uses of common computer hardware components.

-- 3.2 Explain the principles and uses of common business applications software.

-- 3.3 Explain the principles and uses of computer systems software.

-- 3.4 Explain the relationship between computer hardware, systems software, and business application software.

-- 3.5 Trace the development of computer hardware and software technologies.

-- 3.6 Describe the fundamentals of computer architectures.

IV. Application Programming

-- 4.1 Design and code programs in at least one business-oriented, higher-level programming language, preferably COBOL.

-- 4.2 Produce application system specifications.

-- 4.3 Explain and illustrate the implementation of applications systems.

-- 4.4 Produce and use test data for application systems.

-- 4.5 Identify and implement necessary application system control procedures.

-- 4.6 Develop programming specifications for a major business application system.

-- 4.7 Program in machine-level language.

-- 4.8 Program in assembly-level language.

-- 4.9 Apply structured programming techniques in the design and coding of business application programs.

-- 4.10 Explain and illustrate several different structured methodologies for program development.

V.Application Systems Analysis and Design

-- 5.1 Use structured systems analysis strategies and techniques in the development of business application systems.

-- 5.2 Explain and illustrate a systems development life cycle.

-- 5.3 Use structured systems design strategies and techniques in the development of business application systems.

-- 5.4 Use classical systems analysis and design strategies and techniques in the development of business application systems.

-- 5.5 Explain and illustrate the principles and practices of systems planning.

-- 5.6 Explain and illustrate the principles and practices of systems management.

-- 5.7 Explain and illustrate the principles and practices of systems conversion that will not be unduly disturbtive to computer center operations or system users.

-- 5.8 Understand the systems development methodologies that lead to business application systems that are reliable, auditable, and secure.

-- 5.9 Explain and illustrate disaster recovery procedures.

VI. Team Approach

-- 6.1 Explain and illustrate the benefits and problems in applying a team approach to systems development.

-- 6.2 Explain and illustrate project management principles and techniques.

-- 6.3 Participate as a member of a project team in the development of a major business application systems.

VII. New Technology

-- 7.1 Develop a database schema appropriate for a specific environment.

-- 7.2 Design a local area network for a given environment.

-- 7.3 Explain and illustrate distributed data processing concepts and principles.

-- 7.4 Explain and illustrate design considerations for developing decision support systems.

-- 7.5 Utilize a fourth generation language to implement a problem-specific decision support system.

VIII. Job Levels

-- 8.1 Successfully apply for jobs as entry-level application programmers.

-- 8.2 Successfully apply for jobs as entry-level programmer / analyst.

-- 8.3 Successfully apply for jobs as entry-level ystems analysts.

USER'S MANUAL FOR

THE EVALUATION OF THE SURVEY INSTRUMENT

USER'S MANUAL FOR
THE EVALUATION OF THE SURVEY INSTRUMENT

INTRODUCTION

The survey instrument was designed to evaluate the two model degree programs with business options in computer education, namely ACM'S MIS program and DPMA'S CIS program.

ARRANGEMENT OF THE EVALUATION

Before the evaluation of the survey instrument, the evaluator should be familiar with the purpose of the instrument, categories, items to be evaluated, and general instructions.

Purpose

The purpose of the survey instrument is to assess the level of the coverage of the skills described in the instrument, as suggested in the ACM'S MIS curriculum, or in the DPMA'S CIS curriculum, or in the curriculum used at any institution.

Categories in the Survey Instrument

The eight areas to be assessed for any curriculum, are the categories for the survey instrument, and are given below:

I. Communications Skills
II. General Studies
III. Hardware and Software
IV. Application Programming
V. Applications Systems Analysis and Design
VI. Team Approach
VII. New Technology
VIII. Job Levels

Items to be Evaluated

In each category there are few topics to be evaluated in each curriculum. These are listed as items in each category.

GENERAL INSTRUCTIONS

1. Study the user's manual
2. Study the curriculum to be evaluated
3. Evaluate each item of the survey instrument as described below

EVALUATION OF THE SURVEY INSTRUMENT

The survey instrument is to be evaluated based on the evaluators perception of the level of the coverage of the skill in each item as perceived in the curriculum to be evaluated. The number of evaluators used to score the survey instrument should be more than 2. Each question

should be evaluated using the 5 point Likert scale given below:

5 = Excellent coverage of the topic

4 = Above average coverage of the topic

3 = Average coverage of the topic

2 = Below average coverage of the topic

1 = Poor coverage of the topic

ANALYZING THE EVALUATION OF THE SURVEY INSTRUMENT

The average score ratings for all of the evaluators should be calculated by each category. Then the total scores for the whole instrument should be obtained. These results should be put in the form of a table similar to table 4.6. The table thus produced will indicate the amount of coverage of each category skill in the curriculum being evaluated.

The average score rating for all the evaluators by each item in category 8 should also be calculated, similar to the table 4.7. This will help to find the job level preparation in the curriculum being evaluated.