MANAGEMENT TOOLS USED BY HOME ECONOMICS DEPARTMENT HEADS

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CHAPTER I

INTRODUCTION

The administration of colleges and universities has a cultural and social context against which it should be viewed. In the 1970's the situation in which universities find themselves can be described as one of increasing expectations which often takes the form of growing scrutiny from within, external pressures toward accountability, burgeoning paperwork, varieties of financial stress, student pressure for improved programs, and faculty anxieties regarding employment security and equity.

The pressures which confront academic institutions have served as a stimulus for change. Governors, state legislatures, state coordinating boards, trustees, and other groups have shown an intense interest in better management of educational dollars. Management systems used successfully in business and/or government agencies are often held up as models for academic managers. The public dollar and the size and quality of the educational unit it will purchase are of utmost concern. The need to supplement scarce local and state dollars with extramural funds is an added push toward the adoption of sophisticated management tools, i.e., technical skills of management. It is widely believed that winning proposals are characterized by evidence of ability to justify, document, and account for all available resources and ability to show meaningful relationships between inputs and outcomes.

A preoccupation with resource management does not diminish the need for administrators to be able facilitators of human affairs. It is widely acknowledged that administration in any setting requires a mixture of human, intellectual, and technical skills. Since most academic administrators are initially selected from the faculty, they tend to be best prepared in knowledge and human skills, both of which have been demonstrated in prior service, and least prepared in technical skills. The usual case is that an administrator is first a scholar in a discipline and secondly a manager. The two roles are not necessarily mutually exclusive. McKeachie (1972) points out that one's scholarly habits--the ability to analyze a problem, amass available evidence, and consider the adequacy of several alternative hypotheses--are as relevant and useful in solving the problems of the department as they are in scholarly research.

From reviewing higher education literature one is impressed with the array of management tools and management systems available to the academic administrator and at the same time curious about the extent to which such tools are actually used. Lahti (1972, p. 43) reported that in a somewhat feverish search for new management methods, "the college administrator is susceptible to implementing 'in' systems of management." Rourke and Brooks (1966) termed this phenomenon, a "managerial revolution." They contended that a "managerial science" has evolved as a growing number of universities are experimenting with theories and practices which they believe will make their operations more rational.

Statement of the Problem

While there is much encouragement in the literature to implement

new systems of management, there is very little to help the reader ascertain the present level of use. The problem in this study was to determine the extent to which some of the tools associated with scientific management have been adopted by department chairpersons in home economics units in state universities and land grant institutions. The study was viewed as an attempt to develop the "state of the art" pertaining to the utilization of selected management tools by departmental chairpersons in a specific discipline. A measure of interest in management or administrator development programs was also obtained. Background variables which correlated with the utilization of management tools and an interest in management development were identified.

Need for the Study

The practical implications of the study are that results can be considered by institutions who are developing and/or upgrading graduate programs which prepare home economics administrators for higher education positions. Professional associations such as the American Home Economics Association and the Association of Administrators of Home Economics may also find the results useful when planning in-service administrator development opportunities. The fact that the Association of Administrators of Home Economics funded the research project is recognition that the study was viewed as a contribution to the rather limited field of research on administration of home economics programs in higher education.

Limitations of the Study

Data were collected from one specific population of persons

appointed as academic administrators in home economics units in higher education. These administrators were department chairpersons who reported to chief administrative officers of home economics units (usually deans). Their places of employment were state universities and land grant colleges in the United States. Inference to other administrative levels or other academic fields is not suggested.

Objectives

The specific objectives of the study were:

1. describe the present utilization of five specific management tools: Management by Objective (MBO), Management Information System (MIS), Program Planning Budgeting System (PPBS), Program Evaluation Review Technique (PERT), and the Delphi Technique,
2. identify personal, professional, and institutional variables that may be related to the utilization of selected management tools,
3. determine if the descriptions of systems (tools) in the literature were consistent with actual administrative practices, and
4. assess the extent of interest in and perceived need for administrator development programs related to the use of management tools.

The study did not presume to recommend specific management tools or relate the utilization of specific tools to managerial effectiveness. Instead, it attempted to verify in one specific group whether or not recent higher education literature reflected common practice.

Hypotheses

The null hypotheses tested were as follows. (Each hypothesis represents a set of hypotheses dealing with each of a number of tools or factor scores.)

1. There is no difference in tool use by administrators in various regions.
2. There are no interrelationships among items describing institutional participation in administrator development.
3. There is no consistency between clusters of practices defined as management systems in the literature and the clusters of practices reported by administrators.
4. There is no difference in factor means between groups with and without formal academic preparation in:
    a. quantitative methods
    b. higher education administration
    c. home economics administration
5. There is no difference in factor means between groups who did or did not administer:
    a. resident instruction budgets
    b. university extension budgets
    c. Cooperative extension budgets
    d. research budgets
6. There is no difference in factor scores for groups categorized by:
    a. age
    b. degree

c. region

d. years in administration

e. research dollars as percent of total budget

7. There is no difference in factor scores for groups categorized by:

   a. number of graduate assistants supervised

   b. number of faculty supervised

8. There is no difference in factor scores for groups categorized by:

   a. percent of time assigned to administration

   b. percent of time assigned to research

9. There is no difference in factor scores for groups categorized by:

   a. total enrollment

   b. undergraduate enrollment

   c. graduate enrollment

10. There is no difference in the extent to which administrators (a) express personal interest in administrator development and (b) perceive need for others to develop administrator skill.

Assumptions

The following assumptions provided a basis for planning and conducting the study.

1. It is possible for department chairpersons to accurately report the extent to which they use selected management tools.
2. It is possible for department chairpersons to accurately report the extent to which they employ decision making processes judged

to be very similar to component parts of well-recognized management systems.

3. It is possible for department chairpersons to assess the general degree of precision (rigor, quantification) they apply to day-to-day decision making.
4. It is possible for department chairpersons to identify management tools or processes for which they believe competency development would contribute to administrative efficiency and effectiveness.
5. Department chairpersons can and will accurately report background data identified as necessary for testing the hypotheses.

