THE RELATIONSHIP BETWEEN THE IMPORTANCE OF SELECTED SYSTEMS ANALYSIS AND DESIGN TOOLS AND JOB FUNCTIONS AS PERCEIVED BY INDUSTRIAL SYSTEMS ANALYSTS AND UNIVERSITY-LEVEL INFORMATION SYSTEMS EDUCATORS

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To my "homeboys". . .thanks for teaching me the greatest lesson of all--how to carry on without getting carried away!

And to my friend and wife Susan. . .I dedicate the rest of my life and work to you, for your love and strength have brought so much of life into focus and reach. . .I love you.

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CHAPTER I

THE RESEARCH PROBLEM

Introduction

"All man's history has been a continuing enlargement of this theme: Meaningful and durable relationships must be uncovered if we are to expand man's knowledge and successfully administer his affairs. The scientific method of investigation, which necessitates such meaningful and durable relationships for its results, is systems analysis in the broadest sense." Fuori (1977)

Man's quest in the discovery of meaningful and durable relationships in the business world has been greatly enhanced by the evolution of the computer. Advances in computer hardware and application software coupled with the demands for cost-effective and responsible computer systems have introduced a new computing era. This new computer era will increase the critical need for synthesis and coordination of various applications and uses of the computer into a coherent operational set. This coherent "set" is often referred to as a system. At the center of this integration effort is the business staff position entitled "Systems Analyst."

Both higher education and industry are faced with the formidable task of training and educating individuals to perform and excel in the area of systems analysis. The difficulty of this task lies in the need to create and maintain a dynamic learning environment. This dynamic learning environment must strike a balance between a qualitative unstructured setting, representative of an organizational climate, and a technically rigid approach, representative of computer operations and applications.

Phenomenal growth and development in information processing has created a situation of growing user dependency. In many business concerns, there is no possibility of reverting to manual procedures. Sanders (1983) reports that the amount of information being stored in computers is soaring. In the United States today, more than 1.7 trillion characters are stored online--a number just about equal to four full-size novels for every person in the country. According to predictions by IBM, by 1985 the amount of electronically stored data is expected to multiply seven times. Golen and Smeltzer (1984) report that 75% of our nation's labor force will be engaged in information occupations. This absolutely stunning pace of past and expected technological development has contributed to the growth of complex computer systems with demanding personnel needs.

Higher education, bound by the lecture approach, finds itself in somewhat of a predicament in the area of information processing. According to Wetherbe (1978), a particularly perplexing problem in providing a meaningful learning experience in systems analysis and design lies in the difficulty of providing an industry or applied orientation. Systems analysis is an applied discipline. The learning experience is compromised when theories and concepts are only discussed and are not applied to industry-oriented problems. There has been a tendency, in academic circles, to ignore the need for exposure to realistic applications. Although exposing students to a totally realistic situation may be impossible in an academic environment, any effort made in that direction should ultimately benefit both students and future employers. Thus, the goal of a systems analysis course should be to teach theories, techniques, and methodologies that can be directly applied to a real life environment. Martin (1976)

Statement of the Problem

The problem of this study was to determine what relationship exists between the importance of (1) selected systems analysis and design tools, techniques, and methods and of (2) six job functions of a systems analyst as perceived by systems analysts and university-level information systems educators.

A related problem of this study was to determine what relationship exists between systems analysts' work environment and systems analysis and design students' classroom environment.

Purpose of the Study

The purpose of this study was to provide information that might lead to a more effective way to conduct a learning environment for the education of systems analysts.

A secondary purpose of the study was to aid in the line of communication between educators in higher education and the professional data processing community. The formidable task of providing an individual with sufficient knowledge concerning systems analysis should be shared by all those concerned. The student, higher education, and industry all have a valuable stake in this effort. The results of this study should help serve the needs of all three in the sense each will be aware of what is required for successful performance in the area of computer systems, both in the classroom and on-the-job.

Need for the Study

The need for professionally trained and educated systems analysts in the field of information processing is rapidly becoming a paramount problem. This problem is not easily traced. No primary source may be identified when attempting to cite a reason concerning a critical shortage of exposure in the systems area. Obsolescence of learning material and aids, the continuing evolution of the computer industry, high cost of realistic education and training, and low educational budget expenditures have contributed to the educational gap between systems analyst positions and business college graduates.

By investigating and evaluating the separate environments of business colleges and industry concerning systems analysis, this study will provide business education with critical insights concerning systems analysis course design, development, and content. Such investigation will assist in the establishment of guidelines for the organization and development of college-level occupational curricula in business education in institutions of higher learning.

Variables

The independent variable of this research study is occupational group membership. Opinion data was gathered from two seperate occupational groups. One occupational group represented university-level information systems faculty and the other occupational group represented industrial systems analysts.

The dependent variable within this research study is the perceived level of importance concerning (1) selected systems analysis and design tools, techniques, and methods, and (2) six possible job functions of the systems analyst. Frequency data concerning the dependent variable, perceived level of importance, was gathered from a mail-questionnaire. Questionnaire respondents used a five point Likert-type rating scale to indicate their perceived level of importance concerning the listed systems tools, techniques, and methods.

The following systems analysis tools, techniques, and methods comprised the list of thirty-five systems analysis and design tools, techniques, and methods to be rated by the two occupational groups--university-level information systems faculty and industrial systems analysts. Each item was rated concerning its individual importance within the field of systems analysis and design.

A. Codes and Coding
B. Forms Design
C. Chart Construction
D. Decision Tables
E. Critical Path Networks
F. Gantt-Type Charts
G. Flowcharts
H. HIPO Charts
I. Technical Writing
J. Information Service Request
K. Feasibility Analysis
L. Candidate Evaluation Matrix
M. Input Design
N. Output Design
O. Printer Spacing Chart
P. File Design
Q. Logical Record Layout
R. Payback Analysis
S. Pert
T. Linear Programming
U. Data Flow Diagrams
V. Data Dictionary
W. Decision Trees
X. Program Walkthrough
Y. Interviewing
Z. Pseudocode

AA. Warnier-Orr Diagrams

BB. Data Base Design

CC. System User-Manual Preparation

DD. Hardware Performance Testing

EE. Software Performance Testing

FF. System Walkthrough

GG. Oral Presentation and Reports

HH. Algorithm

II. Data Element Analysis

Order data were also gathered concerning the dependent variable perceived level of importance. Questionnaire respondents ranked, in order of importance, a list of six possible job functions of a systems analyst. Each listed job function was assigned a different ranking value, with a value range of one through six.

The following six possible job functions of a systems analyst were be ranked in order of importance by the two occupational groups:

1. To analyze systems with problems and to design new or modified systems to solve these problems.

2. To develop manuals to communicate company procedures.

3. To design various business forms used to collect data and distribute information.

4. To perform records management, including the distribution and use of reports.

5. To participate in the evaluation of equipment and to define standards of equipment selection.

6. To interface with data processing to coordinate the development of systmes whenever computer-oriented systems have been selected.

Frequency data were also collected concerning a second independent variable, the degree of simialarity which exists between the two occupational groups' work environments. Questionaire respondents from both occupational groups described aspects about their current work environment. Aspects such as: hardware employed (mainframe and/or microcomputer), the amount of work conducted in a group and/or setting, and the predominant programming language used, were all evaluated in order to determine the degree of simialarity that exists between the two groups work environments.

Hypotheses

The following hypotheses were all tested at the .01 level of significance:

H_1: No significant difference exists between the expressed degree of importance perceived by systems analysts and university-level information systems educators concerning thirty-five systems analysis and design tools, techniques, and methods.

H_2: No significant difference exists between the expressed degree of importance perceived by systems analysts and university-level information systems educators concerning six possible job functions of a systems analyst.

H_3: No significant difference exists between systems analysts' work environments and a systems analysis and design students' classroom environment.

H_4: No significant difference exists between the expressed degree of importance perceived by university-level information systems educators who teach at schools of business with a full-time undergraduate enrollment of 2,000 or less students, and those who teach at schools with more than 2,000 business students concerning 35 systems analysis and design tools, techniques, and methods.

H_5: No significant difference exists between the expressed degree of importance perceived by university-level information systems educators who teach at schools of business who offer an undergraduate degree in information systems and those who do not have such a degree program concerning thirty-five systems analysis and design tools, techniques, and methods.

H_6: No significant difference exists between the expressed degree of importance perceived by systems analysts with educational backgrounds consisting of a either a computer-related degree or a noncomputer-related degree concerning thirty-five selected systems analysis and design tools, techniques, and methods.

H_7: No significant difference exists between the expressed degree of importance perceived by systems analysts who have received formal company training in the area of systems analysis and design and those who have not received such training concerning thirty-five selected systems analysis and design tools, techniques, and methods.

H_8: No significant difference exists between the expressed degree of importance perceived by systems analysts who have less than 3 years of work experience as a systems analysis, 3 to 6 years work experience, and more than 6 years work experience concerning thirty-five selected systems analysis and design tools, techniques, and methods.

H_9: No significant difference exists between the expressed degree of importance perceived by systems analysts who work for a company with a data processing department with 50 or fewer employees and companies with more than 50 data processing employees concerning thirty-five selected systems analysis and design tools, techniques, and methods.

Delimitations of the Study

The study was delimited by the following factors:

1. This study used accredited schools of business within The American Assembly of Collegiate Schools of Business (AACSB) as the source from which the occupational group "university-level educators" sample was drawn. The results of this study were therefore delimited to the degree to which faculty members of the AACSB accredited schools are representative of all university-level information systems faculty who teach an undergraduate course in systems analysis and design.
2. This study was concerned with the first undergraduate university-level systems analysis and design. Respondents from the occupational group university-level educators were restricted to the material covered in the first undergraduate course which covered systems analysis and design.
3. This study did not attempt to evaluate the entire first undergraduate course in systems analysis and design. The study concerned selected aspects of the first undergraduate course in systems analysis and design.
4. This study used the Data Processing Management Association (DPMA) systems analysis and design special interest group as the source from which the occupational group "industrial systems analysts" sample was drawn. The reults of this study were

therefore delimited to the degree to which members of the DPMA special interest group are representative of all industrial systems analysts.

5. This study did not attempt to evaluate all of the possible job functions, duties, and responsibilities of an industrial systems analyst. The study concerned selected aspects of an industrial systems analyst's job.

Limitations of the Study

The study will be limited by the following factors:

1. The ability of respondents to answer the qustionnaire.
2. The degree to which the samples chosen are representative of the population.
3. The degree to which the questionnaire respondents are representative of the population.

Definition of Terms

In support of this study, the following terms have been defined:

The American Assembly of Collegiate Schools of Business (AACSB)--An accrediting agency specifically for baccalaureate and masters degree programs in business administration which is devoted to the promotions and improvement of higher education in business administration and management.

Data Processing Management Association (DPMA)--One of the largest worldwide organizations serving the information processing and computer management community. It comprises all levels of management personnel and, through its educational and publication activities, seeks to encourage high standards of performance in the field of data processing.

Information Systems--The configuration of personnel, equipment, time, resources, and software which is responsible for the conversion of data into information.

System Analysis and Design--entails planning, designing, and applying computer systems to the solution of a business need.

System Analyst--a person in a staff position who is responsible for planning, designing, and applying computer systems to the solution of business needs.

The following independent variables are operationally defined for the purpose of this study:

Systems analyst: operationally defined as a member of the Data Processing Management Association (DPMA) who has an expressed special interest in the area of systems analysis and design.

University-level information systems educator: operationally defined as the faculty member of an American Assembly of Collegiate Schools of Business (AACSB) accredited business school responsible for teaching Systems Analysis and Design course material.

Systems analysis and design tools, techniques, and methods: operationally defined as the instruments and/or approaches employed by a systems analyst.

Systems analysis and design job function: operationally defined as a duty and/or task for which a systems analyst is held accountable for.

Systems analysis and design work environment: operationally defined as the surroundings and/or conditions in which the task of systems analysis and design is conducted.

Systems analysis and design classroom environment: operationally defined as the surroundings and/or conditions in which the study of systems analysis and design is conducted. Conditions to be studied: type of hardware employed (mainframe and/or microcomputer), amount of work conducted in a group and/or project setting, and the predominate computer language employed.

Full-time undergraduate enrollment: operationally defined as the number of undergraduate students enrolled as majors within the school of business.

Undergraduate information systems degree program: operationally defined as a degree program in which a student is required to complete a stated number of course hours in information systems.

Educational backgrounds: operationally defined as the the type of college education received; computer-related or noncomputer-related.

Formal company training: operationally defined as education supplied by a systems analysts' employer and/or company concerning the area of systems analysis and design.

Computer-related work experience: operationally defined as the number of years the respondent has worked within the computer field.

Systems analysis and design work experience: operationally defined as the number of years a respondent has worked as a systems analyst.

Data processing department size: operationally defined as the number of employees who work for a company within the data processing department.

CHAPTER II

REVIEW OF RELATED LITERATURE

This study concerns the role of the Collegiate schools of business in the education and training of computer systems analysts for private sector jobs. An examination of related research and literature was conducted for the following reasons: (1) to evaluate the impact of advanced computer technology concerning the position of Systems Analysts, (2) to construct an accurate description of systems development personnel, and (3) to develop possible considerations for higher education.

Impact of Advanced Computer Technology on Systems Analysis

The impact of data processing upon today's society is of such magnitude that not a single day passes in which people are not directly affected or influenced by the computer. (Boyd and Chase (1981))

Hamblen (1975) stated that predictions clearly indicate that during the next two decades there will be a continuing, if not an increasing need for well-trained systems analysts in the field of information processing.

Nord (1980) stated that the trend toward increased computer usage is projected to continue through future decades. The impact of low-cost computer systems with the pre-transaction figure constantly declining will add further emphasis to the information processing explosion.

Constant, rapid change is a fact of life in the information processing industry, and all those involved in it must maintain an awareness of where that industry is and where it is going. At times, professional survival may depend on a correct assessment of impending changes. Dolotta (1976) stated that data processing has grown to the point where major social, business, and governmental functions are totally dependent upon it. In many cases, there is no possibility of reversion to manual procedures.

Beeler (1981) feels that this absolutely stunning pace of past and expected technological development means that systems personnel face the threat of professional obsolescence unless they constantly renew their knowledge of their chosen field.

Kroenke (1982) defined two movements with the computer industry that have caused application systems development to become less machine and more human-oriented. In the last ten years, the economics of application computer systems has changed dramatically. Computers have become not only cheaper but also more powerful. At the same time, cost of computer-related labor has risen dramatically. These cost changes have significantly altered the relative status of people as servants to computers. Today's systems are designed with machines as servants to people.

Advances in hardware and software technology coupled with the creation of cost effective computer-based systems have resulted in a business product that is in great demand. Crumpler (1982) estimated the value of computers in service to American business will rise to 115.3 billion dollars in the 1980's.

Beaudoin (1976) concerned himself with the effect of advanced computer technology on management. The computer, because of its huge capacity for data recording, data processing, and data generation, has contributed to the need for management to focus its attention on the role of information in organizations. The computer assits in the performance of routine and tedious work, it helps in managing resources such as personnel, funds, and inventories, in compiling statistics and in simulating complex phenomena. It processes and furnishes the manager with a large quantity of data, previously unavailable, allowing him to concentrate on decision-making.

Dolotta (1976) continued Beaudoin's line of thought concerning management activities in light of computer technological advances. Applications are expanding throughout all levels of the typical enterprise, and there is an increasing emphasis upon the integration of many applications into a coherent, "total enterprise" set. Data processing will be more and more directly involved in the decision-making process.

The computer, as a decision-making aid, has reduced the turnaround time concerning a manager's response to a given area of interest. Due to increasingly smaller turnaround times systems have become somewhat complex. Athey (1976) stated that rapid technological advancements in hardware and software, increasing interrelatedness among functional areas requiring more encompassing systems, and increasing educational levels of managers able to use more sophisticated decision-making techniques have all lead to the requirement of increasingly complex, but more adequate information systems.

Systems Personnel in Industry

Abbey (1976) defined a system as an aggregation of objects united by some form of regular interaction or interdependence; a group of diverse units so combined by nature or art as to form an integral whole. The job of uniting diverse units to achieve a predefined goal or purpose is that of a Systems Analyst.

Aukerman (1976) described systems analysis as the profession responsible for effectively applying computers to the solution of business problems. Adams (1977) continued the job description of systems analysts by stating that systems analysts are responsible for devising computer-based solutions to information problems. They confer with persons in functional areas of a business enterprise in order to define and analyze problems in operations. They conduct feasibility studies and suggest solutions to problems. They prepare systems flowcharts of existing and proposed procedures, recommend equipment usage, and design required records or forms.

Kroenke (1982) defined the staff position of systems analysis in a manner which encompasses separate components of a computer-based information system. Systems analysts specify requirements and evaluate alternatives for all five components (hardware, programs, data, procedures, and people) of systems. They also design and implement procedures for human functions concerning the operation of systems. Systems analysts typically work with vendors for the design of hardware specifications and the installation of hardware.

Sayani (1976) stated the qualifications of the systems analyst will be changing quite rapidly. There will be diminishing demand for analysts who can find out the needs of conventional payroll systems or those who can make trite little systems without due consideration for users. The real demand will be for analysts capable of handling large complex systems and smaller systems which demand greater attention to human behavior. One would predict that systems analysts will have to be conversant with the following fields and human factors: systems theory, organizational theory, specific applications, and theory of information systems, and be proficient in at least one of them.

Athey (1976) continued along the lines of Sayani in that the complexities of the systems area are sometimes overcoming. The milieu of the analyst in the world today and even more so in the post-industrial society of the near future will be characterized as one of great complexity. Accelerating demands will be placed on analysts as they try to understand and solve the problems of the various systems which they are associated with. Athey solidifies his stance by referring to research in the fields of Human Information Processing and Cognitive Psychology. Both fields conclude that as the complexity of any system expands, so must the cognitive ability of those people directly responsible for the system. Failure to expand an individual's internal cognitive structure to include understanding of a system's operation and workings may alter results and contribute to system failure.

Sanders (1983) included distinct phases of a systems life-cycle in his definition of system analysis. A systems analyst is an information specialist who is knowledgeable about the technical aspects of analyzing, designing, and implementing computer-based processing systems.

In defining the staff position of the systems analyst, Kroenke (1982) felt it critical to distinguish between a systems analyst and a programmer. Analysts develop requirements specifications, prepare project plans, and design and implement the human side of the system. Programmers work more with technical details of programs and data design. Kroenke continued by dealing with two important issues which may influence systems development careers; the cost of people and the time required to develop systems. Today, one of the biggest DP budget items is people. While the cost of electronic equipment falls, the cost of labor continues to escalate. At the same time, developing systems takes too long. Most major data processing departments are far behind in development schedules; there is usually a long waiting list. Further, between the time a system is envisioned and the time it becomes operational, dramatic changes may occur in the business. The system may be woefully outdated the day it is implemented.

Dance (1976) attempted to provide a working definition for systems analysts; a college graduate, capable of programming in both low and high level languages, having competence for advanced designing and understanding of hierarchical and associative information structures for databases. Yet, Dance continued by pointing out the difficulty of defining a systems analyst's role found in many information processing installations. Dance stated that the systems analyst is an ambiguous position having a generic definition to an extreme. That is, available descriptions are exceedingly general and often include wording which leaves the reader confused as to what such an individual, the analyst, does in a computing environment.

Another factor, cited by Bryant (1976) is the difficulty of recognizing potential productive systems personnel. The recognition of those individuals, from among job applicants and promotion eligibles who will successfully perform in higher level positions as systems analysts or managers, is rapidly becoming one of the most significant problems faced by data processing organizations.

Considerations for Higher Education

Aulgur's 1982 survey of AACSB (American Assembly of Collegiate Schools of Business) members, in which 172 out of 214 possible universities responded, revealed that a majority of those responding allocate zero to twenty percent of an introductory course in information systems to systems analysis and/or management information systems. Thirty-seven percent of the population indicated no in class coverage concerning system analysis and/or management information systems.

Abbey (1976) stated that the need for professionally trained and educated systems analysts in the field of data processing is rapidly becoming a paramount problem. There are few specialized programs at colleges and universities to produce college graduates with the broad range of skills and abilities necessary for dynamically performing the functions of a systems analyst.