Definition of Terms

Terms crucial to an understanding of the study are defined as follows:

Administrator development--the creation, improvement, or expansion of the competencies employed in, or desired for, managing or leading an enterprise (Litherland, 1975).

Association of Administrators of Home Economics in State Universities and Land-Grant Colleges, Inc. (AAHE)--an association of administrators of home economics which was founded to promote and effectually integrate instruction, research, extension, and public service functions of home economics, and to strengthen the contribution of home economics within states, nationally, and internationally. Membership is composed of home economics administrators in resident instruction, research, and extension from institutions with membership in the National Association

of State Universities and Land-Grant Colleges (NASULGC) and/or the American Association of State Universities and Colleges (Litherland, 1975).

Chief administrative officer--the person responsible for the administration and supervision of home economics academic unit activities.

Competencies--those concepts, skills, and personal qualities which are essential or useful for an occupational classification (Litherland, 1975).

Decision Theory Analysis (DTA)--a set of techniques of quantitative analysis which includes decision trees and probability estimates (Brown, 1970).

Delphi technique--a technique wherein experts complete a series of questionnaires interspersed with controlled feedback on the responses of the other participants. The participants do not meet face-to-face; instead they complete questionnaires and submit them to the project staff by mail (Uhl, 1970).

Department chairperson--the person assigned the responsibility for administration, supervision, and academic leadership of a department or sub-unit of a home economics unit at a level reporting to the chief administrative officer of the unit.

Effectiveness--the degree of success an organization enjoys in doing whatever it is trying to do (Rourke and Brooks, 1966).

Efficiency--capacity of an organization to achieve results with a given expenditure of resources--in short, the ratio between organizational inputs and outputs (Rourke and Brooks, 1966).

Home economics--the field of knowledge and service primarily concerned with strengthening family life through educating the individual

for family living; improving the goods and services used by families; conducting research to discover changing needs of individuals and families and means of satisfying those needs; furthering community, national, and world conditions favorable to individual and family living (Litherland, 1975).

Home economics academic unit--the administrative unit of a college or university which deals with teaching, research, and extension or continuing education in the various areas of home economics. Although units bear different names such as Human Development, Human Ecology, Family Life, and Family Resources and Consumer Sciences, the common designation in this study shall be "home economics unit" or "home economics academic unit" (Litherland, 1975).

Management--the art and science of planning, organizing, motivating, and controlling human and material resources and their interaction in order to attain a predetermined objective (Cook, 1966).

Management by Objectives (MBO)--a system which involves the establishment and communication of organizational goals, the setting of individual objectives pursuant to the organizational goals, and the periodic and then final review of performance as it relates to the objectives. Specifically, MBO includes the following elements: (1) effective goal setting and planning by top levels of the managerial hierarchy, (2) organizational commitment to this approach, (3) mutual goal setting, (4) frequent performance review, and (5) some degree of freedom in developing means for the achievement of objectives (Carroll and Tosi, 1973).

Management Information System (MIS)--a structured, interacting complex of persons, machines, and procedures designed to generate an

orderly flow of pertinent information, collected from both intra- and extraorganizational sources, for use as the bases for decision making in specified responsibility area (Brien, 1970).

Management science--a management process which has as its main characteristic the use and interpretation of quantitative or qualitative data to assist in solving management problems. The key is the analysis of data to support decision making (Schroeder and Adams, 1976).

Organizational Development (OD)--a long-range effort to improve an organization's problem solving capabilities and its ability to cope with changes in its external environment with the help of external or internal consultants or change agents (French, 1969).

Program Evaluation Review Technique (PERT)--a planning and control technique which is applied to projects which have many interrelated tasks. It is designed to (1) evaluate progress toward the attainment of project goals, (2) focus attention on potential and actual problems in the project, (3) determine the shortest time in which a project can be completed, (4) provide the researcher with frequent, accurate status reports, and (5) predict the likelihood of reaching project objectives. Specifically, it is concerned with the identification of each goal in the project and the time required to complete it (Cochran, 1969).

Program Planning Budgeting System (PPBS)--a rational approach whose aim is to improve resource allocation decisions. More specifically, PPBS involves the following elements: (1) identification of objectives, (2) analysis of the "output" of a given program in terms of its objectives, (3) measurement of total program costs, (4) formulation of objectives and programs within an extended time-horizon, and (5) systematic

analysis of alternatives to find the most effective means for achieving program objectives (Scurrah and Shani, 1974).

Systems approach--an inquiry to aid a decision-maker to choose a course of action by systematically investigating his proper objectives, comparing quantitatively where possible the costs, effectiveness, and risks associated with the alternative policies or strategies for achieving them, and formulating additional alternatives if those examined are found wanting (Brien, 1970).

Unit Cost Analysis (UCA)--the calculation and use of unit cost data for management control (Schroeder and Adams, 1976).

Organization of the Report of the Study

The report of the study is presented in five chapters. Chapter I (1) develops the general background against which the problem is viewed, (2) states the specific problem investigated, (3) lists the objectives of the research, (4) identifies the limitations of the study, (5) presents the hypotheses tested, (6) states assumptions underlying the study, and (7) defines terminology important to understanding the report.

Chapter II is a review of literature with emphasis on theory and practice of academic administration, the emergence of newer methods or tools of management, and the specific development and use of MBO, MIS, PPBS, PERT, and the Delphi Technique.

Chapter III describes research procedures utilized in the study. The survey population, instrument construction, data collection, preparation of data for storage and retrieval, and analysis of data are discussed.

Chapter IV presents the results of the study.

Chapter V summarizes the procedures and major results. Conclusions are drawn and recommendations for current programs, program planning, and further research are presented.