Bryant (1976) stated that college curricula are not producing the type of talent that meets the broad range of skills and abilities necessary to be successful as a systems person.

Schulman (1975) saw industry grasping for more and higher quality programmers. The student graduating from a business school has been poorly prepared for integration into the average commercial systems environment, thus creating a difficult gap between classroom activities and application in the business environment.

Another critical area in the systems area, which many in higher education would consider a foundational issue, is that of current and functional textbooks. The authors of any text carry a heavy burden in their effort to design a text so that it is relevant as well as practical. Athey (1976) stated that computer information systems personnel agree that in the design and development of computer-based systems, there is a need to gather much information as it concerns systems requirements, user's preferences and skill levels, interface points, and acceptance testing criteria. Unfortunately, most data processing textbooks have very limited discussion of information gathering methodologies beyond a discussion of how to conduct interviews and develop structure charts. Athey continues his discussion of system textbooks, by stating the need to move beyond the basic accounting applications and encompass more of the information gathering skills of the social sciences.

Vanecek and Guynes (1983) evaluated the effort of higher education in light of future advancements and continued technological upgrades. They state that the business information systems environment is rapidly changing. The proliferation of powerful low-cost processors, which are being configured into either stand-alone systems or modes in a distributed network, is simply having a significant effect upon the responsibility of many Information Systems graduates. Vanecek and Guynes continued in their examination by illustrating the width and breadth of computer information systems curricula. Most undergraduate information systems curricula do have at least one capstone course in system design, the majority of the course work is centered around the syntax of a specific programming language and solving over-simplified, non-integrated problems. For this reason most graduates having only an educational background are ill-equipped to handle the design, development, and implementation of real-world business applications.

Unique problems demand unique solutions, and important problems require careful solutions. Leadership in the classroom is often the sole responsibility of the instructor. Mitchell (1983) focused his research on the area of instruction in the systems area. Mitchell felt the "retaining phenomenon" in computing requires close examination. In the past higher education witnessed faculty transitions into adjacent disciplines when faculty members' interest shifted, or as the disciplines boundaries changed. But today the love of the computer is drawing historians into mathematic departments and chemists into business schools to teach computing. The vast majority of faculty who provide computing education today do not hold computer related degrees.

Yet the day when one could gain an adequate grasp of the field through informal study is past. Therefore, formal education in computing will be a part of any future faculty member's retaining program.

Athey (1982) as Mitchell researched instruction in the computing systems area. Athey stated there is a very great demand by students who want to take information systems courses, the number of qualified people who want to be educators is much less than needed. Higher education is unable to compete with industry where salary is concerned. Why? Lack of funding and resulting salary compression implications within educational institutions.

Athey also developed the issues of the quality of instruction in the systems classroom. The quality of instruction is dropping because the student/teacher ratios are going up significantly and funding is providing for less, if any, student assistant help for grading and lab work. Instructors' education and retooling efforts have fallen behind, and in many cases are really non-existent.

Along with tremendous opportunities in the information systems field, there are a set of very real threats which could negate the advances higher education has made over the past ten years. Athey (1982) cited and stated that the threats of deceased funding, rapid technological change, quantity of instructors, quality of instruction, and teaching mode may overwhelm higher education to the point where universities are just trying to "stay live," rather than think about how to enhance an emerging profession.

Concerning decreased funding, Athey stated that higher education is now at the point where most colleges are having to put limits on computer education program enrollments, reduce course offerings, raise tuition, limit faculty salary increases, and move slowly on computer equipment acquisitions.

Reduced funding has impacted the type of equipment that information systems faculty and students have available for learning use. Technological advances have left many schools with much less than the needed state-of-the-art equipment. Due to a lack of, or non-existent funding, classroom modification efforts have failed. Thus the traditional classroom setting of instructor, blackboard, and chalk continue to be the dominant instructional support for a class in which the subject matter is considered dynamic and hardware/software bound.

In light of the stated threats and issues facing the exchange of information in the formal systems classroom, it is believed that the situation is not a lost one. A unified effort which will illuminate the condition of higher educations situation can result in some very positive gains. Spence, Grout, and Anderson (1981) stated that with additional funding and curricula development, higher education will be able to produce systems personnel which will have an applicable foundational knowledge of computing. The bottom line of the educational effort must lie in the ability of a curriculum to allow for a smooth transition from classroom to a preselected area of application.

Vanecek and Guynes (1983) continued the Spence, Grout, and Anderson (1981) and the Athey studies by conducting critical and in-depth research concerning trends and needs of the systems environment, improvements in classroom equipment, instructors' salaries, and teaching modes that educational efforts would be greatly enhanced. Resulting enhancements would allow for Information Systems programs to place greater emphasis on systems development and provide more realistic integrated programming exercises. Thus upgraded educational programs in Information Systems will allow for a formal educational setting which will more accurately portray the complexities of application systems development.

Summary and Critique

A review of related research in the computer information systems area resulted in the formulation of three consistent concepts. The first concept is that the computer industry must be viewed in the sense that it is only now approaching its infantile stage due to daily technological upgrades in hardware and software. The second common bond which developed in this research concerns itself with the difficulty factor involved in job descriptions and evaluations concerning systems personnel. The final area of notable consideration was the struggle higher education faces in order to present and maintain an applicable learning environment in the information systems area.

Of the numerous variables in the computing industry, the variable concerning change rapidly approaches certainty. And research indicates not only is this phenomenon a concern of modern day professionals in the computer information area, it has been a relevant issue for the past thirty years and will continue to be so.

Granted, the limitations of time and space may soon slow the technological growth and modification of computing hardware. However, the focus of attention has begun to swing to the area of application software. Due to increased competition and advanced technology the cost of hardware has begun and will continue to drop. Thus the resulting buyers market has given rise to a computing era which will attempt to coordinate and correlate various aspects of a concern overall programming needs. The vehicle which will allow industry to cross the bridge into a new generation of computing is that of systems analysis.

A prime illustration of a coordinated effort, managed by a systems analyst, would be the area of database management. The database concepts centers on the recognition of interrelated records and provide for the organization of files in order to facilitate the information flow within an organization. Such efforts, often handled by systems personnel, allow for shortened response times, which in turn, may be critical concerning the financial dealings of the organization.

Rapid technological change in computer hardware and software has resulted in the need for industry to constantly evaluate as well as revise policies and procedures concerning the information services sub-function. This often constant state of modification has created a situation in which the job description and evaluation of the position "Systems Analyst" has become quite ambiguous. The inability to define concrete as well as consistent job functions and duties has left the profession of systems analysis in a very fragmented state. The resulting nonconformity to an industrial standard has prohibited the efforts of those attempting to train and educate qualified systems personnel.

The struggle of higher education was also revealed in research. In times of limited resources and ever threatening cut backs concerning funding, higher education has found itself in somewhat of a predicament. In order to meet faculty and student computing educational needs, an institution is faced with what may be considered a extremely high front-end investment, with what is often followed by never-ending yearly updating needs and costs. The widespread inability of leading universities to make this large outlay of resources and funding has resulted in an educational environment which is often outdated and doomed to the infinite task of playing catch-up.

These and other factors which have culminated from an extensive review of research indicate the critical need for indepth research concerning an evaluation of the role of the business college in the education and training of computer systems analysts for public sector jobs.

CHAPTER III

RESEARCH DESIGN AND PROCEDURES

The following sequence of tasks was performed in order to determine what relationship exists between the expressed degrees of importance perceived by systems analysts and university-level educators concerning a) thirty-five systems analysis and design tools, and b) six possible job functions of a systems analyst. A related problem was to determine what relationship exists between systems analysts' work environments and a systems analysis and design students' classroom environments. The steps undertaken were:

1. General procedures
2. Review of related research and literature
3. Construction of questionnaire
4. Selection of samples
5. Collection of data
6. Analysis and interpretation of data
7. Hypothesis statements
8. Presentation of findings, conclusions, and recommendations

General Procedures

This study was designed to obtain descriptive data concerning AACSB curriculum patterns and trends in the area of Information Systems Analysis and Design, as well as to gather data concerning current job functions and work conditions of the business staff position entitled "systems analysts."

Data were obtained from representatives of accredited schools of business via a mail-questionnaire. The questionnaires, completed by an instructor in the information systems area, were designed to allow respondents to express their perceived degree of importance concerning selected systems analysis and design tools, techniques, and methods.

Data were also obtained from a DPMA Special Interest Group concerned with systems analysis and design. The DPMA questionnaire was designed to allow respondents to indicate their perceived degree of importance concerning selected systems analysis and design tools, techniques, and methods.

The two questionnaires, the AACSB questionnaire and the DPMA questionnaire, were similar in both structure and content. Such construction allowed for statistical interpretation, thus allowing for generalizations to be made concerning the amount of agreement that exists for selected systems analysis tools and job functions between the two samples of this study (AACSB schools of business and DPMA systems analysts).

Review of Related Research and Literature

A review of related research was conducted in order to: a) determine the degree of existing research in this topic area, b) set a foundation for this research effort, and c) place this research in perspective--in light of existing research. The review of research included an examination of the following sources: professional publications, course textbooks, Business Education Index (1980, 1981, 1982), professional journals, and an on-line ERIC search by the Edmon Low Library at Oklahoma State University.

Construction of the Test Instrument

The test instrument employed in this study was a mail-questionnaire. The selection of a mail-questionnaire as a means of collecting the research data was based on the following factors: a) allows for expanded geographic coverage, b) respondents could remain anonymous, c) prejudices and biases of the interviewer would be minimized, d) respondents could complete the questionnaire at a time convenient for them, and e) the questionnaire could be quickly distributed and at a low cost.

Decisions made concerning the questionnaire's content were based on a review of literature, a survey of current university-level systems analysis and design textbooks, suggestions made by OSU information systems faculty members, and suggestions made by the dissertation committee. Structure and format decisions concerning the questionnaire's construction were based on suggestions from OSU faculty members from all of the following groups: the Information Systems area, the College of Business, the Statistics department, the University Computer Center, former OSU doctoral candidates, and a review of literature.

Both the AACSB-questionnaire and the DPMA-questionnaire were noticeably coded with an identification number in the upper, right-hand corner of page one. This identification number served as the key in determining what members within the sample had responded to the questionnaire and which members would receive a follow-up questionnaire.

The AACSB Questionnaire

The first section of the AACSB questionnaire, entitled "The Business Program," was designed to capture demographic data concerning the business department responsible for systems analysis and design instruction.

The second section of the AACSB questionnaire, entitled "Information Systems Analysis and Design Course Description," requested that respondents to describe the course set-up, design, and content of the first undergraduate course in information systems analysis and design. It is within this section that respondents indicated a) if the course in question covers any of the listed thirty-five systems tools and techniques, and b) their perceived degree of importance concerning each of the listed thirty-five systems tools and techniques. The term "class coverage" was defined within this section's instructions as "detailed in-class discussion." The rating of the given systems tools and techniques was based on a Likert-type rating scale from one to five: 1--not important, 2--slightly important, 3--moderately important, 4--very important, and 5--extremely important. The term "important" within this rating scale was defined within the section's instructions as "important in the overall study of systems analysis and design."

AACSB-sample respondents were allowed to indicate not only if a given system tool or technique was covered within their class but if they considered this system tool or technique as important. The logic for such a questionnaire design is based on the fact a respondent may consider an item important--yet may not be able to discuss the item in class due to time or resource constraints; or the respondent may consider an item as not important but is required to cover the item.

This structural consideration is consistent with the purpose of this research effort--to determine what relationship exists between the perceived degree of importance of AACSB systems instructors and DPMA systems analysts concerning selected systems tools and techniques.

The third section of the AACSB questionnaire, entitled "Application," pertained to special tasks and activities that may be included within the study of systems analysis and design. It was the purpose of this section to identify what classroom conditions (individual work/group work, mainframe-system/microcomputer-system, use of computer-related assigned tasks, and use of industry simulations) that are currently being employed in the delivery of systems analysis and design course material. The data gathered within this section allowed for the comparison of the classroom systems environments with the job environments of the DPMA systems analysts sample.

It was within section three of the AACSB questionnaire that respondents were asked to rank the importance of the six listed possible job functions of a systems analyst. The respondents were asked to assign the number 1 to the least important job function and ascend through the number 6 which would represent the most important possible job function. The respondents were only allowed to use a number between 1-6 once, thus causing the respondents to prioritize the six given possible job functions of a systems analyst.

The fourth and final section of the AACSB questionnaire was entitled "Optional" and allowed respondents to identify their name, academic position, and degree held/major field if they so desired. This section also included a given date for the return of questionnaire on and allowed the respondent to indicate where an abstract of the study could be mailed if so desired.

The DPMA Questionnaire

The first section of the DPMA-questionnaire, entitled "The Business Environment," was designed in order to gather demographic data concerning the sample of DPMA systems analysts. Items were included to determine a respondent's company's type, overall personnel size, data processing department personnel count, and how the position of systems analyst is staffed.

The second section of the DPMA-questionnaire, entitled "Systems Analysis Tools and Techniques," requested the respondents to indicate if their work in the field of systems analysis and design includes or makes use of any of the listed thirty-five tools, techniques, or practices. The respondents were then asked to rank each tool, technique, or practice concerning its degree of importance. All respondents ranked the items with a Likert-type scale from one to five: 1--not important, 2--slightly important, 3--moderately important, 4--very important, and 5--extremely important. This section is identical to the second section of the AACSB-questionnaire entitled "Information Systems Analysis and Design Course Description." Both sections of the prospective questionnaires call for the respondents to indicate degree of importance for a selected list of thirty-five separate systems tools and techniques.

The third section of the DPMA-questionnaire, entitled "Application," pertains to the special tasks and activities that may be a part of the respondent's job. It is within this section that data is gathered concerning hardware/software aspects of the respondent's job, type of work environment, and importance of selected tasks. Respondents are asked to indicate the amount of time, in percent, they work within a given work area and/or environment.

It is within section three that DPMA respondents are required to rank (1 through 6) in order of importance six possible job functions of a systems analyst. Respondents were instructed to rank the listed job functions according to their required job duties and functions. Respondents used the number 1 to indicate the least important job function and ascended through the number 6 to represent the most important possible job function. Respondents were only allowed to use a number between 1-6 once, thus causing respondents to prioritize the six given possible job functions of a systems analyst.

The fourth and final section of the DPMA-questionnaire, entitled "Optional," allowed the respondent to indicate their name, company position/job title, number of years work experience in the computer field, number of years work experience as a systems analyst, degree held, and if they received company training in systems analysis and design. Space was also provided at the end of this section for any additional comments and suggestions the respondent may wish to make.

A pilot test was conducted on both versions of the questionnaire. Selected college faculty members and industrial representatives were invited to critique and review the questionnaires. Respondents were asked to comment on the following questions concerning the questionnaire: a) How easy was the form to follow and fill out? b) Were there any ambiguous terms, concepts, and/or questions? c) What length of time is needed to complete the form? d) What other areas would you like to see covered? and e) What areas of the questionnaire are irrelevant and/or redundant?

The AACSB-questionnaire was pilot tested by fifteen information systems faculty members from OSU, San Diego State University, James Madison University, and Emporia State University. Minor structural comments were noted and the following revisions were made to the AACSB questionnaire: a) the enlarging of the possible selection ranges concerning the respondents' school size of enrollment and number of undergraduate student majors, (these questions are found within the first section, entitled "Environment"), and b) the modification of the Likert-type rating scale (used in the second section, entitled "Information Systems Analysis and Design Course Description") allowing the use of the key word "Important" to be included within all five of the possible importance selections concerning the rating of selected tools and techniques.

The DPMA version of the questionnaire was pilot tested by a selected group of twenty experienced systems analysis and design professionals. No revisions were made to the DPMA-questionnaire as a result of any comments made during the pilot study. One revision, however, was made based on the manner in which pilot study respondents answered certain questions. Questionnaire items which required the respondent to select only one, or rate from 1 through 6, were revised with key words within the items' instructions underlined.

Selection of the Sample

The population researched included all people who practice and/or teach in the information systems design and Analysis area. This population includes a group of individuals who are directly responsible for working in and/or research in systems content areas.

The two samples used in this research effort were comprised of responses from the following two subpopulations: AACSB Information Systems faculty and DPMA's special interest group in systems analysis and design.

The 1984-85 AACSB accreditation list currently identifies 227 out of the possible 628 domestic educational institutions as "institutions with undergraduate programs accredited." The AACSB sample of this study will consist of 208 of the 227 institutions with AACSB accredited programs.

The national membership for DPMA numbered over 50,000 members in 1984. Of these 50,000 national members, over 1,400 were members of a special interest group within DPMA concerned with systems analysis and design. The DPMA sample consisted of 495 out of the 1,400 national DPMA members who have an expressed special interest in systems analysis and design.

Collection of the Data

In order to increase the number of returns, both a cover letter and follow-up letter were drafted for both questionnaires. Each letter stressed the following: a) the possibility of improving working conditions which would be a direct benefit to all involved, b) a detailed explanation of the study and what the researcher hoped to accomplish, c) that this research had the support of OSU, d) assure the respondent of confidentiality and anonymity, e) an offer to send the respondent an abstract of the report's findings, and f) a stated return date for the completed questionnaire.

Cover letters were addressed to the Deans of Colleges of Business with a request to the Dean to forward the letter and questionnaire to the appropriate person (the appropriate person was indicated as the college of business faculty member responsible for teaching Systems Analysis). The letters were reproduced on Oklahoma State University stationery and co-signed by Dr. Rick Aukerman, Thesis Adviser. See Appendix C.

Cover letters mailed to DPMA members were mailed to the address listed in the DPMA membership log. These letters were reproduced on Oklahoma State University stationery and co-signed by Dr. Rick Aukerman, Thesis Adviser. See Appendix D.

Follow-up letters were mailed to all non-respondents four weeks after the original mailing. Both mailings were in a package format. Each mailing, the original and follow-up, included a letter of introduction, a questionnaire, and an addressed postage-paid return envelope. See Appendix C and D.

Analysis and Interpretation of Data

Both questionnaires were prearranged in order to facilitate the transfer of responses to computer Scantron sheets. Both groups of questionnaires were tabulated with a Statistical Package for the Social Sciences (SPSS-X). The SPSS-X statistical program package allowed for a Two-Way Chi Square Test for Significance to be conducted on both groups of respondents. The Chi Square Test is a technique for determining the significance of the association between the frequencies of occurrence in two or more groups. Such analysis allowed for an expressed opinion concerning the thrust of this research: Is there any difference in the number of DPMA and AACSB representatives as to their preference for and/or perceived importance of selected content areas in information systems analysis and design? Such a view is called a two-way classification, since two items of information are needed from the respondents in our sample--their occupation and their content preference.

After running the SPSS-X program and conducting the included Chi Square Test, the two resulted in a statistical function X^2 (Chi Square). With the use of statistical Chi Square tables, one is able to make a determination as to the significance of the X^2 value. If the resulting X^2 value proves to be significant, the research may conclude that there is a significant relationship between the degree of importance in selected systems areas and occupational group membership (AACSB or DPMA). Such a result would indicate a lack of agreement concerning the importance of selected areas in Information Systems Analysis and Design between AACSB representatives and DPMA members.

The converse of this observation would be a resulting nonsignificant X^2. Such a result would indicate a high degree of agreement concerning the importance of various selected content areas in Information Analysis and Design between AACSB representatives and DPMA members.

The .01 level of significance was used within this research study.

Hypotheses

As previously stated in Chapter I, the hypotheses, which were tested in the null form, were:

H_1: No significant difference exists between the expressed degree of importance perceived by systems analysts and university-level information systems educators concerning thirty-five systems analysis and design tools, techniques, and methods.

H_2: No significant difference exists between the expressed degree of importance perceived by systems analysts and university-level information systems educators concerning six possible job functions of a systems analyst.

H_3: No significant difference exists between systems analysts' work environments and a systems analysis and design students' classroom environment.

H_4: No significant difference exists between the expressed degree of importance perceived by university-level information systems educators who teach at schools of business with a full-time undergraduate enrollment of 2,000 or less students and those who teach at schools with more than 2,000 business students concerning thirty-five systems analysis and design tools, techniques, and methods.