Chapter Summary

This chapter has presented a background for the study of the utilization of specific management tools by academic department heads in higher education. The study, funded in part by the Association of Administrators of Home Economics, was intended to be useful to institutions in planning graduate programs for potential administrators and to the association and others in planning in-service opportunities. The study was limited to departmental administrators employed in home economics units having two or more departments. Administrators were identified by the chief administrative officers of home economics units in the state universities and land grant colleges in the United States. The reader was cautioned that the findings should not be generalized to other academic fields, other levels of administration, or other types of institutions.

The basic purposes of the study were to (1) describe the present utilization of five specific management tools: Management by Objectives, Management Information System, Program Planning Budgeting System, Program Evaluation Review Technique, and the Delphi Technique, (2) identify personal, professional, and institutional variables that may be related to the utilization of selected management tools, (3) determine if the descriptions of the systems (tools) in the literature were consistent with actual administrative practices, and (4) assess the extent of

interest in and perceived need for administrator development programs related to the use of management tools.

CHAPTER II

REVIEW OF LITERATURE

The Higher Education Climate

The administration of higher education has a cultural, social, and political milieu against which it should be viewed. The 1960's brought unprecedented growth and affluence, but in the same decade the exalted status and public confidence in higher education began to decline. Higher education was moving beyond its golden age. The problems that confronted it were many. Problems which developed in the sixties had far-reaching implications for the seventies as well.

Students became alienated by what they perceived to be unresponsive institutions. Colleges and universities were viewed as unnecessarily rigid, lacking the motivation and creativity for adapting themselves to changing student interests and values. Higher learning institutions were tagged as protectors of the status quo and transmitters of establishmentarian values which deemphasized human rights and revered materialistic wealth.

Inflated claims about the economic values of higher education created a backlash as the wage earning gaps between degree holding and non-degree holding employees narrowed. It was widely asserted that a college degree was no longer a good investment because of its declining return on the dollar. Counter claims touted the values of other options

by emphasizing the economic returns of vocational training programs. Young people who claimed little interest in economic gains began to look elsewhere for the key to the "good life."

While students were restless on campuses the public outside was growing more and more hostile toward "liberal" institutions. An anti-intellectualism was setting in. Institutions were caught in the middle, being attacked on the one hand by student bodies and on the other by the public at large. Any concession to student demands served to broaden the base of public concern.

As dissension mounted among student and public groups, faculty became increasingly militant. The campus became an arena for political demonstrations and debate. As pressures were directed toward keeping the university academically free, the relationship between faculty and administration deteriorated. Adversary roles were assumed and often faculty and students joined forces to focus public attention on an issue.

Estrangement with the business community developed as it was noted that an increasing number of university students and faculty members were "knocking" the "free enterprise" system. Any loss of moral and financial support from the business sector was perceived as an ominous threat to administrators and trustees. The reality that business and higher education needed each other was blurred by reactionary behaviors on both sides.

In the latter 60's the public became even more disenchanted with the inability of public institutions to solve social, economic, and technological problems. People could no longer cling to the ideal that higher education produced a more advanced, efficient, and moral society.

These are a few of the problems that contributed to the higher education legacy of the 60's. According to Pifer (1976) universities had become somewhat arrogant and pretentious, lax in intellectual and moral standards, and insensitive to the needs of individual students. Furthermore, he says, higher education came "to perceive success more in terms of enrollment growth, number of degrees granted, construction of new buildings, and continuous expansion of functions than in the enhancement of academic quality" (p. 26).

By the early 1970's, higher education was entering a period of retrenchment. Mullen (1974) stated that higher education had outlived the fantastic growth rates and funding gluts of the 1950's and early 1960's and was then confronting expenditures increasing at a faster rate than revenues. He credited this fiscal crisis and the decline in the public's infatuation with higher education as instrumental in forcing educational administrators to become very concerned with the efficiency and effectiveness of their institutions.

Pressures on the academic purse were felt nation wide. Spiraling costs brought on by inflation called for increasing scrutiny over the allocation of scarce resources. For many institutions declining enrollments came at a time when faculty members and facilities were at all-time highs.

At a time when resources were becoming more scarce, institutions found themselves moving from mass access to universal access. The social conscience and legislative mandates combined to open widely the doors of higher learning. Some institutions worried about lessening standards while others worried about attracting students who could bring federal and foreign dollars to the financial ledger.

Historically, when universities fall on hard times, disagreements about governance become more pronounced. Faculty members and students alike challenge authority on campus--particularly the authority of the trustees and the president (The Carnegie Foundation, 1976). These conflicts raise public suspicion and the question of whether the institution can manage its own affairs is debated. It is not unusual that this debate takes place in the halls of Congress and state legislatures.

A Managerial Revolution

In the late 70's it is not uncommon to find ongoing university programs of management development. Usually these programs are aimed toward the development of specific skills needed by administrators to accomplish their tasks more effectively (Wagner, Sovilla, and Andrews, 1974). The specific factors underlying the implementation of management development efforts vary from one institution to another, however, factors such as increasing size and complexity, expanding research and graduate programs, and an expanding number and scope of services provided for students are often among the catalysts. According to Bolman (1965), the demands on university management include other factors such as:

> . . . the expansion of educational opportunity, the desire for variety of education, the adaptation to urban life, the statewide coordination and full utilization of resources, national defense, vocational service, special integration with industry, regional and perhaps even national planning, elevation of standards, the elimination of want and concern for underprivileged nations. (p. 170)

In spite of all the pressures which seem to require improved management techniques, Rourke and Brooks (1966) contended that a resistance to reform was "founded upon the belief that higher education could

easily be damanged by administrative innovations which might be perfectly acceptable in other types of organizations" (p. 1). The fact that changes in administration did occur in spite of a conservative tradition was termed by Rourke and Brooks (1966, p. 1) "a managerial revolution." They saw this interest in managerial efficiency as predating the current economic crunch and report that institutions of higher learning have increasingly engaged in a conscious effort to find ways and means of using their resources with greater efficiency since World War II. In their view, governors, state legislatures, and in some states coordinating agencies in the field of higher education have exerted strong pressure in the direction of new patterns of organization and management.

These pressures to adopt a managerial approach have been met with resistance on campuses. There are those who believe that the university is an intellectual retreat and that it should not have imposed upon it a hierarchical structure and narrowly directed behavior (Brien, 1970). In some instances, the advocacy of management science has been countered by efforts which emphasize potential hazards of implementing corporate management models in a nonprofit organization.

While some believe that management science is widely applicable from one kind of institution to another, others are convinced that "the equation of different outputs and a common work process is a fallacy" (Millett, 1975, p. 221). This issue is in the forefront of campus resistance to fuller utilization of management tools. Those who advocate the transferability of organizational experience are challenged by those who believe that varying social contexts are important and should impact significantly upon organizational experiences and managerial styles.

Even though there is disagreement, there is acknowledgement that similar managerial techniques may be used in business-for-profit enterprises and in university operations. Millett (1975) compared the differing uses of managerial tools as follows:

> In business, these techniques are performed by management on an integrated, coordinated basis with a clear purpose and objective: to ensure the viable operation of the enterprise. In a university, these problem-solving and managerial techniques are divided between academic and institutional affairs. Administrative officers as a team use these techniques to ensure the viability of the learning environment. Faculty members utilize these techniques on an individual basis in the management of learning to the extent that they have the expertise and the inclination to do so. (p. 224)

While some are debating the transferability of management techniques from one type of enterprise to another, there are others who simply recognize the many pressures on higher education and suggest that responding to these pressures forces an institution to look outside higher education for methods and approaches to decision making (Chamberlain, 1975). As a consequence, managerial processes such as management by objectives (MBO), organizational development (OD), planning program budgeting systems (PPBS), management information systems (MIS), systems analysis, and others are implemented. When new management techniques are widely used in an institution, the collegial model for decision making is considerably threatened. Concurrent with the uncertainty, instability, confusion, and complexity which abound in contemporary institutions, there is a shift from the use of value-based criteria, as commonly used in the collegial decision-making model, toward more logical, empirically-derived criteria. Thus, the emergence of a managerial revolution is again recognized. Higher education today is different from that of the past. The problems confronted differ in size,

scope, and significance, therefore it is reasoned that traditional decision making processes are incapable of responding efficiently and effectively (Chamberlain, 1975).

Rath (1968) summarized a study on management science in university, operations with the statement "Education will not readily advance until decision tables are instilled and operating" (p. B-383). The term, "decision tables," implies a far more sophisticated decision making model than usually associated with the management by consensus collegial style or with the current use of computer generated data. Rath was concerned that the use of management science reported in his study was still not addressing a fundamental issue of how the individual student is academically affected. Others agreed that computer technologies which support scheduling, records management, unit cost analyses, prediction studies, space utilization studies, admissions, and registration to name only a few functions, do not necessarily serve the student's best interest. This suspicion is another source of resistance to management science. Some universities are working to reduce this problem with administrator development seminars and faculty communication with the office of institutional research.

Schroeder and Adams (1976) cited dwindling enrollments, inflation, diminishing public confidence, and student disenchantment as contributors to the need for universities to develop improved management methods and procedures. They, however, pointed out the problem administrators have in deciding which management science techniques should be introduced and where the responsibility for the analysis efforts should be placed within the organization. Even when administrators have positive attitudes toward systematic and comprehensive management approaches, a

lack of understanding of tools available and costs and benefits that can be derived is an impeding factor.

Hearle (1961) attempted to help administrators to understand the overall values of the tools of the management revolution by emphasizing their "scientific" qualities: explicitness, rigor, and quantification. He believes that the dominant characteristic of the new tools of management is that "they are efforts toward an accurate representation of some part of the world" (p. 206). Managers have tried throughout recent history to increase the level of explicitness, rigor, and quantification, and now management science has evolved ways of expressing and manipulating these factors to achieve different results. The use of new management tools is justified by Hearle (1961) in the following way: "The discipline of explication forces clear thinking. Rigor guarantees logical consistency. Quantification demands data we often fail to gather and reveals values we recognize but seldom specify" (p. 206).

According to Kingston (1972) the managerialization of higher education has taken on many forms including (1) increased reliance on the computer, (2) improved operating information and reporting systems, (3) movement toward more sophisticated planning and budgeting systems, including PPBS and (4) improved accounting and auditing techniques.

A study ("EDP Leads," 1973) for Administrative Management determined that in industry the five management tools in most widespread use were electronic data processing (EDP), MIS, MBO, OD, and direct costing. The study was based on a national sampling of firms of all sizes in various industries. Specific results on the five most popular tools were: 9 out of 10 companies used EDP and MIS, 8 of 10 companies used

MBO, slightly fewer than 8 of 10 were using or testing OD, and over 6 of 10 were making use of direct costing.

Other findings of the study ("EDP Leads," 1973) were interesting in terms of the questions they raised for university studies. It was found that large companies, those with over $50 billion in sales, tend to use twice as many modern management techniques as smaller companies, an implication that size is a factor. In industry, there is a continuing interest in human resource development, perhaps an effort to offset negative reactions to management techniques perceived as dehumanizing. Companies on the west coast reported using more management tools than companies in other parts of the country, a suggestion that geographic region is a factor.

Schroeder (1973) surveyed college and university personnel to determine the extent of development and use of management science in higher education. The four specific areas explored in the study were PPBS, MIS, Resource Allocation Models, and Mathematical Models. These four areas, according to Schroeder (1973), included the uses of quantitative methods for decision making in institutions of higher education. One conclusion (Schroeder, 1973) was that although many models and techniques had been developed, there seemed to be a lack of actual implementation. Schroeder attributed this to inadequate integration of the models into the operating system of the institution and warned that unless the outputs of models are understood by administrators they will not be used.

Management Tools

In the previous sections various tools of management have been

mentioned. Studies which surveyed tool use in industry and in higher education were discussed. Another study conducted by the National Center for Higher Education Management Systems (NCHEMS) asked administrators and institutional researchers about use of 13 separate products developed at NCHEMS. Glenny, Shea, Ruyle, and Freschi (1976) asked administrators to respond to questions about 11 management/planning techniques. From the various tools available, five were selected by the investigator for intensive study. Factors which guided this selection were current visibility, capacity of departments to utilize tools independently, and resources required for implementation.