H_5: No significant difference exists between the expressed degree of importance perceived by college-level data processing educators who teach at schools of business who offer an undergraduate degree in information systems and those who do not have such a degree program concerning thirty-five systems analysis and design tools, techniques, and methods.

H_6: No significant difference exists between the expressed degree of importance perceived by systems analysts with educational backgrounds consisting of a either a computer-related degree or a noncomputer-related degree concerning thirty-five selected systems analysis and design tools, techniques, and methods.

H_7: No significant difference exists between the expressed degree of importance perceived by systems analysts who have received formal company training in the area of systems analysis and design and those who have not received such training concerning thirty-five selected systems analysis and design tools, techniques, and methods.

H_8: No significant difference exists between the expressed degree of importance perceived by systems analysts who have less than 3 years of work experience as a systems analysis, 3 to 6 years work experience, and more than 6 years work experience concerning thirty-five selected systems analysis and design tools, techniques, and methods.

H_9: No significant difference exists between the expressed degree of importance perceived by systems analysts who work for a company with a data processing department with 50 or less employees, companies with and more than 50 data processing employees concerning thirty-five selected systems analysis and design tools, techniques, and methods.

Presentation of Findings, Conclusions, and Recommendations

On the basis of the findings reported in Chapter IV, conclusions and recommendations will be made and included in Chapter V.

CHAPTER IV

ANALYSIS OF DATA

Data, gathered from representatives of the DPMA special interest group in the systems analysis and design area and AACSB members who offer systems analysis and design courses were analyzed to determine each group's perceived degree of importance for a given list of systems analysis and design tools and techniques. Each group, DPMA members and AACSB members, completed different but similar questionnaires.

Both versions of the questionnaire, a DPMA version and an AACSB version, were constructed with three major sections. Data were gathered on both versions of the questionnaire in the three following areas: a) demographics: size and set-up factors for each of the study group's environments, b) systems analysis and design tools and techniques employed, and c) systems analysis and design tasks and activities.

Plan for Analyzing the Gathered Data from the DPMA Questionnaire

Section I of the DPMA study instrument was designed to obtain responses from DPMA members regarding the general organization of their company and information systems department. The items in this section were chosen through review of other research questionnaires concerned with information systems, a review of statistical textbooks concerning demographics, a review of research and related literature, a pilot study sent to systems people in the Oklahoma region, and interviews and consultations with Oklahoma State University and San Diego State University faculty and staff members.

Section II of the DPMA study instrument was planned to obtain responses concerning DPMA members' perceived degree of importance for individual systems tools and techniques. Items for this section were recommended by faculty and staff members in the systems area at both Oklahoma State University and San Diego State University, systems analysts in both Oklahoma and California, and leading systems textbooks on the college level.

The third and final section of the DPMA questionnaire, Section III, was constructed to gather data concerning special tasks and activities (job functions) of the systems analysts. Topics within this section were justified by a review of opinions of selected systems texts, systems analysts, and systems faculty and staff on the college level.

A Statistical Package for the Social Sciences (SPSS-X) program was utilized to tabulate the DPMA study instrument responses. The results from each item were tabulated using frequency of occurrence, cumulative frequency, percentage, and cumulative percentage.

Two-way tables and a chi-square test for significance were used to compare DPMA members' responses in sections two and three with AACSB members' responses in sections two and three of their respective study instruments.

Plan for Analyzing the Gathered Data from the AACSB Questionnaire

Section I of the AACSB study instrument was designed to gather data concerning the individual school's business program. The items in this section were chosen through review of other research questionnaires concerned with AACSB structure, a review of statistical textbooks concerning demographics, a review of research and related literature, a pilot study to systems faculty at Oklahoma State University, San Diego State University, and James Madison University and interviews and consultations with Oklahoma State University and San Diego State University faculty and staff members.

Section II of the AACSB questionnaire was planned to obtain responses concerning the schools' first undergraduate course which covers the area of systems analysis and design. It is within this section that educators indicated their perceived or associated degree of importance concerning the study of given systems tools, techniques, and methods. Items for this section were recommended by faculty and staff members at both Oklahoma State University and San Diego State University, systems analysts in both Oklahoma and California, and leading systems textbooks on the college level.

The third and final section of the AACSB questionnaire pertains to the special tasks and activities that may be included in the study of systems analysis and design. Topics within this section were justified by a review of opinions of given systems texts, systems analysts, and systems faculty and staff on the college level.

A Statistical Package for the Social Sciences (SPSS-X) program was utilized to tabulate the AACSB study instrument responses. The results from each item were tabulated using frequency of occurrence, cumulative frequency, percentage, and cumulative percentage.

Two-way tables and a chi-square test for significance were used to compare AACSB members' responses in sections two and three of the AACSB study instrument with DPMA members' responses in sections two and three of the DPMA study instrument. Such a test for significance allowed for a determination of the degree of relationship that exists between occupational group membership (AACSB and DPMA) and perceived importance of selected systems analysis and design tools, job functions, and work environments.

Analysis of Gathered Data

It should be noted that the number of responses for both occupational groups (AACSB and DPMA members) varies for selected systems tools, techniques, and methods. The reason for this is that both groups of respondents were asked if a) the given item was either included in in-class discussion for AACSB coverage of systems analysis and design or used on the job by DPMA members, and b) the degree of importance of the given tool, technique, or method. Respondents from both groups tended not to rate an item concerning its degree of importance if they indicated it as not being covered in class or used on the job.

The AACSB sample consisted of 208 accredited institutions. Of the 208 AACSB schools of business who were mailed a questionnaire, 98 returned the document. Ninety-eight returns out of a possible 208 represents a 47% return rate.

Table I lists the current full-time undergraduate school of business enrollments of the responding AACSB members. Of the 98

TABLE I

CURRENT FULL-TIME UNDERGRADUATE SCHOOL OF BUSINESS ENROLLMENT OF RESPONDING AACSB MEMBERS
N = 98

Number of Students	Frequency	Percent	Valid Percent*	Cumulative Percent
1-500	4	4.1	4.3	4.3
501-1000	13	13.3	13.8	18.1
1001-1500	13	13.3	13.8	31.9
1501-2000	21	21.4	22.3	54.3
2001-2500	13	13.3	13.8	68.1
over 2500	30	30.6	31.9	100.0
No response	4	4.1	missing	
TOTAL	98	100.0	100.0	

Valid cases: 94 Missing cases: 4

*Valid percent is based on the percent the selected item represents concerning the number of valid cases.

responding schools of business, 52% indicated an undergraduate enrollment of 2,000 students or less. Forty-four percent of the responding schools indicated an undergraduate enrollment of more than 2,000 students.

Sixty-three of the responding 98 AACSB business schools, or 64%, currently offer an undergraduate degree in the information systems area through their schools of business. Table II summarizes the degree program status for all of the 98 responding schools.

Table III contains the analysis of the department within the responding AACSB members' school of business responsible for teaching information processing related courses. Forty-seven percent of the 98 responding schools indicated an "Information Systems" department or operating unit as the department responsible for the teaching of information processing courses. "Management" with 30% and "Accounting" with 10% were the second and third most indicated departments as being held responsible for such courses.

The number of responding AACSB members who offer an undergraduate course which solely pertains to information systems analysis and design is presented in Table IV. Ninety percent, 88 out of the 98 schools responding, offer an undergraduate systems analysis and design course. The 10 schools who do not offer such a course indicated that a "Management of Information Systems" course covered the material on systems analysis and design.

AACSB respondents were asked to indicate the length of time, in weeks, devoted to the classroom coverage of information systems analysis and design. Table V represents the analysis of this question. Sixty-eight percent of the 98 schools responding indicated one semester (where

TABLE II

THE NUMBER OF RESPONDING AACSB MEMBERS WHO OFFER AN UNDERGRADUATE DEGREE IN INFORMATION SYSTEMS THROUGH THEIR SCHOOL OF BUSINESS
N = 98

Degree Offered	Frequency	Percent	Valid Percent	Cumulative Percent
A degree is offered	63	64.3	64.3	64.3
A degree is not offered	35	35.7	35.7	100.0
TOTAL	98	100.0	100.0	

Valid cases: 98 Missing cases: 0

TABLE III

DEPARTMENTS WITHIN RESPONDING AACSB MEMBERS' SCHOOL OF BUSINESS RESPONSIBLE FOR TEACHING INFORMATION PROCESSING RELATED COURSES
N = 98

Department	Frequency	Percent	Valid Percent	Cumulative Percent
Accounting	10	10.2	11.4	11.4
Business education	1	1.0	1.1	12.5
Marketing	2	2.0	2.3	14.8
Management*	29	29.6	33.0	47.7
Information systems**	46	46.9	52.3	100.0
No response	10	10.2	missing	
TOTAL	98	100.0	100.0	
Valid cases:	88	Missing cases:	10	

*Management includes all responses who used the "other" response to indicate "management science" as the responsible department.

**Information systems includes all responses who used the "other" response to indicate "decision science" as the responsible department.

TABLE IV

THE NUMBER OF RESPONDING AACSB MEMBERS WHO OFFER AN UNDERGRADUATE COURSE WHICH SOLELY PERTAINS TO INFORMATION SYSTEMS ANALYSIS AND DESIGN
N = 98

Course Offered	Frequency	Percent	Valid Percent	Cumulative Percent
Systems course is offered	88	89.8	89.8	89.8
Systems course is not offered	10	10.2	10.2	100.0
TOTAL	98	100.0	100.0	

Valid cases: 98 Missing cases: 0

TABLE V

LENGTH OF TIME, IN WEEKS, DEVOTED TO THE CLASSROOM COVERAGE OF INFORMATION SYSTEMS ANALYSIS AND DESIGN BY RESPONDING AACSB MEMBERS
N = 98

Time	Frequency	Percentage	Valid Percent	Cumulative Percent
1 semester (16 weeks)	67	68.4	69.1	69.1
2 semesters (32 weeks)	9	9.2	9.3	78.4
1 quarter (8 weeks)	15	15.3	15.5	93.8
2 quarters (16 weeks)	1	1.0	1.0	94.8
Other (less than 8 weeks)	5	5.1	5.2	100.0
No response	1	1.0	missing	
TOTAL	98	100.0	100.0	

Valid cases: 97 Missing cases: 1

one semester equals approximately 16 weeks) is devoted to the classroom coverage of information systems analysis and design. The second most popular time allotment was 1 quarter (8 weeks) with 15% of the responses.

Table VI analyzes the number of responding AACSB members who offer an advanced or second undergraduate course in information systems analysis and design. Forty percent of the 97 schools who addressed this question indicated they offered a second or advanced systems analysis and design course. The remaining 60%, or 58 schools, indicated that no second or advanced systems analysis and design course was offered.

Of the 495 questionnaires mailed to DPMA members, 183 were returned. These 183 returns out of a possible 495 questionnaires represents a return rate of 37%.

Table VII is an analysis of the percentages of DPMA respondents who work for a given company type. The five most popular company types worked for of the 183 respondents, manufacturing (24% of the responses), insurance (11%), finance (10%), government (9%), and consultant (8%), accounted for 61% of the company types worked for.

DPMA respondents were asked to identify the total number of employees within their company. Table VIII contains the analysis to this question. The DPMA response group consisted of 19 respondents, or 10%, who work for a company with fewer than 100 employees, 10% of the DPMA respondents work for a company with 101-250 employees, with the remaining 80% working with more than 250 employees.

Table IX describes the total number of employees within responding DPMA members' data processing department within the company for which they work. The majority of DPMA respondents, 52%, work for a company

TABLE VI

THE NUMBER OF RESPONDING AACSB MEMBERS WHO OFFER AN ADVANCED OR SECOND UNDERGRADUATE COURSE IN INFORMATION SYSTEMS ANALYSIS AND DESIGN
N = 98

Course Offered	Frequency	Percentage	Valid Percent	Cumulative Percent
Second systems course is offered	39	39.8	40.2	40.2
Second systems course is not offered	58	59.2	59.8	100.0
No response	1	1.0	missing	
TOTAL	98	100.0	100.0	

Valid cases: 97 Missing cases: 1

TABLE VII

PERCENTAGE OF DPMA RESPONDENTS WHO WORK FOR
A GIVEN COMPANY TYPE
(N = 183)

Company Type	Frequency	Percent	Cumulative Percent
Manufacturing	43	23.5	23.5
Insurance	20	10.9	34.4
Finance	19	16.4	44.8
Government	16	8.7	53.5
Consultant	14	7.7	61.2
Utility	13	7.1	68.3
Retail	10	5.5	73.8
Medicine	8	4.3	78.1
Business service	6	3.3	81.4
Education	6	3.3	84.7
Transportation	6	3.3	88.0
Communications	4	2.2	90.2
Petroleum	4	2.2	92.4
Wholesale	3	1.6	94.0
Mining	2	1.1	95.1
Other	9	4.9	100.0
TOTAL	183	100.0	

TABLE VIII

TOTAL NUMBER OF EMPLOYEES WITHIN RESPONDING
DPMA MEMBERS' PLACE OF EMPLOYMENT
(N = 183)

Number of Employees	Frequency	Percent	Percent	Cumulative Percent
1-50	12	6.6	6.7	6.7
51-100	7	3.8	3.9	10.6
101-150	6	3.3	3.3	13.9
151-200	6	3.3	3.3	17.2
201-250	7	3.8	3.9	21.1
Over 250	142	77.6	78.9	100.0
No response	3	1.6	missing	
TOTAL	183	100.0	100.0	

Valid cases: 182 Missing cases: 1

TABLE IX

TOTAL NUMBER OF EMPLOYEES WITHIN RESPONDING DPMA MEMBERS' DATA PROCESSING DEPARTMENT (N = 183)

Number of Employees	Frequency	Percent	Percent	Cumulative Percent
1-50	95	51.9	52.5	52.5
51-100	32	17.5	17.7	70.2
101-150	17	9.3	9.4	79.6
151-200	11	6.0	6.1	85.6
201-250	8	4.4	4.4	90.1
Over 250	18	9.8	9.9	100.0
No response	2	1.1	missing	
TOTAL	183	100.0	100.0	

Valid cases: 181 Missing cases: 2

with a data processing department with 1-50 employees. Twenty-seven percent indicated a data processing staff of 51-150 employees and 20% of the DPMA respondents work for a company with a data processing staff of more than 150 employees.

DPMA members were asked if their company had a staff position entitled "Systems Analyst." Table X is a summary of this question. Ninety-seven percent, or 178 of the 183 respondents, work for a company which has a staff position entitled "Systems Analyst." Of the 5 respondents who indicated no such company position, 2 indicated their company employed a service bureau to conduct their systems analysis and design work, 2 cited the vendor as the supplier of systems advice, and 1 respondent stated an outside consultant was used as the company's systems analyst.

Table XI contains the analysis of the amount, in years, of work experience in the computer field held by responding DPMA members. Eleven percent of the 183 DPMA respondents indicated from 0 to 6 years of computer related work experience, with the 77% indicating over 6 years of work experience in the computer area.

The DPMA respondents were also asked to identify the amount, in years, of work experience in the systems analysis and design area. Table XII presents the analysis to this question. Eighteen percent indicated they had up to 2.9 years experience in the systems area, 26% cited from 3-5.9 years of experience, and 43% of the DPMA respondents indicated 6 or more years of system analysis and design work experience.

A summary of the highest educational degree held by responding DPMA members is presented in Table XIII. Fifteen percent of the 145 DPMA members who responded to this question have received a Ph.D. or masters,

TABLE X

THE NUMBER OF RESPONDING DPMA MEMBERS WHO WORK FOR A COMPANY WITH AN IN-HOUSE POSITION OF SYSTEMS ANALYST (N = 183)

In-House Systems Analyst	Frequency	Percent	Valid Percent	Cumulative Percent
Companies which have in-house systems analyst position	178	97.3	97.3	97.3
Companies which do not have in-house systems analyst position	5	2.7	2.7	100.0
TOTAL	183	100.0	100.0	

Valid cases: 183 Missing cases: 0

TABLE XI

THE AMOUNT, IN YEARS, OF WORK EXPERIENCE
IN THE COMPUTER FIELD HELD BY
RESPONDING DPMA MEMBERS
(N = 183)

Work Experience (in years)	Frequency	Percentage	Valid Percent	Cumulative Percent
0-2.9	4	2.2	2.5	2.5
3.0-5.9	17	9.3	10.5	13.0
Over 6.0	140	76.5	87.0	100.0
No response	22	12.0	missing	
TOTAL	183	100.0	100.0	

Valid cases: 161 Missing cases: 22

TABLE XII

THE AMOUNT, IN YEARS, OF WORK EXPERIENCE
IN THE SYSTEMS ANALYSIS AND DESIGN AREA
HELD BY RESPONDING DPMA MEMBERS
(N = 183)

Work Experience (in years)	Frequency	Percentage	Valid Percent	Cumulative Percent
0-2.9	33	18.0	20.8	20.8
3.0-5.9	48	26.2	30.2	50.9
Over 6.0	78	42.6	49.1	100.0
No response	24	13.1	missing	
TOTAL	183	100.0	100.0	

Valid cases: 159 Missing cases: 24

TABLE XIII

HIGHEST EDUCATIONAL DEGREE HELD BY
RESPONDING DPMA MEMBERS
(N = 183)

Degree	Frequency	Percentage	Valid Percent	Cumulative Percent
Ph.D.	2	1.1	1.4	1.4
Masters	25	13.7	17.2	18.6
Bachelors	77	42.1	53.1	71.7
Associate	27	14.8	18.6	90.3
High school	14	7.7	9.7	100.0
No response	38	20.8	missing	
TOTAL	183	100.0	100.0	

Valid cases: 145 Missing cases: 38

42% have a bachelors degree, 15% an associate degree, and 8% of the responding DPMA members indicated a high school diploma as their highest educational degree held.

DPMA respondents were also asked to identify if they had or had not received formal company training in systems analysis and design. The analysis of this question is found in Table XIV. Of the responding DPMA members, 54% indicated they had received company training, and 34% indicated they had received no company training in systems analysis and design.

Hypothesis Number 1

No significant difference exists between the expressed degree of importance perceived by systems analysts and university-level information systems educators concerning thirty-five systems analysis and design tools, techniques, and methods.

Hypothesis number one is rejected at the .01 level of significance for the following systems analysis and design tools, techniques, and methods: codes and coding, Gantt-type charts, flowcharts, HIPO charts, information service request, printer spacing charts, logical report layout, data flow diagrams, decision trees, and system user-manual preparation. The numerical breakdown of each response group's ratings for these tools is found in Appendix E, Table XV.

Seventy-four percent of the 86 AACSB respondents rated codes and coding as a moderately to not important systems tool on a scale of importance, with the value 1 representing "not" important and the value 5 representing "extremely" important. This is in direct contrast to 67% of 165 responding DPMA members who rated codes and coding as either a 4

TABLE XIV

PERCENTAGE BREAKDOWN OF DPMA RESPONDENTS WHO DID OR DID NOT RECEIVE COMPANY TRAINING IN SYSTEMS ANALYSIS AND DESIGN
(N = 183)

Systems analysis and design company training	Frequency	Percentage	Valid Percent	Cumulative Percent
Did receive company training	98	53.6	61.2	61.2
Did not receive company training	62	33.9	38.7	100.0
No response	23	12.6	missing	
TOTAL	183	100.0	100.0	

Valid cases: 160 Missing cases: 23

or 5, indicating that this is a very to extremely important systems tool. This difference resulted in a chi-square value of 45.42, which is significant at the .01 level.

A significant difference in degree of importance concerning the systems tool Gantt-type charts was revealed. Sixty-two percent of the responding 82 AACSB members rated Gantt-type charts as moderately or slightly important while 68% of the 139 DPMA respondents rated the charts as moderately to very important.

The systems tool flowcharting was rated as an extremely important (a value of 5) systems tool by 46% of the 90 responding AACSB schools. However, 80% of the 166 DPMA respondents rated flowcharting as a 4 or less indicating a somewhat lower degree of importance than the AACSB group.

HIPO charts were rated as very or extremely important (a value of 4 or 5) by 49% of 90 AACSB respondents. This system tool received a considerably lower ranking from the DPMA respondents with 75% of the members rating HIPO charts as moderate, slightly, or low in importance (a value of 3 or less).