The five tools selected for the present study do not correspond directly with any of the studies previously cited but there is some overlap. As indicated in the previously cited studies, some tools are more applicable to use in central administration while others are more frequently used at the mid-management level. The five tools selected for the present study were believed by the investigator to be in most frequent use by academic department heads. A review of the literature and results of a pilot survey confirmed this selection. In the following sections the five specific tools examined in this study are discussed.

Management by Objectives

For the purposes of this study MBO has been defined as a process whereby the members of an organization define its goals, make explicit the goals and objectives of each major component of the institution, and develop a time schedule for reaching objectives. Results of these

steps are then used as guides for managing the organization and assessing the contribution of each subunit and individual.

Most of those who write about MBO give credit for its introduction to Peter Drucker. Reddin (1971) reported that the ideas behind MBO were popularized by Drucker in the early 1950's, but that currently the name most associated with MBO in the United States is George Odiorne. According to Reddin, who is also a well-known author of books and articles on management, in 1970 there were approximately 20 books on MBO.

Although definitions of MBO vary among authors, there are elements of commonality. Odiorne (1969) reported that MBO "presumes that management of our affairs on a continuing basis requires that we define objectives before we release energy or resources to achieve them" (p. 8). He further stated:

> The term 'management by objectives' is similar to the language of navigation--we navigate by a star, or by the sun. When we manage by objectives we mean simply that we will fix our ultimate purpose in mind before we start our journey. This objective then becomes a target, a goal, a desired outcome, and along the route becomes a criterion for measuring progress. Finally, when we have spent our time and energies, we are able to evaluate the degree of success by measuring it against the objective. (p. 8)

In another source (Odiorne, 1965) MBO is described as basically:

> a process whereby the superior and the subordinate managers of an enterprise jointly identify its common goals, define each individual's major areas of responsibility in terms of the results expected of him, and use these measures as guides for operating the unit and assessing the contribution of each of its members. (p. 78)

Reddin (1971) identified other terms such as "Management by Results" and "Goals of Management" which also describe MBO. According to Reddin (1971) the major common elements in MBO systems are:

1. Objectives established for positions--to decide what the manager

in the position is required to achieve. Most of the objectives require quantitative specificity such as number, amount, and time.

2. Use of joint objective setting--participation by both superior and subordinate.
3. Linking of objectives--the integration and synchronizing of the objectives of the various subunits.
4. Emphasis on measurement and control--being able to measure and control results.
5. Establishment of a review and recycle system--a review of progress between superior and subordinate, followed by the setting of objectives for the next period.
6. High superior involvement--the superior is deeply involved in all steps of the process.
7. High staff support in early stages--training for staff in how the system works.

In relation to the common components above, authors selectively highlight critical aspects of the system. Lahti (1972) emphasized the importance of complete and current job descriptions for each position. He believes that a thorough understanding of what is expected in a position is a first step to meaningful goal setting. Tosi and Carroll (1968), who interviewed 50 managers regarding their reactions to MBO, emphasized the importance of frequent performance review and feedback by pointing out that when expectations about feedback and appraisal are raised and not met, problems are magnified.

One component recognized by Carroll and Tosi (1973) and not by authors mentioned earlier is some degree of freedom for the employee to

develop the means for achieving the objectives. They believe this element is necessary to run an effective MBO program. In theory, all components must be included in order for the system to work. MBO is a total approach to management. It is claimed that it serves four managerial needs: planning, communication, motivation, and coordination.

Lahti (1973) believes there are two concepts common to all MBO programs: (1) the clearer the idea one has of what one is trying to accomplish, the greater the chances of accomplishing it and (2) progress can only be measured in terms of a goal. Speaking as an advocate of MBO, Lahti (1973) described it as a system that is:

> based on participation and interaction and should support a creative environment. It seeks personal involvement in the functions of the organization and is oriented toward the fullest realization of individual potential in the success of the organization. The individual is motivated through his understanding of what the organization is trying to accomplish and his relationship to those goals. (p. 56)

It was reported earlier that the first uses of MBO were in major corporations. Its use there illustrated that its conceptual bases were in harmony with the human relations school of management. This realization plus a need to manage more effectively made MBO attractive to university personnel. In considering the implementation of MBO in higher education, Mullen (1974, p. 58) began by defining management as "the function that deals with getting things done through others." He noted that an academic manager or administrator must:

1. Plan his work and set forth objectives;
2. Organize the relevant factors of production (generally students, faculty, facilities, knowledge, and financial resources);
3. Secure qualified personnel;
4. Direct the efforts of his staff; and
5. Control the activities of his staff and students to minimize interruption and interference. (p. 58)

In the corporate world these functions are generally known as planning, organizing, staffing, directing, and controlling; functions which can be accommodated by the implementation of MBO.

There is some evidence that MBO has been introduced into the academic community. Glenny et al. (1976) reported a study which examined the use of 11 management and planning techniques. University administrators were asked to indicate the extent to which the use of each tool had changed between 1968 and 1974 and the extent to which use was expected to change from 1974 to 1980. The questionnaires were filled out by more than 1,000 presidents, deans, institutional research officers, and others. In the questionnaire, the investigators had combined "program budgeting" with "management by objectives" as one of the items. Responses to that item indicated that for the period 1968 to 1974, 17 percent of the administrators perceived the change in use as extensive, 46 percent reported some change, and 37 percent reported very little change. For the period 1974 to 1980, 47 percent projected extensive change, 43 percent projected some change, and only 10 percent anticipated very little change.

One example of the implementation of MBO in a university structure may be found at Harper College in Chicago. Harvey (1962) reported that Harper College began implementation of MBO in 1970. At that time the enrollment at Harper, a community college, was approximately 7,000. The MBO system at Harper involved the establishment of annual quantifiable objectives for each administrator and counselor, quarterly and annual reviews of objectives with one's supervisor. The annual review included a salary discussion and application of a merit pay system. Harvey (1972, p. 293) noted that merit pay is not essential to the MBO system,

"but it adds a good deal to the development and operation of the system."