Sixty-two percent of the 77 AACSB respondents rated the systems tool information services request as a 3 or less, indicating a low degree of importance. Of the 163 responding DPMA members, 72% rated information services requests as very or extremely important.

The systems tool printer spacing charts received a low importance rating with 56% of the 73 responding AACSB schools rating it as slightly to not important. A reverse trend was established within the DPMA response group with 82% of the 158 respondents rating printer spacing charts as moderately, very, or extremely important.

A majority of the AACSB respondents, 57% of 82 respondents, rated the systems tool logical record layout as slightly or not important. DPMA responses tended to be in the higher end of the importance scale with 62% of the 149 respondents ranking this tool as very or extremely important.

Data flow diagrams were noted as very or extremely important by 66% of the 92 responding AACSB members. Fifty-eight percent of the 85 responding DPMA contradict the AACSB rating by indicating a slight to no degree of importance for the systems tool data flow diagrams.

Of the 85 responding AACSB members, 69% rated decision trees as a 3, 4, or 5 indicating a somewhat high degree of importance. DPMA ratings clustered around the lower portion of the importance scale with 53% of the 85 responding DPMA members rating decision trees as slightly or not important.

A polarized view of the system tool system user-manual preparation resulted from the analysis. Fifty-seven percent of the 85 responding AACSB schools of business gave this tool a moderate to not important rating while of the 170 DPMA respondents, 75% rating system user-manual preparation as very or extremely important.

Hypothesis Number 2

No significant difference exists between the expressed degree of importance perceived by systems analysts and university-level information systems educators concerning six possible job functions of a systems analyst.

Hypothesis number two is rejected at the .01 level of significance for the following job functions of a systems analyst:

a. To develop manuals to communicate company procedures, and

b. To participate in the evaluation of equipment and to define standards of equipment selection.

The numerical breakdown for each response group's ranking for these two job functions is found in Appendix E, Table XVI.

On a six point Likert-type scale of importance, with the value 1 representing the least important job function and the value 6 representing the most important job function, 73% of the 81 AACSB respondents rated the job function of developing company manuals as a 3 or less identifying it as a somewhat unimportant job function. In contrast was the DPMA rating in which 48% of the 178 respondents ranked the development of company manuals as an important job function (a rating of 4 or higher).

Concerning the systems job function of equipment evaluation and selection, a majority of the AACSB respondents, 73% of the 81 responses, rated this job function as a 4, 5, or 6 indicating it was an important job function of a systems analyst. Sixty-eight percent of 178 DPMA members responding gave the systems job function of equipment evaluation and selection a low importance rating, with a score of 3, 2, or 1.

Hypothesis Number 3

No significant difference exists between systems analysts' work environments and a systems analysis and design student's classroom environments.

Work environment has been operationally defined as the surroundings and/or conditions in which the task of systems analysis and design is conducted. Conditions to be analyzed within this study: type of hardware employed (mainframe and/or microcomputer), amount of work conducted in a group or project-team setting, and the predominant computer language employed.

Hypothesis number 3 is rejected at the .01 level of significance for all four conditions of the systems analysis work environment. The numerical breakdown for each response group concerning the four work environment conditions is found in Appendix E, Table XVII.

Of the 97 responding AACSB members, 69% indicated that their systems analysis and design students have access to and use a mainframe computer system located at a central site on campus. Ninety-eight percent of the 176 DPMA members indicated the employment of a mainframe computer. A majority of the AACSB schools responding, 77% of 47 respondents, indicated that microcomputers were employed or required for assigned course work in systems analysis and design. Yet in spite of this large percent of users of microcomputers, 77%, the remaining 23% of nonusers is in direct contrast to the 9% of nonusers of microcomputers in the DPMA responses. Ninety-one percent of the 176 DPMA respondents indicated the employment of a microcomputer.

Seventy-five percent of 81 responding AACSB members indicated that 20% or more of their class work in the systems analysis and design area is conducted in a group or project-team environment. In direct contrast, 45% of the 176 DPMA members indicated they spent less than 20% of their time working within a project-team.

Concerning the predominantly employed programming language within the class systems analysis and design, 68% of the responding 60 AACSB members indicated COBOL as the predominant language and 27% selected the language BASIC. Of the 145 DPMA respondents, 83% indicated COBOL was the predominant language used on the job and 3% selected BASIC as the predominant language.

Hypothesis Number 4

No significant difference exists between the expressed degree of importance perceived by university-level information systems educators who teach at schools of business with a full-time undergraduate enrollment of 2,000 or less students and those schools of business with more than 2,000 students enrolled concerning thirty-five systems analysis and design tools, techniques, and methods.

Hypothesis number 4 is rejected at the .01 level of significance for the following systems analysis and design tools: file design, PERT, and system walkthrough. The numerical breakdown for these three systems tools is found in Appendix E, Table XVIII.

Of the 45 AACSB schools responding with an enrollment of 2,000 or less, 73% rated the systems tool file design as a 4 or less on a 5 point Likert-type importance scale (with the value 5 representing an extremely important systems tool and 1 representing a "not important" systems tool). Sixty-five percent of the 37 responding AACSB schools with more than 2,000 rating the systems tool PERT, rated it as moderately, very, or extremely important (a score of 3 or more).

Fifty-eight percent of 48 AACSB schools with an enrollment of 2,000 or less rated the systems tool system walkthrough as a 3 or less, indicating a low degree of importance as a systems tool. Of the 38 AACSB schools who rated the systems tool systems walkthrough, 71% rated this tool as either very or extremely important (a score of 4 or 5).

Hypothesis Number 5

No significant difference exists between the expressed degree of importance perceived by university-level information systems educators who teach at schools of business who offer an undergraduate degree in information systems and those who do not have such a degree program concerning thirty-five systems analysis and design tools, techniques, and methods.

Hypothesis number 5 is not rejected at the .01 level of significance.

Hypothesis Number 6

No significant difference exists between the expressed degree of importance perceived by systems analysts with educational backgrounds consisting of either a computer-related degree or a noncomputer-related degree concerning thirty-five selected systems analysis and design tools, techniques, and methods.

Hypothesis number 6 is not rejected at the .01 level of significance.

Hypothesis Number 7

No significant difference exists between the expressed degree of importance perceived by systems analysts who have received formal company training in the area of systems analysis and design and those who have not received such training concerning thirty-five selected systems analysis and design tools, techniques, and methods.

Hypothesis number 7 is not rejected at the .01 level of significance.

Hypothesis Number 8

No significant difference exists between the expressed degree of importance perceived by systems analysts who have less than 3 years of work experience as a systems analysts, 3 to 6 years work experience, and more than 6 years work experience concerning thirty-five selected systems analysis and design tools, techniquesm and methods.

Hypothesis number 8 is not rejected at the .01 level of significance.

Hypothesis Number 9

No significant difference exists between the expressed degree of importance perceived by systems analysts who work for a company with a data processing department with 50 or less employees and systems analysts who work for companies with more than 50 data processing employees concerning thirty-five selected systems analysis and design tools, techniques, and methods.

Hypothesis number 9 is rejected at the .01 level of significance for the systems tool information services request. The numerical breakdown for this system tool for each response group is found in Appendix E, Table XIX.

On a five-point Likert-type scale of importance (the value 5 representing a high degree of importance and the value 1 representing a low degree of importance) 75% of the 79 DPMA members who work for a company with 50 or fewer data processing employees rated the systems tool information services request as a 4 or less indicating average to low importance. Of the 83 DPMA members who work for a company with more than 50 data processing employees, 49% ranked the systems tool information services request as a 5 or as extremely important.

Summary

This chapter presented an analysis of the results from the two study instruments: the AACSB questionnaire and the DPMA questionnaire. The analysis of the data obtained from the two questionnaires concerned the following research hypothesis:

H_1: No significant difference exists between the expressed degree of importance perceived by systems analysts and university-level information systems educators concerning thirty-five systems analysis and design tools, techniques, and methods.

H_2: No significant difference exists between the expressed degree of importance perceived by systems analysts and university-level information systems educators concerning six possible job functions of a systems analyst.

H_3: No significant difference exists between systems analysts' work environments and a systems analysis and design students' classroom environment.

H_4: No significant difference exists between the expressed degree of importance perceived by university-level information systems educators who teach at schools of business with a full-time undergraduate enrollment of 2,000 or less students and those schools of business with 2,001 or more students enrolled concerning thirty-five systems analysis and design tools.

H_5: No significant difference exists between the expressed degree of importance perceived by university-level information systems educators who teach at schools of business who offer an undergraduate degree in information systems and those who do not have such a degree program concerning thirty-five systems analysis and design tools, techniques, and methods.

H_6: No significant difference exists between the expressed degree of importance perceived by systems analysts with educational backgrounds consisting of either a computer-related degree or a noncomputer-related degree concerning thirty-five selected systems analysis and design tools, techniques, and methods.

H_7: No significant difference exists between the expressed degree of importance perceived by systems analysts who have received formal company training in the area of systems analysts and design and those who have not received such training concerning thirty-five selected systems analysis and design tools, techniques, and methods.

H_8: No significant difference exists between the expressed degree of importance perceived by systems analysts who have less than 3 years of work experience as a systems analyst, 3 to 6 years work experience, and more than 6 years work experience concerning thirty-five selected systems analysis and design tools, techniques, and methods.

H_9: No significant difference exists between the expressed degree of importance perceived by systems analysts who work for a company with a data processing department with 50 or less data processing employees and companies with 51 or more data processing employees concerning thirty-five selected systems analysis and design tools, techniques, and methods.

The results concerning each research hypothesis were tabulated and reported according to frequency of occurrence, cumulative frequency, percentage, and cumulative percentage. The chi-square test for significance was utilized in comparing and revealing relationships between selected items in the study instruments. Specific results were summarized and presented through discussion and the various tables within the chapter and Appendix E.

The summary, conclusions, and recommendations are presented in Chapter V.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

In 1980 there was an estimated one electronic work station for every 23 white collar employees in the American economy: by 1989 it is estimated there will be one for every two (Gray, 1984). This growth curve entails enormous changes in the way in which one creates and maintains a network computer system of users. In many business concerns it is often the systems analysts who bear the responsibility of coordinating a multi-user environment.

The explosion in computer system users and uses, cited by Gray, has sent out an after-shock felt by vendors, management, data processing departments, and higher education. All four groups have begun to rethink traditional approaches to systems analysis and design in order to cope with rising computer needs, applications, and uses. Hopefully, as these groups re-tool in the area of systems analysis and design there will be a high degree of both interaction and agreement.

Purpose and Design of the Study

The purpose of this study was to provide information that might lead to a more efficient way to conduct a learning environment for the education of systems analysts.

A secondary purpose of the study was to aid in the line of communication between educators in higher education and management in industry. The formidable task of providing an individual with sufficient knowledge concerning systems analysis should be shared by all those concerned. The student, higher education, and industry all have a valuable stake in this effort. The results of this study should serve the needs of all three in the sense each will be aware of what is required for successful performance in the area of computer systems, both in the classroom and on-the-job.

These purposes were accomplished by using interpretative analysis of the data obtained from two groups of questionnaires, one group being mailed to DPMA members with an expressed special interest in systems analysis and design, and the other group being mailed to instructors of AACSB accredited schools of business who are responsible for the teaching of systems analysis and design concepts. By comparing some of the data from these two groups, it was possible to determine what relationship exists between the importance of (1) systems analysis and design tools, techniques, and methods and of (2) six possible job functions of a systems analyst as perceived by the DPMA members and the university-level information systems educators.

The Study Instrument

In order to accomplish the purposes of this study, two questionnaires were developed. Both questionnaires were designed and constructed from a study of related research, other research questionnaires, a pilot study sent to both university-level information systems educators and industrial systems analysts, and critiques by Oklahoma State University and San Diego State University faculty members. The first questionnaire, the AACSB version, was mailed to 208 members of American Assembly of Collegiate Schools of Business. Ninety-eight schools returned a completed questionnaire. The second questionnaire, the DPMA version, was mailed to 495 members of Data Processing Management Association special interest group in systems analysis and design. One hundred and eighty-three DPMA members returned a completed questionnaire.

Analysis of the Data

All the responses from the two groups of questionnaires were coded and analyzed via a SPSS-X statistical software package. The collected data were analyzed through the employment of frequency counts and percentage breakdowns. Two-way tables and chi-square tests were used to test the stated research hypotheses.

Review of Related Research

A review of related literature was conducted in order to define the role of the collegiate school of business in the education and development of computer systems analysts for public sector jobs.

As stated in Chapter II, Review of Related Literature, the difficulty of a university-level information systems educator's task is compounded by daily technological advancements and modifications which often result in teaching third-generation computer concepts in a fourth-generation user environment.

Much research has been conducted which has a) illuminated the plight of data processing educators: tight budgets, overcrowded classrooms, outdated teaching and computer resources, and lacking retraining potential, and b) voiced the unhappiness of the data processing community as to the quality of instruction in the systems analysis and design area; teaching outdated and/or obsolete concepts, unstructured approach, and failure to present the "big picture" of computer-based information systems.

One of the purposes of this study was to serve as a bridge on which data processing professionals and university educators could meet to interact and exchange information as to what should be and what should not be included in the study of systems analysis and design.

Conclusions

The major conclusion drawn from this research effort is that a significant relationship exists between one's occupational group membership and the degree of importance one places on selected systems analysis and design tools and job functions. It is also concluded, from statistical interpretation of collected data, that the computer-related work environments of the two occupational groups (AACSB members and DPMA members) are significantly different.

These and other conclusions have been summarized in a section format. Each section represents one of the study's research hypotheses. Conclusions are based on the statistical analysis of the collected data.

Hypothesis Number 1

No significant difference exists between the expressed degree of importance perceived by systems analysts and university-level information systems educators concerning thirty-five systems analysis and design tools, techniques, and methods.

Hypothesis number one is rejected at the .01 level of significance for the following systems analysis and design tools, techniques, and methods:

- o Codes and coding,
- o Gantt-type charts,
- o Flowcharts,
- o HIPO charts,
- o Information service request,
- o Printer spacing charts,
- o Logical report layout,
- o Data flow diagrams,
- o Decision trees,
- o System user-manual preparation.

The low rankings of the systems tools: codes and coding, printer spacing charts, and logical report layouts by AACSB members may be attributed to the curriculum structure of many AACSB schools of business. An introductory programming course is often a prerequisite course for the course systems analysis and design. Therefore the systems tools codes and coding, printer spacing charts, and logical report layouts may have received a low degree of importance rating concerning the study of systems analysis and design due to the fact they are covered within another class. However, in light of the fact that each of these above mentioned tools received a high rating (concerning degree of importance) from DPMA members, a course in systems analysis and design should discuss in detail codes and coding, printer spacing charts, and logical report layouts.

DPMA members' low ratings for the systems tools Gantt-type charts, flowcharts, HIPO charts, dataflow diagrams, and decision trees may be attributed to the fact that each of these system project management aids often fail to make it from the classroom blackboard to the front lines of systems analysis and design. Each tool is a strong system aid, as indicated by the high degree of importance rating by AACSB members, but each is somewhat detailed and often too time consuming in what can be hectic deadline-driven systems analysis and design environment.

Two of the systems tools, information services requests and system user-manual preparation, both received a high importance rating from DPMA members and low importance rating from AACSB respondents. Both tools involve a high degree of interaction between the systems analysts and the systems users. Interaction between a systems analyst and a systems user would be very difficult to simulate in a systems classroom environment, however any effort in such a direction would strengthen the systems analysis and design course.

Hypothesis Number 2

No significant difference exists between the expressed degree of importance perceived by systems analysts and university-level information systems educators concerning six possible job functions of a systems analyst.

Hypothesis number two is rejected at the .01 level of significance for the following job functions of a systems analyst:

a. To develop manuals to communicate company procedures, and

b. To participate in the evaluation of equipment and to define standards of equipment selection.

The development of company manuals received polar evaluations from the two responding groups. DPMA members consider development of such manuals an important job function as opposed to AACSB instructors who consider it an unimportant job function. Educators may view this job function of writing as one which is covered in a business writing university-level course. This may prove to be a costly misjudgement. School of business writing courses often primarily deal with correspondence and/or letter construction. The skill of developing a comprehensive, computer-oriented company manual often falls somewhere in between the two courses of business writing and systems analysis and design.

The possible job function of equipment evaluation and selection received a high importance rating from educators and a low rating from DPMA systems analysts. One explanation for this might be that the task of hardware evaluation and selection is often the responsibility of the data processing manager or director rather than the systems analysts who work primarily with the development, modification, and maintenance of application software.

Hypothesis Number 3

No significant difference exists between systems analysts' work environments and a systems analysis and design student's classroom environments.

Work environment has been operationally defined as the surroundings and/or conditions in which the task of systems analysis and design is conducted. Conditions to be analyzed within this study: type of hardware employed (mainframe and/or microcomputer), amount of work conducted in a group or project-team setting, and the predominant computer language employed.

Hypothesis number 3 is rejected at the .01 level of significance for all four conditions of the systems analysis work environment.

Often information systems educators' hands are tied concerning the type of computer environment they work within. An educational computer system is often selected based on the system's ability to serve the school's administration needs rather than in-class instructional uses, whereas a company often selects a computer which is application oriented and best suited for that company. This discrepancy may account for the significant difference in the type of hardware environment of the two groups.

The uneven portion concerning the amount of direct computer interface between the two groups may be due to the objective of the two groups. A systems instructor's objective is often to draw and discuss the "big picture" of systems analysis and design, whereas the systems analyst's objective may be to correct a small part of that "big picture." Thus a smaller portion of the student's tasks may require a direct computer interface due to the fact that many of the systems analysis and design learning tasks are not computer driven.

A strong majority of AACSB members indicated at least 20% and up to 100% of the assigned systems analysis and design course tasks were given in a team or project fashion. This is in direct contrast to the DPMA responses, in which 45% of the group indicated less than 20% of their work was conducted in a team or project fashion. This contrast may be accounted for by the time constraints placed on educators. Due to limited assistance for evaluation purposes, projects are often assigned in a group fashion to factor down the number of individual evaluations. This approach is often justified in hopes that group-membership will place a student within a dynamic environment, dealing with interaction, delegation, and authority.

Both groups cited COBOL as the predominant programming language employed, yet they differed as to the second most popular predominant language. The computer language BASIC was the predominant language in 27% of the responding schools, while only 3% of the DPMA members indicated it as the predominate language. The preference of BASIC over COBOL by educators may be attributed to the following two facts: COBOL is considered a dying language by part of the academic world, and 34% of the responding schools of business indicated no formal course in the language of COBOL. Without such a course in COBOL, a systems analysis and design student's computer language exposure may be limited to the school of business course entitled "Introduction to Computers," which 83% of AACSB respondents indicated they offered. Aulgur (1982), in her study of AACSB accredited schools of business, cited that the predominant programming language used in such an introduction course was BASIC, with 65% of the possible 169 schools indicating so.

Hypothesis Number 4

No significant difference exists between the expressed degree of importance perceived by university-level information systems educators who teach at schools of business with a full-time undergraduate enrollment of 2,000 or less students and those schools of business with more than 2,000 students enrolled concerning thirty-five systems analysis and design tools, techniques, and methods.

Hypothesis number 4 is rejected at the .01 level of significance for the following systems analysis and design tools: file design, PERT, and system walkthrough.

Hypothesis Number 5

No significant difference exists between the expressed degree of importance perceived by university-level information systems educators who teach at schools of business who offer an undergraduate degree in information systems and those who do not have such a degree program concerning thirty-five systems analysis and design tools, techniques, and methods.

The analysis of data resulted in a failure to reject hypothesis number 5 at the .01 level of significance.

Hypothesis Number 6

No significant difference exists between the expressed degree of importance perceived by systems analysts with educational backgrounds consisting of either a computer-related degree or a noncomputer-related degree concerning thirty-five selected systems analysis and design tools, techniques, and methods.

The analysis of data resulted in a failure to reject hypothesis number 6 at the .01 level of significance.

Hypothesis Number 7

No significant difference exists between the expressed degree of importance perceived by systems analysts who have received formal company training in the area of systems analysis and design and those who have not received such training concerning thirty-five selected systems analysis and design tools, techniques, and methods.

The analysis of data resulted in a failure to reject hypothesis number 7 at the .01 level of significance.

Hypothesis Number 8

No significant difference exists between the expressed degree of importance perceived by systems analysts who have less than 3 years of work experience as a systems analysts, 3 to 6 years work experience, and more than 6 years work experience concerning thirty-five selected systems analysis and design tools, techniquesm and methods.

The analysis of data resulted in a failure to reject hypothesis number 8 at the .01 level of significance.

Hypothesis Number 9

No significant difference exists between the expressed degree of importance perceived by systems analysts who work for a company with a data processing department with 50 or less employees and systems analysts who work for companies with more than 50 data processing employees concerning thirty-five selected systems analysis and design tools, techniques, and methods.

Hypothesis number 9 is rejected at the .01 level of significance for the systems tool information services request.

One possible explanation for DPMA members who work for a company with 50 or fewer data processing employees to rate the systems tool information services request low in importance may be due to the physical set-up of the company. A smaller shop may be more conducive to informal requests for services, where a large data processing department, more than 50 employees, may require a closer adherence to formal communication procedures and policies.

Recommendations for Systems Analysis and Design Course Content and Environment

The following recommendations for systems analysis and design course content and environment are based on the results of the descriptive analysis of the data gathered from the two questionnaires and on a review of related literature:

1. Educators in the systems analysis and design area should have computer-related degrees.
2. Educators in the systems analysis and design area should attempt to modify course content according to fourth generation competency standards.
3. Systems tools which are program development oriented, such as codes and coding, printer spacing charts, and logical report layouts should receive strong coverage in the college coverage of systems analysis and design.
4. Systems tools which are project management oriented, such as Gantt-type charts, flowcharts, HIPO charts, and data-flow diagrams should be considered low priority lecture topics in the study of systems analysis and design due to a low level of use in industry.
5. Systems analysis and design courses should attempt to discuss the interaction between the systems user and the systems

analysts by the inclusion of course tasks or exercises which deal with information service requests and system user-manual preparation.

6. The task of hardware equipment evaluation and selection should be discussed within the systems classroom but preferenced as being a probable job function of a manager or director of the data processing department.
7. The study of systems analysis and design should be conducted in an environment in which both a mainframe and microcomputers are available and employed, with the majority of computer-required tasks being conducted in the mainframe environment.
8. Programming tasks should be a part of the college coverage of systems analysis, with COBOL being the required computer language.
9. Group projects are an important aspect within the study of systems analysis and design, and should be designed to insure and/or require individual group members are held accountable for subtasks within the group's scope of required activities; thus allowing for objective evaluation of an individual student's group participation and contribution.
10. College coverage of the systems analysis and design area should address the possible special needs and/or considerations required when working within a small data processing shop environment.

Recommendations for Future Research

1. Studies should be conducted to gather information about fourth generation systems analysis and design tools.
2. Studies should be conducted in which data processing managers, or those who supervise data processing employees, are allowed to evaluate the effect having an information systems degree has on one's productivity.
3. Studies should be conducted as to possible personality traits that may serve as a predictor of success in the role of systems analyst.
4. Studies should be conducted as to the criteria employed for selecting personnel to serve as systems analysts.
5. Studies should be conducted concerning as to how a systems analyst is evaluated with respect to on-the-job performance and productivity.
6. Studies should be conducted as to why responding AACSB schools with 2,000 or less students enrolled in their school of business rated all three of the following systems tools: file design, PERT, and system walkthrough as low in importance while schools with more than 2,000 undergraduate business students rated all three tools as high in importance. The explanation for such an occurrence was beyond the scope of this research effort.

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APPENDIXES

APPENDIX A

THE AACSB QUESTIONNAIRE

____
Identification Number

NATIONAL SURVEY OF AACSB RECOMMENDATIONS
CONCERNING SYSTEMS ANALYSIS AND DESIGN

This questionnaire is a survey of AACSB-accredited business schools to determine the status and trends of Systems Analysis and Design courses offered by educational institutions.

I. THE BUSINESS PROGRAM

This portion of the questionnaire pertains to the individual AACSB business programs.

1. _____ What is the current full-time undergraduate enrollment (FTE) in your school of business?

a. 1 - 500 Students	d. 1501 - 2000 Students
b. 501 - 1000 Students	e. 2001 - 2500 Students
c. 1001 - 1500 Students	f. over 2500 please specify: _______

2. _____ Do you currently offer an undergraduate degree in the information processing/systems area through your school of business?

   a. YES - Please indicate the current number of FTE undergraduate majors in this information processing/systems degree program: _________

   b. NO

3. _____ Which department or operating unit within your school of business is responsible for the teaching of information processing related courses (e.g., "SYSTEMS ANALYSIS," "INTRO TO INFORMATION PROCESSING")

a. Accounting	e. Marketing
b. Business Education	f. Management
c. Economics	g. Information Systems
d. Finance	h. Other please specify _______________

4. Please check which of the following undergraduate courses are currently offered through your school of business. Suggested course titles may vary from your selected course titles. Please feel free to use the title which best fits your course.

a. _____ Intro to Computer-Based Systems

b. Applications Program Development I (COBOL)

c. _____ Applications Program Development II (COBOL)
d. _____ Systems Analysis Methods
e. _____ Structured Systems Analysis and Design
f. _____ Database Program Development
g. _____ Applied Software Development Project
h. _____ Software and Hardware Concepts
i. _____ Office Automation
j. _____ Decision Support Systems
k. _____ Advanced Database Concepts
l. _____ Distributed Data Processing
m. _____ EDP Audit and Control
n. _____ Information Systems Planning
o. _____ Information Resource Management
p. _____ Management of Information Systems
q. _____ Data Communications
r. _____ Others: please specify __________

____

____

II. INFORMATION SYSTEMS ANALYSIS AND DESIGN COURSE DESCRIPTION

This portion of the questionnaire pertains to the first undergraduate course which covers the area of Information Systems Analysis and Design.

1. Do you offer a course which solely pertains to Information Systems Analysis and Design?

   a. _____ YES (please indicate the following)
   Course title: ____________________
   Current text, title, and publisher:
   ____

   b. _____ NO (if no please indicate which courses cover this area)
   ____
   ____

2. Do you offer an advanced or second course in the Information Systems Analysis and Design course area?

   *a. _____ YES b. _____ NO

****
* * Please note that the remainder of this questionnaire is to be *
* filled out with respect to the material presented in only the first*
* course in Systems Analysis and Design or courses indicated in your *
* response to question 1 above. *
****

3. What length of time is devoted to the classroom coverage of Information Systems Analysis and Design?

   a. _____ 1 Semester (Semester equals approximately 16 weeks)
   b. _____ 2 Semesters

c. _____ 1 Quarter
d. _____ 2 Quarters
e. _____ Other, indicate the approximate amount of time in weeks:

____

4. Please rate each of the following topics toncerning a possible introduction to the Information Systems Analysis and Design area. Your rating should correlate with the amount of coverage each topic receives in your systems course. Please use the following scale:

   1. NOT IMPORTANT
   2. SLIGHTLY IMPORTANT
   3. MODERATELY IMPORTANT
   4. VERY IMPORTANT
   5. EXTREMELY IMPORTANT

a. _____ History of computing
b. _____ The evolution of Systems Analysis and Design techniques
c. _____ Defining the role of the Systems Analyst
d. _____ Automation and the business environment
e. _____ Life cycle of a computer-based system (Study Phase, Design Phase, Development Phase, Operation Phase)
f. _____ Review of EDP terminology, phrases, and vocabulary
g. _____ Information systems organizational chart
h. _____ Management Levels and Information Needs: Strategic, Tactical, Supervisory, and Operational.

5. Please indicate (by circling) if your course coverage in the Information Systems Analysis and Design area includes the following topics. Then please rank the content area concerning its degree importance within the overall study of systems analysis and design. Your ranking should correlate with your class coverage and direction. Where class coverage equals detailed in-class discussion of the listed item.

   Scale: 1. NOT IMPORTANT
   2. SLIGHTLY IMPORTANT
   3. MODERATELY IMPORTANT
   4. VERY IMPORTANT
   5. EXTREMELY IMPORTANT

SYSTEMS TOOLS AND TECHNIQUES	Class Coverage	Item's Degree of Importance (Not ... Extremely)
a. CODES AND CODING: the use of a group of characters to identify an item of data and to show its relationship to other items of similar nature.	Yes No	1 2 3 4 5

Scale: 1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

	SYSTEMS TOOLS AND TECHNIQUES	Class Coverage		Item's Degree of Importance				
				Not				Extremely
b.	FORMS DESIGN: the construction and evaluation of documents used to capture source information.	Yes	No	1	2	3	4	5
c.	CHART CONSTRUCTION: graphical or pictorial expressions of relationships or movements (Example: Bar Charts)	Yes	No	1	2	3	4	5
d.	DECISION TABLES: tabular technique for describing logical rules	Yes	No	1	2	3	4	5
e.	CRITICAL PATH NETWORKS: planning and management tools that use a graphical format to depict the relationship between tasks.	Yes	No	1	2	3	4	5
f.	GANTT-TYPE CHART: horizontal bar chart used to depict a project schedule and record a project's progress	Yes	No	1	2	3	4	5
g.	FLOWCHART PREPARATION AND USE: a flowchart is a pictorial representation that uses predefined symbols to describe data flow.	Yes	No	1	2	3	4	5
h.	HIPO CHART (Hierarchy plus Input Processing): a chart designed and used to document functions.	Yes	No	1	2	3	4	5

Scale: 1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

SYSTEMS TOOLS AND TECHNIQUES	Class Coverage		Item's Degree of Importance				
			Not				Extremely
i. TECHNICAL WRITING (Reports): A formal written communication of results and conclusions due to a particular set of actions; it summarizes work that has been done. IF YES, which of the following documents are covered: 1. _____ Study phase report 2. _____ Request for proposal 3. _____ Design phase report 4. _____ Development phase report	Yes	No	1	2	3	4	5
j. INFORMATION SERVICES REQUEST: a method of communication used between the user of an information system and the analyst	Yes	No	1	2	3	4	5
k. FEASIBILITY ANALYSIS: process of identifying candidate systems and evaluating their costs and performances	Yes	No	1	2	3	4	5
l. CANDIDATE EVALUATION MATRIX: depicts the system evaluation criteria to be used to evaluate candidate systems.	Yes	No	1	2	3	4	5
m. INPUT DESIGN: the process of converting a user-oriented description of the inputs to a computer-based business system into a programmer-oriented specification.	Yes	No	1	2	3	4	5

Scale: 1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

	SYSTEMS TOOLS AND TECHNIQUES	Class Coverage		Item's Degree of Importance				
				Not				Extremely
n.	OUTPUT DESIGN: the identification of print positions to be used for the title, headings, detail data, and totals.	Yes	No	1	2	3	4	5
o.	PRINTER SPACING CHARTS: used to arrange and sequence computer outputs.	Yes	No	1	2	3	4	5
p.	FILE DESIGN: logical effort to provide effective auxiliary storage and to contribute to the overall efficiency of the computer program. If YES, please check which type of file design(s) are covered: 1. _____ Sequential files 2. _____ Direct files 3. _____ Indexed sequential files 4. _____ Other, please specify ______________________	Yes	No	1	2	3	4	5
q.	LOGICAL REPORT LAYOUT: a worksheet used for documenting the data format for each field in a record.	Yes	No	1	2	3	4	5
r.	PAYBACK ANALYSIS: the determination of the length of time necessary to recover system development costs.	Yes	No	1	2	3	4	5
s.	PERT (Program Evaluation Review Technique): analysis tool that uses a graphical display (network) to show relationships between tasks that must be performed to accomplish an objective.	Yes	No	1	2	3	4	5

Scale: 1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

	SYSTEMS TOOLS AND TECHNIQUES	Class Coverage		Item's Degree of Importance Not				Extremely
t.	LINEAR PROGRAMMING: involves the use of a mathematical model to find the best combination of available resources to achieve a desired result.	Yes	No	1	2	3	4	5
u.	DATA FLOW DIAGRAMS: a nontechnical graphical picture of a logical system, often serves as a communication tool.	Yes	No	1	2	3	4	5
v.	DATA DICTIONARY: a collection of files in which each record concerns a different data item, record, area, or record relationship in the data base.	Yes	No	1	2	3	4	5
w.	DECISION TREES: a graphical representation of the decision, events, and consequences associated with a problem. Once a tree is drawn, probabilities can be assigned, and expected values of outcomes computed.	Yes	No	1	2	3	4	5
x.	PROGRAM WALKTHROUGH: an evaluation technique used to inspect newly written code.	Yes	No	1	2	3	4	5
y.	INTERVIEW: the collection of information concerning existing documentation, procedures, data flows, and possible organizational structure.	Yes	No	1	2	3	4	5

Scale: 1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

	SYSTEMS TOOLS AND TECHNIQUES	Class Coverage		Item's Degree of Importance Not				Extremely
z.	PSEUDOCODE: an attempt to describe the executable code in a form that a programmer can easily translate.	Yes	No	1	2	3	4	5
aa.	WARNIER-ORR DIAGRAM: a diagram which may be used to describe a data structure, a set of detailed program logic, or a complete program structure.	Yes	No	1	2	3	4	5
bb.	DATA BASE DESIGN: the detailed study of data element relationships and file structures in order to design the most effective data storage environment.	Yes	No	1	2	3	4	5
cc.	SYSTEM USER-MANUAL PREPARATION: the development of a manual which contains all the information needed to train a user of the computer-related information system.	Yes	No	1	2	3	4	5
dd.	COMPUTER HARDWARE CAPACITY AND PERFORMANCE PLANNING: the "benchmark" testing of two or more computers on an identical series of tasks.	Yes	No	1	2	3	4	5
ee.	COMPUTER SOFTWARE PERFORMANCE EVALUATION: quality judgments concerning utility programs, programming languages, operating systems, and application packages.	Yes	No	1	2	3	4	5

Scale: 1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

SYSTEMS TOOLS AND TECHNIQUES	Class Coverage		Item's Degree of Importance (Not … Extremely)				
ff. SYSTEM WALKTHROUGH: a step-by-step review of a system in order to determine if any logic and/or manual errors exist in a proposed system.	Yes	No	1	2	3	4	5
gg. ORAL PRESENTATIONS AND REPORTS: verbal exchange of information concerning system development and/or user training.	Yes	No	1	2	3	4	5
hh. ALGORITHM: a set of rules or instructions used to accomplish a task.	Yes	No	1.	2	3	4	5
ii. DATA ELEMENT ANALYSIS: a process for understanding the meanings of data names and codes.	Yes	No	1	2	3	4	5
OTHERS PLEASE SPECIFY:							
jj.	Yes	No	1	2	3	4	5
kk.	Yes	No	1	2	3	4	5
ll.	Yes	No	1	2	3	4	5

III. APPLICATION

This portion of the questionnaire pertains to special tasks and activities that may be included in the study of Information Systems Analysis and Design.

1. Does your coverage of Systems Analysis and Design include a simulated industry case study and/or class project that deals directly with Systems Analysis and Design?

_____ YES _____ NO

2. Please indicate which programming language, is predominately used or included in your class coverage and/or course work in Systems Analysis and Design. One response only.

a. _____ APL
b. _____ BASIC
c. _____ COBOL
d. _____ FORTRAN
e. _____ PL/1
f. _____ RPG
g. _____ PASCAL
h. _____ Other, please specify: _____________

3. Do your Systems Analysis and Design students have access to and use a mainframe computer system located at a central site on campus?

a. _____ YES If YES, please indicate what make and model: _____________________
b. _____ NO

4. Do your Systems Analysis and Design students have access to and use microcomputers for their assigned course work?

a. _____ YES Please indicate the microcomputer vendor and model: _____________________
b. _____ NO

5. Do any classroom assignments, special projects, or class projects require Systems Analysis and Design students to employ a computer to solve assigned course work?

a. _____ YES If YES, indicate the approximate hours spent with a
b. _____ NO computer. _____________________

6. What percentage of class work in the Systems Analysis and Design area is done in a group or committee environment (the grouping of two or more students to work jointly on an assigned problem)?

a. _____ No group work
b. _____ less than 20%
c. _____ 21 - 40%
d. _____ 41 - 60%
e. _____ 61 - 80%
f. _____ 81 - 100%

7. Please rank (1 through 6) in order of importance the following six possible job functions of a Systems Analyst. Your ranking should correlate with your class coverage and direction. Please use the number 1 to indicate the least important job function and ascend through to the number 6 which will represent the most important possible job function. Each number (1 - 6) may only be used once.

a. _____ To analyze systems with problems and to design new or modified systems to solve these problems. (System/program maintenance)

b. _____ To develop manuals to communicate company procedures.

c. _____ To design the various business forms used to collect data and distribute information.

d. _____ To perform records management, including the distribution and use of reports.

e. _____ To participate in the evaluation of equipment and to define standards for equipment selection.

f. _____ To interface with data processing to coordinate the development of systems whenever computer-oriented systems have been selected.

V. OPTIONAL

Name ______________________________

Academic Position ______________________________

Degree held and major field ______________________________

Do you now teach a course in Information Systems Analysis and Design? _____ Y _____ N

****

Thank you very much for your participation in this survey. Your contribution will greatly aid in the analysis of curriculum considerations concerning Information Systems Analysis and Design.

If you wish an abstract of this study's findings mailed to you, please fill out the following.

NAME: ______________________________

SCHOOL: ______________________________

ADDRESS: ______________________________

CITY, STATE, and ZIP: ______________________________

Please return the completed questionnaire in the enclosed, postage-paid business reply envelope addressed to:

Central Mailing Services
Stillwater, OK 74078-9988

APPENDIX B

THE DPMA QUESTIONNAIRE

____
Identification Number

NATIONAL SURVEY OF DPMA RECOMMENDATIONS
CONCERNING SYSTEMS ANALYSIS AND DESIGN

This questionnaire is a survey of selected DPMA members to determine opinions concerning what specific theories, operational procedures, and approaches are being employed in the field of systems analysis and design. Please complete the questionnaire by checking the appropriate response.

I. THE BUSINESS ENVIRONMENT

This portion of the questionnaire concerns the general organization of your company and your information systems department.

1. Please indicate which of the following best describes your company:

a. _____ Manufacturing
b. _____ Finance
c. _____ Medicine
d. _____ Insurance
e. _____ Real Estate
f. _____ Law
g. _____ Education
h. _____ Wholesale
i. _____ Retail Trade
j. _____ Business Service
k. _____ Government
l. _____ Public Utility
m. _____ Communication System
n. _____ Transportation
o. _____ Mining
p. _____ Construction
q. _____ Petroleum
r. _____ Refining
s. _____ Consultant
t. _____ Other (please specify) _____________________

2. Please indicate the number of employees currently working in your organization:

a. _____ 1- 50
b. _____ 51-100
c. _____ 101-150
d. _____ 151-200
e. _____ 201-250
f. _____ over 250 (please specify) _____________________

3. How many people are currently employed in your data processing department?

a. _____ 1- 50
b. _____ 51-100
c. _____ 101-150
d. _____ 151-200
e. _____ 201-250
f. _____ over 250 (please specify) _____________________

4. Do you have an in-house staff position of Systems Analyst?

a. _____ YES, and our company title for such a position is:

____

b. _____ NO, this company employs one of the following:

_____ Computer Service Bureau
_____ Outside Consultants
_____ Other (please specify) _____________________

____

5. Please indicate the number of employees whose main job functions are analyzing and designing business application systems for your organization?

a. _____ 1- 50
b. _____ 51-100
c. _____ 101-150
d. _____ 151-200
e. _____ 201-250
f. _____ over 250 (please specify) ____________________

II. SYSTEMS ANALYSIS TOOL AND TECHNIQUES

1. Please indicate (by circling) if your work in the field of Information Systems Analysis and Design includes or makes use of the following tools, techniques, or practices. Then please rank each tool, technique, or practice concerning its degree of importance. Your ranking should correlate with your on-the-job performance.