Summary data on the extent of use of MBO across all systems of higher education were not available. Articles usually related to probable advantages of using the system as opposed to results of actual implementation. Saurman and Nash (1975) reported that MBO was a tool being used increasingly by student personnel administrators. A two-part rationale was given for this use: (1) to legitimize the role of student personnel in American higher education and (2) to conform to the demands for accountability.

Saurman and Nash (1975) reiterated the justifications for using MBO as an administrative tool but went on to challenge the value of MBO for student personnel administrators. To them, features such as maximum utilization of scarce resources, accurate measurement of student outcomes, greater accountability, cost effectiveness and efficiency were not attractive enough to overcome possible hazards such as minimizing humaneness and maximizing alienation. In highlighting possible hazards of using MBO in student personnel administration, Saurman and Nash (1975) presented the following viewpoint:

> The basic concern is that a system preoccupied with MBO measures can easily tyrannize the persons within an organization. A system which places so much emphasis on planning, goal setting, the designation of objectives, and quantitative evaluation can distort and even subvert the expressed humanistic goals of the organization. Simply stated, we believe that MBO is not <u>value free</u>. In fact, MBO often contributes to role confusion on the part of student personnel administrators because it is a subtle political procedure meant to maintain and strengthen the distribution of power as it currently exists in an organization. (p. 180)

Other authors (Shetty and Carlisle, 1974) view the implementation of MBO in university settings in a more positive way. They described

the potential of the process for systematic appraisal of university employees. By their perception methods of evaluating university faculty performance had several limitations. Shetty and Carlisle (1974) found that methods were impressionistic, based on very little substantive data; evaluations were personality-oriented rather than result-oriented; constructive information was rarely fed back to the individual; and evaluation systems were too rigid for across-the-board application.

Shetty and Carlisle (1974) conducted a study of faculty reactions to MBO in a private university with an enrollment of approximately 9,000 and a faculty of approximately 600. A questionnaire was distributed to 236 faculty members in 19 departments in five colleges. Usable responses were received from 109 persons scattered among the five colleges; however two-thirds of the responses were from faculty in the Humanities, Arts, and Social Sciences College. Results of the study indicated that a goal setting program in a university can increase awareness of organizational goals, improve planning, result in better data for performance evaluation, and improve performance and communication. It was discovered by Shetty and Carlisle that perceived success of a program seems to be influenced by faculty type. Teachers with lower academic rank, teachers without tenure, and those with fewer years of service considered the program in more positive terms than those of higher rank who were tenured and had more years of service.

Mullen (1974), in his studies of the role of MBO in higher education, also found it to be a very promising system. After recognizing significant structural and conceptual limitations, he concluded that MBO is extremely relevant. It permits an evaluation of the administrator's span of control and increases subordinate autonomy and

participation. It also permits greater control over subordinate's activities and allows the administrator to better organize and direct staff efforts toward unit objectives.

Management Information System

Management Information System (MIS) was a second system investigated in this study. According to Perlman (1974), "the term management information system (MIS) refers to the processes and procedures by which raw data are organized into information useful for administrative decision making" (p. 35). Like other entities which investigators choose to study, the term, MIS, is subject to some lack of clarity and nearly incomprehensible jargon. In one case (Kennevan, 1970), a management information system is described as:

> an organized method of providing past, present, and projection information relating to internal operations and external intelligence. It supports the planning, control and operational function of an organization by furnishing uniform information in the proper time-frame to assist the decision-maker. (p. 62)

Murdick and Ross (1971) defined the term as "a communication process in which information (input) is recorded, stored and retrieved (processed) for decisions (output) on planning, operating, and controlling" (p. 292).

Sheehan (1973) defined MIS as a:

> general term which usually refers to that set of methods, procedures, definitions, standards and systems for the preparation and integration of data to satisfy the institution's need for management control and utilization information. (p. 6)

Examples of data uses include reports of program costs, instructional loads, and space use.

A definition of MIS given by Muston and Creswell (1976) is:

> the organization and storing of quantifiable data or information that is reported to the decision maker and applied for generating historical, operational and projection reports within the institution. (p. 6)

A common thread running through these definitions is decision-making, the raison d'etre provided by all authors who define MIS. Brien (1970) related to this when he referred to the need to organize and systematize the "data blizzard" that confronts contemporary managers and administrators. Brien (1970) stated that there is a need for:

> a management (or administrative) information system--a structured, interacting complex of persons, machines, and procedures designed to generate an orderly flow of pertinent information, collected from both intra- and extraorganizational sources, for use as the bases for decision making in specified responsibility areas. (pp. 276-277)

The author (Brien, 1970) went on to say that the fundamental concept of MIS is as appropriate for a college or university as for a business firm or a government agency.

A more descriptive definition of MIS was given by Schroeder (1973). He agreed with others who refer to the collection, storage, and retrieval functions of MIS but went beyond functions and rationale to mention applications. Types of information usually included in MIS are financial and budgeting information, student records, enrollment data, course demand data, and facility planning. Schroeder (1973) noted that the scope of MIS may be broad or limited depending on the particular application.

Although not an absolute necessity, management information systems are usually computer based. This is true because the repetitive task of accumulating, storing, and retrieving large quantities of detailed information can be handled more efficiently by electronic data processing. According to Withington (1966) the study of information systems

is not the study of computers, rather it is "the study of how the organization communicates and processes information to maximize the effectiveness and further the objectives of management" (p. 3).

Currently information management systems assist universities in making institutional evaluations and in showing accountability. While accountability is a major use, other uses include day-to-day academic, fiscal, and administrative operations and those pertinent to policy making and planning for the institution's future (Balderston, 1974). Through time universities have grown in sophistication to the point where the information system is more than "notes on an envelope in the president's coat pocket." Part of this change is directly related to the increased requests for information from state budgeting agencies and state coordinating boards. The growth that universities have experienced and the increasing diversity of students served and programs administered have also contributed to the need for more sophisticated management techniques.