Scale: 1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

SYSTEMS TOOLS AND TECHNIQUES	Used or done in your work	Items Degree of Importance (Not ... Extremely)
a. CODES AND CODING: the use of a group of characters to identify an item of data and to show its relationship to other items of similar nature.	Yes No	1 2 3 4 5
b. FORMS DESIGN: the construction and evaluation of documents used to capture source information.	Yes No	1 2 3 4 5
c. CHART CONSTRUCTION: graphical or pictorial expressions of relationships or movements (Example: Bar Charts).	Yes No	1 2 3 4 5
d. DECISION TABLES: tabular technique for describing logical rules.	Yes No	1 2 3 4 5
e. CRITICAL PATH NETWORKS: planning and management tools that use a graphical format to depict the relationship between tasks.	Yes No	1 2 3 4 5
f. GANTT-TYPE CHART: horizontal bar chart used to depict a project schedule and record a project's progress.	Yes No	1 2 3 4 5

Scale for tool or technique's Degree of Importance within the area of systems analysis:

1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

SYSTEMS TOOLS AND TECHNIQUES	Used or done in your work	Items Degree of Importance (Not ... Extremely)
g. FLOWCHART PREPARATION AND USE: a flowchart is a pictorial representation that uses predefined symbols to describe data flow.	Yes No	1 2 3 4 5
h. HIPO CHART (Hierarchy plus Input Processing Output): a chart designed and used to document functions.	Yes No	1 2 3 4 5
i. TECHNICAL WRITING (Reports): formal written communication of results and conclusions due to a particular set of actions; it summarizes work that has been done. IF YES, which of the following documents are covered: 1. _____ Study phase report 2. _____ Request for proposal 3. _____ Design phase report 4. _____ Development phase report	Yes No	1 2 3 4 5
j. INFORMATION SERVICES REQUEST: a method of communication used between the user of an information system and the analyst.	Yes No	1 2 3 4 5
k. FEASIBILITY ANALYSIS: process of identifying candidate systems and evaluating their costs and performance.	Yes No	1 2 3 4 5
l. CANDIDATE EVALUATION MATRIX: depicts the system evaluation criteria to be used to evaluate candiate systems.	Yes No	1 2 3 4 5
m. INPUT DESIGN: the process of converting a user-oriented description of the inputs to a computer-based business system into a programmer-oriented specification.	Yes No	1 2 3 4 5

Scale for tool or technique's Degree of Importance within the area of systems analysis:

1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

SYSTEMS TOOLS AND TECHNIQUES	Used or done in your work	Items Degree of Importance Not Extremely
n. OUTPUT DESIGN: the identification of print positions to be used for the title, headings, detail data, and totals.	Yes No	1 2 3 4 5
o. PRINTER SPACING CHARTS: used to arrange and sequence computer outputs.	Yes No	1 2 3 4 5
p. FILE DESIGN: logical effort to provide effective auxiliary storage and to contribute to the overall efficiency of the computer program. If YES, please check which type of file design(s) are covered: 1. _____ Sequential files 2. _____ Direct files 3. _____ Indexed sequential files 4. _____ Other, please specify ________	Yes No	1 2 3 4 5
q. LOGICAL REPORT LAYOUT: a worksheet used for documenting the data format for each field in a record.	Yes No	1 2 3 4 5
r. PAYBACK ANALYSIS: the determination of the length of time necessary to recover system development costs.	Yes No	1 2 3 4 5
s. PERT (Program Evaluation Review Technique): analysis tool that uses a graphical display (network) to show relationships between tasks that must be performed to accomplish an objective.	Yes No	1 2 3 4 5

Scale for tool or technique's Degree of Importance within the area of systems analysis:

1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

SYSTEMS TOOLS AND TECHNIQUES	Used or done in your work	Items Degree of Importance Not Extremely
t. LINEAR PROGRAMMING: involves the use of a mathematical model to find the best combination of available resources to achieve a desired result.	Yes No	1 2 3 4 5
u. DATA FLOW DIAGRAMS: a nontechnical graphical picture of a logical system, often serves as a communication tool.	Yes No	1 2 3 4 5
v. DATA DICTIONARY: a collection of files in which each record concerns a different data item, record, area, or record relationship in the data base.	Yes No	1 2 3 4 5
w. DECISION TREES: a graphical representation of the decision, events, and consequences associated with a problem. Once the tree is drawn, probabilities can be assigned, and expected values of outcomes computed.	Yes No	1 2 3 4 5
x. PROGRAM WALKTHROUGH: an evaluation technique used to inspect newly written code.	Yes No	1 2 3 4 5
y. INTERVIEW: the collection of information concerning existing documentation, procedures, data flows, and possible organizational structure.	Yes No	1 2 3 4 5
z. PSEUDOCODE: an attempt to describe the executable code in a form that a programmer can easily translate.	Yes No	1 2 3 4 5
aa. WARNIER-ORR DIAGRAM: a diagram which may be used to describe a data structure, a set of detailed program logic, or a complete program structure.	Yes No	1 2 3 4 5

Scale for tool or technique's Degree of Importance within the area of systems analysis:

1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

SYSTEMS TOOLS AND TECHNIQUES	Used or done in your work	Items Degree of Importance (Not ... Extremely)
bb. DATA BASE DESIGN: the detailed study of data element relationships and file structures in order to design the most effective data storage environment.	Yes No	1 2 3 4 5
cc. SYSTEM USER-MANUAL PREPARATION: the development of a manual which contains all the information needed to train a user of the computer-related information system.	Yes No	1 2 3 4 5
dd. COMPUTER HARDWARE CAPACITY AND PERFORMANCE PLANNING: the "benchmark" testing of two or more computers on an identical series of tasks.	Yes No	1 2 3 4 5
ee. COMPUTER SOFTWARE PERFORMANCE EVALUATION: quality judgments concerning utility programs, programming languages, operating systems, and application packages.	Yes No	1 2 3 4 5
ff. SYSTEM WALKTHROUGH: a step-by-step review of a system in order to determine if any logic and/or manual errors exist in a proposed system.	Yes No	1 2 3 4 5
gg. ORAL PRESENTATIONS AND REPORTS: verbal exchange of information concerning system development and/or user training.	Yes No	1 2 3 4 5
hh. ALGORITHM: a set of rules or instructions used to accomplish a task.	Yes No	1 2 3 4 5

Scale for tool or technique's Degree of Importance within the area of systems analysis:

1. NOT IMPORTANT
2. SLIGHTLY IMPORTANT
3. MODERATELY IMPORTANT
4. VERY IMPORTANT
5. EXTREMELY IMPORTANT

SYSTEMS TOOLS AND TECHNIQUES	Used or done in your work	Items Degree of Importance (Not … Extremely)
ii. DATA ELEMENT ANALYSIS: a process for understanding the meanings of data names and codes.	Yes No	1 2 3 4 5
OTHERS, PLEASE SPECIFY:		
jj.	Yes No	1 2 3 4 5
kk.	Yes No	1 2 3 4 5
ll.	Yes No	1 2 3 4 5

III. APPLICATION

This portion of the questionnaire pertains to special tasks and activities that may be a part of a systems analyst's job.

1. What make and model of mainframe computer does your organization employ?

   MAKE: ______________________ MODEL: ___________________________

2. What make and model of microcomputer does your company employ?

   MAKE: ______________________ MODEL: ___________________________

   _____ Our company does not currently use microcomputers.

3. Please indicate which programming language is predominately used in your work in the area of Systems Analysis and Design. One answer only.

   a. _____ APL 1
   b. _____ BASIC
   c. _____ COBOL
   d. _____ FORTRAN
   e. _____ PL/1
   f. _____ RPG
   g. _____ PASCAL
   h. _____ Other, please specify: ____________________

4. Please check what percentage of your work in Systems Analysis and Design is conducted in the following work areas and/or enviroments? Note: The total percentage may be less than, equal to, or greater than 100%. An example: you may spend 80% of your time working on a project, and of that 80% you spend 40% of your time programming, 20% of your time requires a direct use of the computer.... and so on.

	0%	1-20%	21-40%	41-60%	61-80%	81-100%
a. PROGRAMMING						
b. WORKING WITHIN OR FOR A PROJECT-TEAM						
c. WORKING ON PROJECTS						
d. HARDWARE/SOFTWARE PURCHASE EVALUATIONS						
e. AMOUNT OF WORK WHICH REQUIRES DIRECT COMPUTER INTERFACE						
f. SOFTWARE/PROGRAM MAINTENANCE						

5. Please rank (1 through 6) in order of importance the following six possible job functions of a Systems Analyst. Your ranking should correlate with your required job duties and functions. Please use the number 1 to indicate the least important job function and ascend through the number 6 which will represent the most important possible job function. Each number, 1 through 6, may only be used once.

1 = LEAST IMPORTANT JOB FUNCTION

6 = MOST IMPORTANT JOB FUCTION

a. _____ To analyze systems with problems and to design new or modified systems to solve these problems.

b. _____ To develop manuals to communicate company procedures.

c. _____ To design the various business forms used to collect data and distribute information.

d. _____ To perform records management, including the distribution and use of reports.

e. _____ To participate in the evaluation of equipment and to define standards of equipment selection.

f. _____ To interface with data processing to coordinate the development of systems whenever computer-oriented systems have been selected.

III. OPTIONAL

Name ______________________________

Company Position or Job Title ______________________________

Number of years work experience in computer field ______________

Number of years work experienced as a Systems Analyst ______________

Degree held and major field ______________________________

Have you ever or are you know receiving formal company supplied and/or sponsored training in Systems Analysis and Design.

_____ YES _____ NO

****

Thank you very much for your participation in this survey. Your input will greatly aid in the analysis of curriculum considerations concerning Information Systems Analysis and Design.

Please return the completed questionnaire in the enclosed, self-addressed stamped envelope.

Central Mailing Services
Stillwater, OK 74078-9988

Please return on or before: Friday, July 12th.

****

Please use this space for any additional comments and suggestions relating to the questionnaire, the study being conducted, or the role of education in developing people to function as "Systems Analysts." Thank you.

APPENDIX C

AACSB CORRESPONDENCE

OSU

Oklahoma State University

COLLEGE OF BUSINESS ADMINISTRATION

STILLWATER, OKLAHOMA 74078
(405) 624-5064

Dear Dean:

Subject: SYSTEMS ANALYSIS AND DESIGN SURVEY OF AACSB-ACCREDITED SCHOOLS OF BUSINESS

A strong curriculum in Information Systems often lies in the hands of faculty. Keeping abreast of curriculum modifications and adjustments in the computer area is a full time job. I am writing to request your assistance in a national survey of AACSB-Accredited Schools of Business. It is the purpose of this study to provide insight into critical curriculum considerations in the Systems Analysis and Design area.

Would you, as Dean of the College of Business, participate in this project by forwarding the enclosed questionnaire along with this letter to the appropriate professor or instructor responsible for your course offering in Systems Analysis and Design. If possible, the questionnaire should be returned on or before Friday, May 3rd. An addressed, postage-paid envelope is enclosed for convenience in returning the questionnaire. Individual school responses will be kept confidential.

Research findings from this study should benefit business curriculum planners in their continuing effort to provide effective education. Please indicate if you wish to have an abstract of the completed research. I thank you and your faculty for sharing your professional expertise in this research.

Sincerely,

Robert E. Schooley
Oklahoma State University
Doctoral Candidate

Dr. Rick Aukerman
Oklahoma State University
Doctoral Thesis Advisor

Enclosures

CENTENNIAL
DECADE
1980 • 1990

Oklahoma State University

COLLEGE OF BUSINESS ADMINISTRATION

STILLWATER, OKLAHOMA 74078
(405) 624-5064

Dear Dean:

Subject: FOLLOW-UP OF SYSTEMS ANALYSIS AND DESIGN SURVEY

Recently you received a questionnaire requesting responses concerning the Systems Analysis and Design area at your institution. This is a national survey of AACSB-Accredited Educational Institutions. At the time this letter was mailed, a response had not been received from your university. If the questionnaire has since been completed and returned, I sincerely thank you.

Would you, as Dean of the College of Business, participate in this project by forwarding the enclosed questionnaire along with this letter to the appropriate professor or instructor responsible for teaching Systems Analysis and Design. If possible, the questionnaire should be returned on or before Friday, May 24th. An addressed, postage-paid envelope is enclosed for convenience in returning the questionnaire. All responses will be kept confidential.

Your assistance is greatly appreciated. Thank you.

Sincerely,

Robert E. Schooley
Oklahoma State University
Doctoral Candidate

Dr. Rick Aukerman
Oklahoma State University
Doctoral Thesis Advisor

Enclosures

CENTENNIAL
DECADE
1980 • 1990

APPENDIX D

DPMA CORRESPONDENCE

OSU

Oklahoma State University

COLLEGE OF BUSINESS ADMINISTRATION

STILLWATER, OKLAHOMA 74078
(405) 624-5064

Dear DPMA Member:

Subject: SYSTEMS ANALYSIS AND DESIGN SURVEY OF DPMA MEMBERS

One of the most valuable tools in developing realistic data processing curriculum is feedback from active DP processionals. I am writing to request your input in a national survey of DPMA members with a special interest in Systems Analysis and Design. It is the purpose of this study to provide insight into the current job needs and trends within the Systems Analysis and Design Area.

Reasearch findings from this study should benefit the business community itself, the business student, and collegiate schools of business across the country. If possible, the questionnaire should be returned on or before Friday, June 7th. An addressed, postage-paid envelope is enclosed for convenience in returning the questionnaire. Individual responses will be kept confidential.

Thank you for your time, and I close my request for assistance with DPMA's stated objective: "One of DPMA's primary objective is to foster a better understanding of the vital relationship of information processing to management and society."

Sincerely,

Robert E. Schooley
Oklahoma State University
Doctoral Candidate and former
OSU DPMA Student Chapter President

Dr. Rick Aukerman
Oklahoma State University
Doctoral Thesis Advisor

Enclosures

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Oklahoma State University

COLLEGE OF BUSINESS ADMINISTRATION

STILLWATER, OKLAHOMA 74078
(405) 624-5064

Dear DPMA Member:

Subject: FOLLOW-UP OF SYSTEMS ANALYSIS AND DESIGN SURVEY

Recently you received a questionnaire requesting responses concerning current job needs and trends in the area of Systems Analysis and Design. This is a national survey of DPMA members. At the time this letter was mailed a response had not been received from you. If the questionnaire has since been completed and returned, I sincerely thank you.

Research findings from this study should benefit the business community itself, the business student, and collegiate schools of business across the country. If possible the questionnaire should be returned on or before Firday, July 19th. An addressed, postage-paid envelope is enclosed for convenience in returning the questionnaire. Individual responses will be kept confidential. All DPMA members who respond to the questionnaire will recieve an abstract of the completed research and associated findings.

Your assistance is greatly appreciated. Thank you.

Sincerely,

Robert E. Schooley
Oklahoma State University
Doctoral Candidate and former
OSU DPMA Student Chapter President

Dr. Rick Aukerman
Oklahoma State University
Doctoral Thesis Advisor

Enclosures
  Questionnaire
  Postage-paid return envelope

CENTENNIAL
DECADE
1980 • 1990

APPENDIX E

STUDY INSTRUMENT ITEMS WHICH RESULTED

IN SIGNIFICANT FINDINGS

TABLE XV

COMPARISON OF RATINGS OF SELECTED SYSTEMS ANALYSIS AND DESIGN TOOLS BY AACSB RESPONDENTS AND DPMA RESPONDENTS

	Not important 1	2	3	4	Extremely important 5
	Tool: Codes and Coding				
AACSB Responses (N=86)					
Frequency	8	24	32	16	6
Row percentage	9.3	27.9	37.2	18.6	7.0
DPMA Responses (N=165)					
Frequency	4	14	36	56	55
Row percentage	2.4	8.5	21.8	33.9	33.3
Chi-square value:	45.4177				
P value:	.0000				
Significant at the .01 value:	Yes				
	Tool: Gantt-charts				
AACSB Responses (N=82)					
Frequency	3	25	27	17	10
Row percentage	3.7	30.5	32.9	20.7	12.2
DPMA Responses (N=139)					
Frequency	16	14	50	45	14
Row percentage	11.5	10.1	36.0	32.4	10.1
Chi-square value:	18.7234				
P value:	.0009				
Significant at the .01 value:	Yes				

TABLE XV (continued)

	Not important 1	2	3	4	Extremely important 5
Tool: Flowchart					
AACSB Responses (N=90)					
Frequency	1	13	14	20	42
Row percentage	1.1	14.4	15.6	22.2	46.7
DPMA Responses (N=166)					
Frequency	13	24	44	51	34
Row percentage	7.8	14.5	26.5	30.7	30.5
Chi-square value: 22.9069					
P value: .0001					
Significant at the .01 value: Yes					
Tool: HIPO-chart					
AACSB Responses (N=90)					
Frequency	7	16	23	29	15
Row percentage	7.8	17.8	25.6	32.2	16.7
DPMA Responses (N=117)					
Frequency	28	22	38	22	7
Row percentage	23.9	18.8	32.5	18.8	6.0
Chi-square value: 17.8883					
P value: .0013					
Significant at the .01 value: Yes					

TABLE XV (continued)

	Not important 1	2	3	4	Extremely important 5
Tool: Information Services Request					
AACSB Responses (N=77)					
Frequency	5	20	23	17	12
Row percentage	6.5	26.0	29.9	22.1	15.6
DPMA Responses (N=163)					
Frequency	6	13	26	57	61
Row percentage	3.7	8.0	16.0	35.0	37.4
Chi-square value:	29.2047				
P value:	.0000				
Significant at the .01 value:	Yes				
Tool: Printer Spacing Chart					
AACSB Responses (N=73)					
Frequency	17	24	19	3	10
Row percentage	23.3	32.9	26.0	4.1	3.7
DPMA Responses (N=158)					
Frequency	10	18	47	45	38
Row percentage	6.3	11.4	29.7	28.5	24.1
Chi-square value:	42.0506				
P value:	.0000				
Significant at the .01 value:	Yes				

TABLE XV (continued)

	Not important 1	2	3	4	Extremely important 5
Tool: Logical Report Layout					
AACSB Responses (N=82)					
Frequency	4	19	24	19	16
Row percentage	4.9	23.2	29.3	23.2	19.5
DPMA Responses (N=149)					
Frequency	11	11	35	50	42
Row percentage	7.4	7.4	23.5	33.6	28.2
Chi-square value:	14.8499				
P value:	.005				
Significant at the .01 value:	Yes				
Tool: Data Flow Diagrams					
AACSB Responses (N=92)					
Frequency	3	4	24	23	38
Row percentage	3.3	4.3	26.1	25.0	41.3
DPMA Responses (N=153)					
Frequency	6	24	58	43	22
Row percentage	3.9	15.7	37.9	28.1	14.4
Chi-square value:	26.1434				
P value:	.0000				
Significant at the .01 value:	Yes				

TABLE XV (continued)

	Not important 1	2	3	4	Extremely important 5
Tool: Decision Trees					
AACSB Responses (N=86)					
Frequency	7	19	29	16	12
Row percentage	8.4	22.9	34.9	19.3	14.5
DPMA Responses (N=165)					
Frequency	25	20	22	15	3
Row percentage	29.4	23.5	25.9	17.6	3.5
Chi-square value:	16.5222				
P value:	.0024				
Significant at the .01 value:	Yes				
Tool: System User-manual Preparation					
AACSB Responses (N=86)					
Frequency	6	16	26	20	17
Row percentage	7.1	18.8	30.6	23.5	20.0
DPMA Responses (N=165)					
Frequency	1	8	33	60	68
Row percentage	.6	4.7	19.4	35.3	40.0
Chi-square value:	33.0021				
P value:	.0000				
Significant at the .01 value:	Yes				

TABLE XVI

COMPARISON OF IMPORTANCE RANKINGS OF SELECTED SYSTEMS ANALYSIS AND DESIGN JOB FUNCTIONS BY AACSB RESPONDENTS AND DPMA RESPONDENTS

	Least important 1	2	3	4	5	Most important 6
Job Function: Development of Company Policy Manuals						
AACSB Responses (N=81)						
Frequency	12	24	23	10	5	7
Row percentage	14.8	29.6	28.4	12.3	6.2	8.6
DPMA Responses (N=178)						
Frequency	30	31	32	61	15	8
Row percentage	16.9	17.5	18.1	34.5	8.5	4.5
Chi-square value: 18.6379						
P value: .0022						
Significant at the .01 value: Yes						
Job Function: Computer Equipment Evaluation and Selection						
AACSB Responses (N=81)						
Frequency	2	7	13	41	12	6
Row percentage	2.5	8.6	16.0	50.6	14.8	7.4
DPMA Responses (N=178)						
Frequency	64	25	32	31	13	13
Row percentage	36.0	14.0	18.0	17.4	7.3	7.3
Chi-square value: 51.2590						
P value: .0000						
Significant at the .01 value: Yes						

TABLE XVII

COMPARISON OF COMPUTER WORK ENVIRONMENTS OF THE AACSB RESPONDENTS AND THE DPMA RESPONDENTS

Aspect of Job Environment: Use of Mainframe

	Mainframe Employed	Mainframe Not Employed
AACSB Responses (N=97)		
Frequency	67	30
Row percentage	69.1	30.9
DPMA Responses (N=176)		
Frequency	172	4
Row percentage	97.7	2.3
Chi-square value:	45.5034	
P value:	.0000	
Significant at the .01 value:	Yes	

TABLE XVII (continued)

Aspect of Job Environment: Use of Microcomputer		
	Microcomputer employed	Microcomputer not employed
AACSB Responses (N=97)		
Frequency	75	22
Row percentage	77.3	22.7
DPMA Responses (N=174)		
Frequency	158	16
Row percentage	90.8	9.2
Chi-square value:	8.3088	
P value:	.0039	
Significant at the .01 value:	Yes	

TABLE XVII (continued)

Aspect of Job Environment: Predominant Programming Language Employed

	BASIC	COBOL	FORTRAN	PL/1	RPG	PASCAL
AACSB Responses (N=97)						
Frequency	16	41	2	0	0	1
Row percentage	26.7	68.3	3.3	0.0	0.0	1.7
DPMA Responses (N=176)						
Frequency	5	121	5	4	9	1
Row percentage	3.4	83.4	3.4	2.8	6.2	0.7

Chi-square value: 29.3569

P value: .0000

Significant at the .01 value: Yes

TABLE XVIII

COMPARISON OF IMPORTANCE RATINGS OF SELECTED SYSTEMS ANALYSIS AND DESIGN TOOLS BY AACSB RESPONDENTS WITH SCHOOL OF BUSINESS ENROLLMENTS OF 2,000 OR LESS AND AACSB RESPONDENTS WITH SCHOOL OF BUSINESS ENROLLMENTS OF MORE THAN 2,000

	Not important 1	2	3	4	Extremely important 5
		Tool: PERT			
AACSB responses with 2,000 or less business students (N=38)					
Frequency	2	15	8	8	5
Row percentage	5.3	39.5	21.1	21.1	13.2
AACSB responses with more than 2,000 business students (N=40)					
Frequency	7	5	12	16	0
Row percentage	17.5	12.5	30.0	40.0	0.0

Chi-square value: 16.2038

P value: .0028

Significant at the .01 value: Yes

TABLE XVIII (continued)

	Not important 1	2	3	4	Extremely important 5
	Tool:	System Walkthrough			
AACSB responses with 2,000 or less business students (N=48)					
Frequency	0	14	14	15	5
Row percentage	0.0	29.2	29.2	31.3	10.4
AACSB responses with more than 2,000 business students (N=38)					
Frequency	0	3	8	12	15
Row percentage	0.0	7.9	21.1	31.6	39.5
Chi-square value:		13.1017			
P value:		.0044			
Significant at the .01 value:		Yes			

TABLE XVIII (continued)

	Not important 1	2	3	4	Extremely important 5
		Tool: File Design			
AACSB responses with 2,000 or less business students (N=38)					
Frequency	0	4	13	16	12
Row percentage	0.0	8.9	28.9	35.6	26.7
AACSB responses with more than 2,000 business students (N=40)					
Frequency	1	2	2	8	24
Row percentage	2.7	5.4	5.4	21.6	64.9

Chi-square value: 15.7696

P value: .0033

Significant at the .01 value: Yes

TABLE XIX

COMPARISON OF IMPORTANCE RATINGS OF SELECTED SYSTEMS ANALYSIS AND DESIGN TOOLS BY DPMA RESPONDENTS WITH DATA PROCESSING DEPARTMENTS WITH 50 OR FEWER EMPLOYEES AND DPMA RESPONDENTS WITH MORE THAN 50 EMPLOYEES

	Not important 1	2	3	4	Extremely important 5
		Tool: PERT			
DPMA respondents with D.P. dept. of 50 or less employees (N=79)					
Frequency	2	10	12	35	20
Row percentage	2.5	12.7	15.2	44.3	25.3
DPMA respondents with D.P. dept. of more than 50 employees (N=83)					
Frequency	4	3	14	21	41
Row percentage	4.8	3.6	16.9	25.3	49.4

Chi-square value: 15.2297

P value: .0042

Significant at the .01 value: Yes

APPENDIX F

RESULTS OF SELECTED ITEMS WITHIN
THE STUDY INSTRUMENT

TABLE XX

UNDERGRADUATE INFORMATION PROCESSING COURSES
WHICH ARE CURRENTLY OFFERED THROUGH
RESPONDING AACSB MEMBERS
SCHOOL OF BUSINESS
N=98

	Course Is Offered		Course Is Not Offered	
Course Title	Frequency	Percentage	Frequency	Percentage
Intro. to Comp.-Based Sys.	81	82.7	17	17.3
Applications Prog. Dev. (COBOL)	65	66.3	33	33.7
Applications Prog. Dev. II (COBOL)	45	45.9	53	54.1
Database Program Dev.	63	64.3	35	35.7
Applied Software Dev. Project	35	35.7	63	64.3
Software/Hardware Concepts	28	28.6	70	71.4
Office Automation	19	19.4	79	80.6
Decision Support Systems	41	41.8	57	58.2
Advanced Database	8	8.8	90	91.8
Distributive Data Proc.	13	13.3	85	86.7
EDP Audit	22	22.4	76	77.6
Info. Systems Planning	18	18.4	80	81.6
Info. Resource Management	18	18.4	80	81.6
Management of Info. Systems	45	45.9	53	54.1
Data Communications	23	23.5	75	76.5

TABLE XXI

COMPARISON OF RATINGS OF SYSTEMS ANALYSIS AND DESIGN TOOLS BY AACSB RESPONDENTS AND DPMA RESPONDENTS

	AACSB Responses						DPMA Responses					
Item	N	1	2	3	4	5	N	1	2	3	4	5
Codes and Coding (45.42)*	86	8	24	32	16	6	165	4	14	36	56	55
Forms Design (12.86)	88	4	22	28	25	8	175	13	19	47	61	35
Chart Construction (2.72)	84	10	27	25	13	9	145	24	41	44	37	9
Decision Tables (10.76)	93	6	20	36	19	12	135	22	40	34	29	10
Critical Path Network (14.30)	86	3	26	27	25	4	136	22	23	41	39	11
Gantt-Type Charts (18.72)*	82	3	25	27	17	10	139	16	14	50	45	14
Flowchart (22.91)*	90	1	13	14	20	42	166	13	24	44	51	34
HIPO Chart (17.89)*	90	7	16	23	29	15	117	28	22	38	22	7
Technical Writing (12.99)	83	1	9	13	23	27	154	5	11	27	72	39
Information Services Request (29.20)*	77	5	20	23	17	12	163	6	13	26	57	61
Feasibility Analysis (7.65)	94	0	7	23	28	26	159	6	24	39	53	37
Candidate Evaluation Matrix (7.56)	73	6	15	19	23	10	93	21	17	26	21	8

TABLE XXI (continued)

Item	AACSB Responses N	1	2	3	4	5	DPMA Responses N	1	2	3	4	5
Input Design (6.04)	88	1	7	32	32	16	162	7	17	41	57	39
Output Design (6.18)	92	3	10	27	27	25	173	5	9	37	60	62
Printer Spacing Chart (42.05)*	73	17	24	19	3	10	158	10	18	47	45	38
File Design (6.39)	86	1	6	16	27	36	169	1	5	18	57	88
Logical Report Layout (14.84)*	82	4	19	24	19	16	149	11	11	35	50	42
Payback Analysis (3.15)	80	6	15	30	17	12	113	15	23	32	22	21
PERT (6.72)	80	9	21	21	24	5	113	17	31	33	18	14
Linear Programming (9.62)	55	26	6	13	4	6	68	25	20	13	8	2
Data Flow Diagram (26.14)*	92	3	4	24	23	38	153	6	24	58	43	22
Data Dictionary (5.61)	91	2	13	24	23	29	125	9	11	27	41	37
Decision Tree (16.52)*	83	7	19	29	16	12	85	25	20	22	15	3
Program Walkthrough (6.31)	83	3	17	30	20	13	142	12	19	39	47	25
Interview (3.97)	90	4	12	17	30	27	163	7	10	31	58	57
Pseudocode (10.56)	82	8	22	24	15	13	113	20	30	36	23	4

TABLE XXI (continued)

Item	AACSB Responses N	1	2	3	4	5	DPMA Responses N	1	2	3	4	5
Warnier-Orr Diagram (9.34)	67	14	12	17	17	7	63	26	14	12	8	3
Data Base Design (10.72)	82	3	10	22	26	21	147	4	7	26	46	64
System User-Manual Preparation (33.00)*	85	6	16	26	20	17	170	1	8	33	60	68
Computer Hardware Capacity and Performance Planning (6.68)	73	8	14	31	13	7	111	17	18	30	33	13
Computer Software Performance Evaluation (4.62)	78	6	20	19	21	12	151	7	26	51	47	20
System Walkthrough (7.87)	89	0	17	25	27	30	155	6	15	41	55	38
Oral Presentations and Reports (6.86)	85	2	6	15	25	37	178	1	12	52	56	57
Algorithm (4.58)	64	9	12	20	16	7	135	9	20	48	34	24
Data Element Analysis (9.09)	70	8	16	21	14	11	123	5	16	37	34	31

N = Number of Responses

1 = Not Important

2 = Slightly Important

3 = Moderately Important

4 = Very Important

5 = Extremely Important

Chi-square values are in parentheses.

*Significant at .01 level.

TABLE XXII

COMPARISON OF IMPORTANCE RANKINGS OF SYSTEMS ANALYSIS AND DESIGN JOB FUNCTIONS BY AACSB RESPONDENTS AND DPMA RESPONDENTS

	AACSB Responses							DPMA Responses						
Job Function	N	1	2	3	4	5	6	N	1	2	3	4	5	6
To analyze systems with problems and to design new or modified systems to solve these problems. (7.70)	81	16	2	2	0	13	48	178	20	8	1	5	33	111
To develop manuals to communicate company procedures. (18.63)*	81	12	24	23	10	5	7	178	30	31	32	60	15	8
To design the various business forms used to collect data and distribute information. (9.78)	81	15	18	21	15	8	4	178	12	35	61	42	21	7
To perform records management, including the distribution and use of reports. (9.50)	81	31	16	17	7	6	4	178	41	50	29	22	22	14

TABLE XXII (continued)

	AACSB Responses							DPMA Responses						
Job Function	N	1	2	3	4	5	6	N	1	2	3	4	5	6
To participate in the evaluation of equipment and to define standards of equipment selection. (51.26)	81	2	7	13	41	12	6	178	64	25	32	31	13	13
To interface with data processing to coordinate the development of systems whenever computer-oriented systems have been selected. (5.84)	81	3	12	3	5	40	18	178	11	23	18	18	72	34

N = Number of Responses

1 = Least Important

6 = Most Important

Chi-square values are in parentheses.

*Significant at .01 level.

TABLE XXIII

COMPARISON OF RATINGS OF SYSTEMS ANALYSIS AND DESIGN TOOLS BY AACSB RESPONDENTS WHO TEACH WITHIN A SCHOOL OF BUSINESS WITH AN UNDERGRADUATE ENROLLMENT OF 2,000 OR LESS STUDENTS AND THOSE WHICH TEACH IN BUSINESS SCHOOLS WITH AN UNDERGRADUATE ENROLLMENT OF MORE THAN 2,000 STUDENTS

	Schools With 2,000 or Less Undergraduate Students						Schools With More Than 2,000 Undergraduate Students					
Item	N	1	2	3	4	5	N	1	2	3	4	5
Codes and Coding (3.04)	42	5	9	19	6	3	41	3	12	13	10	3
Forms Design (5.52)	45	4	12	12	11	6	41	0	10	14	14	3
Chart Construction (5.39)	41	7	14	13	5	2	41	3	12	11	8	7
Decision Tables (5.97)	47	3	13	20	7	4	43	2	6	15	12	8
Critical Path Networks (5.70)	40	1	14	15	9	1	42	2	9	12	16	3
Gantt-Type Chart (2.12)	39	1	14	12	9	3	41	1	11	14	8	7
Flowchart Preparation and Use (9.85)	47	0	10	9	13	15	41	1	3	5	7	25
HIPO Chart (4.58)	45	6	7	9	16	7	42	1	8	13	13	7
Technical Writing (4.30)	43	1	7	8	11	16	37	0	2	5	11	19
Information Services Request (8.46)	37	5	10	10	9	3	37	0	8	12	8	9

TABLE XXIII (continued)

Item	Schools With 2,000 or Less Undergraduate Students						Schools With More Than 2,000 Undergraduate Students					
	N	1	2	3	4	5	N	1	2	3	4	5
Feasibility Analysis (6.38)	49	0	4	15	21	9	41	0	2	7	15	17
Candidate Evaluation Matrix (12.27)	37	5	12	10	6	4	34	1	3	9	15	6
Input Design (10.72)	46	1	7	18	15	5	40	0	0	13	16	11
Output Design (7.03)	47	1	6	18	13	9	42	2	2	9	13	16
Printer Spacing Charts (3.36)	36	10	13	9	1	3	35	6	10	10	2	7
File Design (15.77)*	45	0	4	13	16	13	37	1	2	2	8	24
Logical Report Layout (6.61)	42	1	13	12	11	5	37	3	6	10	7	11
Payback Analysis (11.77)	40	2	12	13	10	3	36	4	2	15	6	9
PERT (16.20)*	38	2	15	8	8	5	40	7	5	12	16	0
Linear Programming (3.01)	27	11	2	8	2	4	26	14	4	4	2	2
Data Flow Diagrams (8.86)	49	3	4	15	12	15	40	0	0	9	10	21
Data Dictionary (8.32)	46	2	10	12	12	10	42	0	3	12	9	18
Decision Trees (8.72)	43	3	12	18	7	3	36	4	5	9	9	9

TABLE XXIII (continued)

Item	Schools With 2,000 or Less Undergraduate Students N	1	2	3	4	5	Schools With More Than 2,000 Undergraduate Students N	1	2	3	4	5
Program Walkthrough (5.16)	41	2	9	16	11	3	39	1	8	12	8	10
Interview (11.59)	46	3	6	13	16	8	41	0	5	4	14	18
Pseudocode (4.28)	38	5	10	12	8	3	41	3	9	12	7	10
Warnier-Orr Diagram (3.87)	27	8	4	5	8	2	38	5	8	11	9	5
Data Base Design (7.22)	43	1	8	11	15	8	36	2	1	9	11	13
System User-Manual Preparation (13.20)	47	4	14	16	7	6	36	2	2	9	13	10
Computer Hardware Capacity and Performance Planning (6.05)	35	5	17	17	5	1	35	3	7	11	8	6
Computer Software Performance Evaluation (10.61)	39	1	13	12	11	2	36	5	7	7	8	9
System Walkthrough (13.10)*	48	0	14	14	15	5	38	0	3	8	12	15
Oral Presentations and Reports (9.96)	44	2	3	8	18	13	38	0	3	7	6	22
Algorithm (10.52)	32	4	7	14	6	1	30	5	5	4	10	6
Data Element Analysis (3.55)	34	5	10	10	4	5	35	3	6	11	9	6

TABLE XXIII (continued)

N = Number of Responses

1 = Not Important

2 = Slightly Important

3 = Moderately Important

4 = Very Important

5 = Extremely Important

Chi-square values are in parentheses.

*Significant at .01 level.

TABLE XXIV

COMPARISON OF RATINGS OF SYSTEMS ANALYSIS AND DESIGN TOOLS BY AACSB RESPONDENTS WHO TEACH WITHIN A SCHOOL OF BUSINESS THAT OFFERS AN UNDERGRADUATE DEGREE IN INFORMATION SYSTEMS AND THOSE WHICH DO NOT

	Schools Which Offer Degree						Schools Which Do Not Offer Degree					
Item	N	1	2	3	4	5	N	1	2	3	4	5
Codes and Coding (7.86)	53	3	11	22	13	4	33	5	13	10	3	2
Forms Design (12.77)	57	2	8	20	21	6	31	2	14	8	4	3
Chart Construction (2.70)	53	5	15	17	9	7	31	5	12	8	4	2
Decision Tables (0.86)	61	4	12	23	13	9	32	2	8	13	6	3
Critical Path Network (5.79)	57	1	16	21	17	2	29	2	10	6	8	2
Gantt-Type Chart (8.10)	54	0	17	16	13	8	28	3	8	11	4	2
Flowchart Preparation and Use (3.34)	57	1	7	7	15	27	33	0	6	7	5	15
HIPO Chart (4.48)	59	3	10	13	21	12	31	4	6	10	10	8
Technical Writing (9.50)	56	0	5	7	13	31	27	1	4	6	10	6
Information Services REquest (5.34)	51	2	13	14	11	11	26	3	7	9	6	1
Feasibility Analysis (6.49)	61	0	3	11	28	19	33	0	4	12	10	7

TABLE XXIV (continued)

Item	Schools Which Offer Degree						Schools Which Do Not Offer Degree					
	N	1	2	3	4	5	N	1	2	3	4	5
Candidate Evaluation Matrix (3.72)	49	4	8	13	15	9	24	2	7	6	8	1
Input Design (9.92)	58	1	1	21	23	12	30	0	6	11	9	4
Output Design (3.66)	61	2	4	18	19	18	31	1	6	9	8	7
Printer Spacing Chart (6.73)	46	8	13	14	2	9	27	9	11	5	1	1
File Design (5.33)	56	0	3	8	20	25	30	1	3	8	7	11
Logical Report Layout (5.83)	53	2	10	18	10	13	29	2	9	6	9	3
Payback Analysis (7.45)	49	1	8	22	10	8	31	5	7	8	7	4
PERT (3.76)	51	8	12	13	14	4	29	1	9	8	10	1
Linear Programming (1.67)	31	17	3	6	2	3	24	9	3	7	2	3
Data Flow Diagrams (6.31)	59	2	2	11	15	29	33	1	2	13	8	9
Data Dictionary (9.56)	61	1	4	18	17	21	30	1	9	6	6	8
Decision Tree (5.33)	55	6	11	20	8	10	28	1	8	9	8	2
Program Walkthrough (1.29)	53	2	11	18	12	10	30	1	6	12	8	3
Interview (2.75)	60	2	8	9	21	20	30	2	4	8	9	7

TABLE XXIV (continued)

	Schools Which Offer Degree						Schools Which Do Not Offer Degree					
Item	N	1	2	3	4	5	N	1	2	3	4	5
Pseudocode (4.11)	54	3	15	15	11	10	28	5	7	9	4	3
Warnier-Orr Diagram (.71)	43	10	8	10	11	4	24	4	4	7	6	3
Data Base Design (1.43)	53	2	6	14	19	12	29	1	4	8	7	9
System User-Manual Preparation (7.50)	56	5	9	17	10	15	29	1	7	9	10	2
Computer Hardware Capacity and Performance (3.17)	46	5	9	20	6	6	27	3	5	11	7	1
Computer Software Performance Evaluation (3.96)	49	5	13	12	10	9	29	1	7	7	11	3
System Walkthrough (2.12)	58	0	9	17	17	15	31	0	8	8	10	5
Oral Presentation and Reports (1.60)	57	1	3	11	16	26	28	1	3	4	9	11
Algorithm (5.96)	43	9	8	11	10	5	21	0	4	9	6	2
Data Element Analysis (3.87)	45	6	8	12	11	8	25	2	8	9	3	3

N = Number of Responses
1 = Not Important
2 = Slightly Important
3 = Moderately Important
4 = Very Important
5 = Extremely Important

Chi-square values are in parentheses.