According to Balderston (1974) today's university MIS must serve many masters. Among the many individuals and organizations needing information are prospective students, donors, vendors, and faculty members; current students, faculty members and administrative staff; legislators, trustees; and foundations and research agencies. All of these individuals and groups need information for many types of decisions, the sum of which determines institutional survival. Balderston (1974) reported that five new factors make evaluative judgments sharper and increase the saliency of information. These are:

> First, the total enrollment market has grown enormously; more people are claiming the right to attend college; and more types of institutions, programs, and students are involved.

> Information to show what the institution is like, to help attract the students it seeks, and to show how well it serves has become far more sophisticated.
>
> Second, most institutions are more complicated than they used to be; there are more competitors (and more possibilities for cooperation) than previously; and each institution has more interest in comparing its activities and performance with others.
>
> Third, higher education is more important in the public mind. Policies toward it have become urgent business for legislators and Congress . . .
>
> Fourth, inflation and productivity problems, together with the willingness or proneness of institutions to take on additional programs and responsibilities, have tightened the budget squeeze, reduced fiscal flexibility, and aroused new struggles for priority.
>
> Fifth, shifts in manpower markets (national, regional, and local) and shifts in other major features of the market environment for educational services (including the results of research and scholarship) have become more frequent, and several of these conditions turned adverse together at the end of the 1960s. (pp. 53-54)

These points reemphasize the need for more kinds of information in more readily accessible forms. Alternatives to this type of information management capability are "soft" decisions, snap decisions, and power decisions, all of which can be extremely detrimental to institutional effectiveness.

A review of the use of MIS by colleges and universities would not be complete without reference to NCHEMS at Boulder, Colorado, one of the leaders in the development of new administrative techniques. NCHEMS is supported primarily by contracts with the U.S. Department of Health, Education, and Welfare and by grants from private foundations. Through its few years of existence much has been done to develop information systems which apply broadly to institutions of varying size and scope. As stated in its 1973 annual report (NCHEMS, 1973), the mission of

NCHEMS is to develop compatible management information systems for higher education and to promote their use in institutions and agencies throughout the United States. In 1973, over 800 institutions and agencies of higher education were participating in the NCHEMS program. According to the report,

> The ultimately successful NCHEMS effort will provide improved information to higher education administration at all levels, facilitate exchange of comparable data among institutions, and expedite reporting of comparable information at the state and national levels. (p. 6)

It does not go unnoticed by the academic community that the federal government has supported so well a unit which provides standardized programs for reporting, aggregating, and retrieving information. From its inception in 1965 to the present, it has been expected that NCHEMS products would have "a profound effect on management practices in higher institutions" (Glenny et al., 1976, p. 69). The extent of perceived change in use of management systems in colleges and universities was measured by Glenny et al. (1976). They found that three-quarters of the administrators in senior public institutions reported extensive change in use of MIS.

Results of a study of Harvard's central information system prompted Wyatt and Zeckhauser (1975) to look at quantitative information and its contribution to decision making in a variety of other institutions. From the Harvard study the investigators had determined that academic administrators "did not work well with the intricate computer based information system" (p. 177). This conclusion was based on the observations that institutions and administrators within institutions have widely diverse managerial styles; current systems are not adaptive to a variety of management styles; and the systems are complex, difficult to

understand and not easy to change. Another problem emerges as administrators employ assistants to act as interpreters. This leads to systems designed for interpreters' needs to have multidudinous data "just in case the boss asks" rather than systems designed to answer critical questions of major significance.

Wyatt and Zeckhauser (1975) found at each of the six institutions where the examined the MIS, the scope of influence and cost of development were items of major concern. First, many administrators were unrealistic about the systems' limitations and thus expected too much. Secondly, the implementation of MIS seemed to generate controversy. Administrators who understood the dynamics of the systems were concerned that their autonomy was threatened. In insitutions using a decentralized management style, there was the feeling that a centralized MIS implied centralized administration.

Glenny (1972) shared another perspective on the implications of centralized information systems, usuallly known as offices of institutional research. He offered the opinion that:

> The general public and, for that matter, the political policy makers are as misled as the faculty and students in thinking that the leadership of a public college or university rests with its president and its governing board. . . . misled, because the people who make the most important decisions on the way to educational policy--and those who finally steer the direction of curricular change, accommodate institutions to new student demands, and determine the efficiency factors in administration--are not necessarily the president and board. Nor are they the students and faculty.
>
> Much of the most telling leadership of public institutions of higher education today is anonymous. Few realize the extent to which unknowns, both within an institution and outside it, really control educational policy.
>
> Internally, the persons most responsible for the new leadership in both public and nonpublic universities and

> colleges are those engaged in institutional research and analytical studies, and those who make and manage the budget. (p. 10)

Glenny noted that institutional researchers have had, up to this time, great latitude in collecting the types and kinds of information they think are useful for studies they believe are important. Further their studies are interpreted according to their biases and assumptions which may be very different from those visibly and legally responsible for the decisions made. In this milieu many decisions of long-range significance are made for administrators by staff members who largely control the content and form of information presented. Glenny (1975) contended that:

> the staff member's argumentation, his alternatives, his underlying assumptions, his selection of data and also what he does not reveal, may be far more determinative of final policy than all the hours of all the faculty members, students, and administrators spent in policy council deliberations. (p. 12)

As administrators and faculty become aware of the potentials of MIS, they react in different ways. An academician who prefers qualitative evaluation may reject the viewpoint that one can describe development of human talent in quantitative terms such as cost benefits, expenditure analyses, and resource requirement prediction models. When this attitude is met by specificity requirements imposed by the support base, conflict prevails. Not all administrators and academicians take the position described above. Some adopt the "if you can't beat them--join them" approach which leads to the identification of ways that systems can be modified to work for and in the best interest of predetermined program objectives.