*Significant at .01 level.

TABLE XXV

COMPARISON OF RATINGS OF SYSTEMS ANALYSIS AND DESIGN TOOLS BY DPMA RESPONDENTS WITH COMPUTER-RELATED DEGREES AND THOSE WITH NONCOMPUTER-RELATED DEGREES

	DPMA Members With Computer-Related Degree						DPMA Members With Noncomputer-Related Degree					
Item	N	1	2	3	4	5	N	1	2	3	4	5
Codes and Coding (1.82)	54	2	4	14	20	14	65	2	6	16	18	23
Forms Design (.59)	58	4	6	17	17	14	72	6	10	20	21	15
Chart Construction (3.42)	46	5	12	15	10	4	64	13	21	17	10	3
Decision Tables (4.22)	42	8	11	9	11	3	58	8	23	16	8	3
Critical Path Network (4.30)	37	5	5	11	10	6	58	13	11	16	15	3
Gantt-Type Chart (5.73)	40	7	4	7	16	6	59	8	7	22	18	4
Flowchart Preparation and Use (1.34)	52	4	7	16	14	11	68	4	12	16	22	14
HIPO Chart (2.82)	40	9	8	11	10	2	50	15	11	16	6	2
Technical Writing (4.28)	49	2	3	8	21	15	66	1	4	13	37	11
Information Services Request (.44)	52	2	4	9	18	19	66	2	6	9	23	26
Feasibility Analysis (2.85)	47	2	8	7	19	11	68	4	11	17	19	17

TABLE XXV (continued)

Item	DPMA Members With Computer-Related Degree N	1	2	3	4	5	DPMA Members With Noncomputer-Related Degree N	1	2	3	4	5
Candidate Evaluation Matrix (3.53)	30	7	7	6	7	3	44	10	8	17	7	2
Input Design (4.25)	51	3	2	14	18	14	67	4	10	19	20	14
Output Design (1.06)	56	2	4	10	18	32	71	2	5	18	21	25
Printer Spacing Chart (1.61)	49	5	3	15	12	14	67	4	7	22	18	16
File Design (3.22)	50	1	1	8	15	25	71	0	2	6	23	40
Logical Report Layout (8.81)	46	6	0	12	14	14	64	4	10	15	17	18
Payback Analysis (2.85)	32	6	4	10	4	8	50	7	13	15	7	8
PERT (1.05)	33	7	8	7	6	5	49	7	14	13	9	6
Linear Programming (5.71)	21	4	8	6	2	1	36	18	9	5	3	1
Data Flow Diagram (5.45)	52	0	9	19	14	10	62	4	12	25	15	6
Data Dictionary (3.20)	40	3	2	8	12	15	56	4	8	12	18	14
Decision Trees (1.86)	26	6	8	5	6	1	40	15	10	7	6	3
Program Walkthrough (.86)	45	4	5	14	13	9	58	5	10	16	15	12

TABLE XXV (continued)

Item	DPMA Members With Computer-Related Degree						DPMA Members With Noncomputer-Related Degree					
	N	1	2	3	4	5	N	1	2	3	4	5
Interview (5.09)	53	1	1	11	19	21	68	5	6	10	23	24
Pseudocode (2.07)	37	7	13	9	6	2	48	11	12	13	11	1
Warnier-Orr Diagram (3.48)	18	9	5	3	0	1	15	6	6	6	5	1
Data Base Design (6.82)	49	0	2	6	15	26	60	3	3	15	18	21
System User-Manual Preparation (5.97)	54	1	2	6	21	24	70	0	2	19	23	26
Computer Hardware Capacity and Performance Planning (2.16)	38	5	8	11	8	6	46	10	8	12	12	4
Computer Software Performance Evaluation (4.11)	51	1	10	14	17	9	61	4	14	22	15	6
System Walkthrough (6.56)	47	2	4	9	21	11	64	2	9	21	15	17
Oral Presentations and Reports (3.00)	57	1	4	15	15	22	73	0	6	25	21	21
Algorithm (6.32)	44	2	5	13	12	12	56	5	14	18	12	7
Data Element Analysis (9.72)	42	3	3	17	6	13	50	1	10	12	16	11

TABLE XXV (continued)

N = Number of Responses

1 = Not Important

2 = Slightly Important

3 = Moderately Important

4 = Very Important

5 = Extremely Important

Chi-square values are in parentheses.

*Significant at .01 level.

TABLE XXVI

COMPARISON OF RATINGS OF SYSTEMS ANALYSIS AND DESIGN TOOLS BY DPMA RESPONDENTS WHO HAVE RECEIVED FORMAL COMPANY TRAINING IN SYSTEMS ANALYSIS AND DESIGN AND THOSE WHO HAVE NOT

	DPMA Members Who Have Received Training						DPMA Members Who Have Not Received Training					
Item	N	1	2	3	4	5	N	1	2	3	4	5
Codes and Coding (5.32)	88	2	9	23	25	2	56	2	2	10	24	18
Forms Design (4.10)	97	9	13	25	33	17	58	3	5	16	17	17
Chart Construction (3.08)	85	12	23	26	18	6	43	10	13	12	7	1
Decision Tables	76	11	21	22	16	6	43	7	15	9	8	4
Critical Path Network (6.35)	76	11	9	28	20	8	40	9	9	8	12	2
Gantt-Type Chart (10.01)	82	7	7	26	34	8	39	8	6	15	6	4
Flowchart Preparation and Use (4.08)	89	4	12	21	34	18	55	5	10	14	13	13
HIPO Chart (1.32)	69	17	13	22	12	5	36	8	8	11	8	1
Technical Writing (1.48)	86	2	6	15	40	23	49	1	4	8	27	9
Information Services Request (2.58)	89	2	7	15	30	35	53	4	4	8	19	18
Feasibility Analysis (4.78)	90	3	11	26	27	23	50	3	10	9	19	9
Candidate Evaluation Matrix (2.82)	50	9	10	17	11	3	32	9	6	8	5	4

TABLE XXVI (continued)

Item	DPMA Members Who Have Received Training						DPMA Members Who Have Not Received Training					
	N	1	2	3	4	5	N	1	2	3	4	5
Input Design (3.04)	87	4	8	26	27	22	55	3	5	13	22	12
Output Design (3.86)	94	3	8	19	28	36	59	1	1	13	22	22
Printer Spacing Chart (1.82)	83	5	6	24	27	21	56	4	6	19	13	14
File Design (6.83)	90	1	3	5	34	47	58	0	1	10	16	31
Logical Report Layout (1.58)	80	6	7	17	25	25	50	4	3	15	15	13
Payback Analysis (11.92)	67	4	15	22	11	15	30	9	4	8	6	3
PERT (4.42)	65	7	18	19	13	8	32	8	9	8	3	4
Linear Programming (2.68)	39	12	14	8	4	1	22	10	4	4	3	1
Data Flow Diagram (1.50)	82	2	14	31	24	11	51	3	8	21	12	7
Data Dictionary (2.47)	70	4	5	17	22	22	39	3	5	7	15	9
Decision Trees (1.22)	48	13	12	11	10	2	25	8	8	5	3	1
Program Walkthrough (12.91)	78	2	9	24	25	18	46	8	8	10	16	4
Interview (3.10)	89	4	5	17	27	36	57	2	5	11	23	16
Pseudocode (1.84)	61	9	16	21	13	2	38	9	10	10	7	2

TABLE XXVI (continued)

Item	DPMA Members Who Have Received Training						DPMA Members Who Have Not Received Training					
	N	1	2	3	4	5	N	1	2	3	4	5
Warnier-Orr Diagram (4.30)	39	15	7	11	5	1	18	9	5	1	2	1
Data Base Design (6.20)	80	2	4	9	28	37	50	1	3	14	14	18
System User-Manual Preparation (3.76)	93	0	3	16	36	38	56	1	3	14	18	20
Computer Hardware Capacity and Performance Planning (4.62)	59	7	8	16	19	9	39	8	9	11	7	4
Computer Software Performance Evaluation (6.72)	80	2	12	24	30	12	52	3	14	17	10	8
System Walkthrough (6.41)	84	1	10	19	28	26	50	3	4	17	17	9
Oral Presentations and Reports (4.22)	95	0	6	27	27	35	61	1	6	19	20	15
Algorithm (4.70)	72	5	16	22	16	13	47	2	4	19	13	9
Data Element Analysis (2.88)	67	3	8	18	19	19	42	1	7	16	10	8

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1 = Not Important

2 = Slightly Important

3 = Moderately Important

4 = Very Important

5 = Extremely Important

Chi-square values are in parentheses.

*Significant at .01 level.

TABLE XXVII

COMPARISON OF RATINGS OF SYSTEMS ANALYSIS AND DESIGN TOOLS BY DPMA RESPONDENTS WITH LESS THAN 3 YEARS WORK EXPERIENCE AS A SYSTEMS ANALYST, 3-6 YEARS, AND MORE THAN 6 YEARS OF WORK EXPERIENCE

DPMA Members With Less Than 3 Years Experience						DPMA Members With 3 to 6 Years Experience						DPMA Members With More Than 6 Years Experience					
N	1	2	3	4	5	N	1	2	3	4	5	N	1	2	3	4	5
Item: Codes and Coding (10.81)																	
28	0	1	6	14	7	44	0	2	12	16	14	71	4	8	15	19	25
Item: Forms Design (2.87)																	
30	3	3	8	9	7	47	2	4	12	18	11	77	7	11	20	23	16
Item: Chart Construction (7.74)																	
22	5	7	7	3	0	37	6	11	12	4	4	68	11	18	18	18	3
Item: Decision Tables (9.24)																	
19	5	4	5	5	0	29	5	11	5	7	1	70	9	19	21	12	9
Item: Critical Path Networks (9.97)																	
18	5	3	6	2	2	35	5	7	14	6	3	62	9	9	15	24	5
Item: Gantt-Type Chart (13.92)																	
17	5	0	4	8	0	35	4	5	9	13	4	68	5	8	28	19	8
Item: Flowchart Preparation and Use (7.19)																	
31	0	7	9	10	5	41	2	6	8	13	12	71	7	10	18	23	13

TABLE XXVII (continued)

DPMA Members With Less Than 3 Years Experience						DPMA Members With 3 to 6 Years Experience						DPMA Members With More Than 6 Years Experience					
N	1	2	3	4	5	N	1	2	3	4	5	N	1	2	3	4	5
Item: HIPO Chart (15.53)																	
19	8	3	6	2	0	31	3	8	10	5	5	54	14	10	17	12	1
Item: Technical Writing (2.13)																	
25	1	2	4	13	5	40	0	3	6	20	11	70	2	6	13	33	16
Item: Information Services Request (3.36)																	
28	1	1	4	11	11	41	1	5	6	13	16	72	4	5	14	24	25
Item: Feasibility Analysis (6.89)																	
28	1	5	4	11	7	38	2	7	12	13	4	72	3	9	19	21	20
Item: Candidate Evaluation Matrix (7.43)																	
17	5	2	6	4	0	18	2	6	6	3	1	46	11	7	13	9	6
Item: Input Design (5.56)																	
32	1	1	8	12	10	43	3	5	11	16	8	66	3	8	19	20	16
Item: Output Design (11.76)																	
32	0	4	4	9	15	44	0	0	11	16	17	75	4	5	16	24	26
Item: Printer Spacing Charts (9.40)																	
29	4	2	4	9	10	38	2	2	15	9	10	70	3	7	23	22	15

TABLE XXVII (continued)

DPMA Members With Less Than 3 Years Experience						DPMA Members With 3 to 6 Years Experience						DPMA Members With More Than 6 Years Experience					
N	1	2	3	4	5	N	1	2	3	4	5	N	1	2	3	4	5
Item: File Design (4.91)																	
29	0	0	3	8	18	44	0	2	3	13	26	74	1	2	8	28	35
Item: Logical Report Layoug (9.57)																	
27	4	2	6	4	11	40	1	5	10	14	10	63	5	3	16	22	17
Item: Payback Analysis (4.31)																	
16	2	2	5	5	2	33	5	7	11	5	5	47	6	10	14	6	11
Item: PERT (3.86)																	
16	4	4	4	3	1	29	3	9	10	3	4	51	8	13	13	10	7
Item: Linear Programming (6.69)																	
13	6	2	3	1	1	17	3	7	4	2	1	31	13	9	5	4	0
Item: Data Flow Diagrams (4.95)																	
28	1	6	12	6	3	36	1	4	12	14	5	68	3	12	27	15	11
Item: Data Dictionary (15.46)																	
19	2	2	2	10	3	34	0	5	5	9	15	55	5	3	16	18	13
Item: Decision Trees (5.80)																	
11	4	4	0	2	1	18	5	4	8	4	0	44	12	12	12	6	2

TABLE XXVII (continued)

DPMA Members With Less Than 3 Years Experience						DPMA Members With 3 to 6 Years Experience						DPMA Members With More Than 6 Years Experience					
N	1	2	3	4	5	N	1	2	3	4	5	N	1	2	3	4	5
Item: Program Walkthrough (8.40)																	
25	4	4	3	8	6	39	1	4	11	14	9	60	5	9	19	19	8
Item: Interview (5.46)																	
30	1	1	7	11	10	44	2	4	11	15	12	70	3	5	9	23	30
Item: Pseudocode (4.76)																	
19	4	7	5	3	0	31	3	8	11	7	2	48	11	11	14	10	2
Item: Warnier-Orr Diagram (15.61)																	
11	8	3	0	0	0	15	3	3	7	1	1	31	13	6	5	6	1
Item: Data Base Design (1.01)																	
22	0	1	4	7	10	39	1	2	7	13	16	68	2	4	10	22	30
Item: System User-Manual Preparation (5.72)																	
29	1	1	6	8	13	44	0	2	9	16	17	75	0	3	14	31	27
Item: Computer Hardware Capacity and Performance Planning (6.41)																	
20	6	3	6	4	1	24	3	3	7	8	3	53	6	10	13	15	9
Item: Computer Software Performance Evaluation (6.09)																	
25	1	6	3	10	5	39	1	8	14	10	6	67	3	11	24	20	9

TABLE XXVIII (continued)

DPMA Members With Less Than 3 Years Experience						DPMA Members With 3 to 6 Years Experience						DPMA Members With More Than 6 Years Experience					
N	1	2	3	4	5	N	1	2	3	4	5	N	1	2	3	4	5
Item: System Walkthrough (2.99)																	
23	1	2	5	10	5	40	1	3	13	13	10	70	2	9	18	21	20
Item: Oral Presentations and Reports (11.00)																	
32	1	2	12	5	12	48	0	2	14	14	18	75	0	8	20	27	20
Item: Algorithm (13.27)																	
22	3	2	7	5	5	32	1	6	8	6	11	64	3	12	24	19	5
Item: Data Element Analysis (15.38)																	
20	2	5	2	5	6	32	0	1	12	13	6	55	2	9	19	19	11

N = Number of Responses

1 = Not Important

2 = Slightly Important

3 = Moderately Important

4 = Very Important

5 = Extremely Important

Chi-square values are in parentheses.

*Significant at .01 level.

TABLE XXVIII

COMPARISON OF RATINGS OF SYSTEMS ANALYSIS AND DESIGN TOOLS BY DPMA RESPONDENTS WHO WORK FOR A COMPANY WITH A DATA PROCESSING DEPARTMENT WITH 50 OR FEWER EMPLOYEES AND THOSE WHO WORK WITHIN A DATA PROCESSING DEPARTMENT WITH MORE THAN 50 EMPLOYEES

	DPMA Members Who Work Within a DP Dept. With 50 or Less Employees						DPMA Members Who Work Within a DP Dept. With More Than 50 Employees					
Item	N	1	2	3	4	5	N	1	2	3	4	5
Codes and Coding (2.18)	85	2	5	20	31	27	78	2	9	16	24	27
Forms Design (3.01)	91	7	7	27	29	21	82	6	11	20	31	14
Chart Construction (2.19)	67	11	23	17	12	4	76	13	18	25	15	5
Decision Tables (2.89)	64	12	20	16	14	2	69	10	20	18	14	7
Critical Path Network (3.71)	64	13	13	16	16	6	71	9	10	24	23	5
Gantt-Type Chart (9.95)	62	13	6	21	16	6	75	3	8	28	28	8
Flowchart Preparation and Use (2.56)	85	5	12	26	24	18	79	8	12	17	26	16
HIPO Chart (5.99)	53	16	11	12	12	2	62	12	10	25	10	5
Technical Writing (3.64)	76	2	6	17	32	19	76	3	5	9	40	19
Information Services Request (15.23)*	79	2	10	12	35	20	83	4	3	14	21	41
Feasibility Analysis (6.93)	77	2	11	23	29	12	80	4	13	15	24	24

TABLE XXVIII (continued)

Item	DPMA Members Who Work Within a DP Dept. With 50 or Less Employees						DPMA Members Who Work Within a DP Dept. With More Than 50 Employees					
	N	1	2	3	4	5	N	1	2	3	4	5
Candidate Evaluation Matrix (7.34)	45	15	9	8	10	3	46	6	8	17	11	4
Input Design (2.90)	87	3	8	22	34	20	72	4	9	19	22	18
Output Design (2.92)	91	1	4	19	32	35	80	4	5	17	28	26
Printer Spacing Chart (0.84)	84	5	10	26	22	21	72	5	7	21	23	16
File Design (1.89)	90	0	3	10	33	44	77	1	2	8	24	42
Logical Report Layout (7.24)	71	8	6	11	26	20	76	3	5	24	23	21
Payback Analysis (2.02)	51	8	11	14	11	7	61	7	11	18	11	14
PERT (8.11)	52	13	13	12	7	7	60	4	17	21	11	7
Linear Programming (4.07)	32	15	6	6	4	1	35	10	14	6	4	1
Data Flow Diagram (5.60)	80	4	16	30	23	7	71	2	8	28	19	14
Data Dictionary (2.36)	60	5	6	11	23	15	63	4	5	15	18	21
Decision Trees (5.39)	39	15	9	6	8	1	44	10	11	15	6	2
Program Walkthrough (5.26)	71	5	12	22	24	8	69	7	7	16	23	16

TABLE XXVIII (continued)

Item	DPMA Members Who Work Within a DP Dept. With 50 or Less Employees						DPMA Members Who Work Within a DP Dept. With More Than 50 Employees					
	N	1	2	3	4	5	N	1	2	3	4	5
Interview (6.75)	83	5	5	15	36	22	78	2	5	16	22	23
Pseudocode (3.44)	60	12	13	20	14	1	53	8	17	16	8	3
Warnier-Orr Diagram (3.35)	30	14	7	3	4	2	33	12	7	9	4	1
Data Base Design (6.93)	73	2	6	14	23	28	72	2	0	12	23	35
System User-Manual Preparation (2.71)	89	1	6	17	32	33	79	0	2	16	28	33
Computer Hardware Capacity and Performance Planning (6.56)	53	11	12	13	12	5	57	6	6	17	20	8
Computer Software Performance Evaluation (2.56)	79	5	16	25	22	11	71	2	10	26	24	9
System Walkthrough (4.23)	79	4	6	23	31	15	74	2	9	18	23	22
Oral Presentations and Reports (2.04)	92	1	7	28	26	30	84	0	5	23	30	26
Algorithm (10.72)	69	7	4	24	20	14	64	2	15	23	14	10
Data Element Analysis (6.55)	61	4	11	20	14	12	61	1	5	17	20	18

TABLE XXVIII (continued)

N = Number of Responses

1 = Not Important

2 = Slightly Important

3 = Moderately Important

4 = Very Important

5 = Extremely Important

Chi-square values are in parentheses.

*Significant at .01 level.

VITA

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Doctor of Education

Thesis: THE RELATIONSHIP BETWEEN THE IMPORTANCE OF SELECTED SYSTEMS ANALYSIS AND DESIGN TOOLS AND JOB FUNCTIONS AS PERCEIVED BY INDUSTRIAL SYSTEMS ANALYSTS AND UNIVERSITY-LEVEL INFORMATION SYSTEMS EDUCATORS

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