Perry (1972) examined the same problem that concerned Glenny, but developed it in a different context. Taking the scenario of conflict

between data required by the funding source and faculty rejection of current accountability systems, Perry believed the situation clamored for a third force, i.e., interpreter and articulator of the planning-management system of higher education.

While Glenny (1975) addressed the power in the hands of institutional researchers, Perry (1972) reported that this power had not been used. He stated that:

> Institutional research has been for the last fifteen years in the position of always reacting to requests for information about the characteristics of higher education institutions. It seldom has been in a position where it could be the progenitor of change in higher education. (p. 740)

Through this statement Perry implied that universities could be better served by institutional research units with sound philosophic orientations. A problem has been that philosophic orientations have been given too little attention in data collection and analysis.

By understanding the major points of opposing sides (the faculty and the support base), when opposition does exist, interpreters of institutional research can effect a third more stable, more acceptable, more productive line of action. The practice may now be characterized as a capacity to describe how, when, and where, but not why an educational event occurs. While there are numerous sophisticated systems available, the institutional researcher is still unable, for the most part, "to relate results to the whole meaning of man as a social being" (Perry, 1972, p. 742).

From this discussion one can observe that all is not well with regard to the use of MIS in higher education. This in no way suggests abolition, but rather a higher level of involvement and interaction between and among all developers, interpreters, and users. A statement

by Dressel (1971) summarized the issue:

> Institutional research and management information systems cannot bring about utopia in higher education; but higher education cannot be rational and open until it has the factual basis in data collection and study to permit sound evaluation of resource allocation and of the consequent quality of education provided. No institution can know how to improve itself without knowing in some detail how it has been and is operating. (p. 16)

Program Planning Budgeting System

Another administrative or management tool that has been introduced to higher education in recent years is program planning budget system (PPBS), sometimes referred to as program budgeting. Primarily, program budgeting is a technique for planning and resource allocation. PPBS focuses on the desired outcomes or products of higher education and their costs. By this technique, an attempt is made to find the right combination of inputs to achieve desired outputs without exceeding available funds.

According to Schroeder (1973), PPBS has often been defined in terms of its name, i.e., planning refers to the setting of organizational objectives and goals; programming refers to identifying and evaluating programs or alternatives which meet those objectives; and budgeting refers to providing the resources to support the programs. However, Schroeder (1973) believes that:

> PPBS is more than just a new method of budgeting; it includes planning and analysis functions as well. The analysis part of PPBS is usually accomplished by the cost-effectiveness approach, which considers the costs and benefits of alternative programs. (p. 896)

A concise definition of PPBS was given by Smithies (1965) who reported that:

> Planning, programming, and budgeting constitute the process by which objectives and resources, and the interrelations among them, are taken into account to achieve a coherent and comprehensive program of action. . . . Program budgeting involves the use of budgetary techniques that facilitate explicit costs, both at the present time and in the future. (p. 24)

A primary objective of PPBS is to help relate the resource requirements of an organization to its goals. In higher education, the primary programs are instruction, research, and public service. When used, PPBS presents information about resources by programs. The program budget is output oriented. Resource requirements are displayed by programs instead of by the traditional line-item method. For example, all university operating or overhead costs are prorated across functions. This budget structure allows program managers to relate the various resource inputs to the outputs or benefits of each program. The situation is one where the manager can, after analysis, trade off resources to achieve greater outputs in priority areas.

As with other tools, there is no standard definition for PPBS, however, there is consensus that the following elements are involved: (1) identification of objectives; (2) analysis of outputs in terms of objectives; (3) measurement of total program costs; (4) formulation of objectives and programs within an extended time frame; and (5) systematic analysis of alternatives to find the most effective means for achieving program objectives (Scurrah and Shani, 1974).

Historically, the RAND Corporation has been credited with the formulation of PPBS as a management concept for use in World War II military operations (Robins, 1973). Novick (1965) related uses of systems very similar to program budgeting in federal government operations as early as 1942. Uses in industry predate the military and

federal government uses by almost two decades. General Motors Budget and Finance Procedures for 1924 included the basic features of PPBS (Novick, 1965). At General Motors the system meant dividing available resources between Cadillac and Chevrolet divisions and other major lines. Within lines, it meant identifying objectives in terms of price classes and categories, setting up specific programs for each, and then calculating the resources required and the potential profits and losses under various conditions.

In August, 1965, President Lyndon B. Johnson announced that the program planning budgeting system that had been so successful in the Defense Department would be applied to all executive offices and agencies of the U. S. Government. His announcement included the following remarks:

> This morning I have just concluded a breakfast meeting with the Cabinet and with the heads of Federal agencies and I am asking each of them to immediately begin to introduce a very new and very revolutionary system of planning and programming the budgeting throughout the vast Federal Government, so that through the tools of modern management the full promise of a finer life can be brought to every American at the lowest possible cost.
>
> Under this new system each Cabinet and agency head will set up a very special staff of experts who, using the most modern methods of program analysis, will define the goals of their department for the coming year. And once these goals are established this system will permit us to find the most effective and the least costly alternative to achieving American goals.
>
> This program is designed to achieve three major objectives: It will help us find new ways to do jobs faster, to do jobs better, and to do jobs less expensively. It will insure a much sounder judgment through more accurate information, pinpointing those things that we ought to do more, spotlighting those things that we ought to do less. It will make our decisionmaking process as up to date, I think, as our space-exploring programs. (Novick, 1965, p. xv)

It was reported by Gross (1969) that since 1965, the new system spread rapidly and was introduced, used and/or misused by hundreds of bureaus and divisions throughout the federal government; the Comptroller General in an attempt to modernize the General Accounting Office; Congressional committees in appraising executive program proposals and writing legislative programs; and by many governors, mayors, and state and local agencies.

In 1966, the American Council on Education studied the possible applications of PPBS in the field of higher education (Robins, 1973). Its use in higher education has been influenced by some of the same pressures and motivations that influenced the adoption of other management tools. The growing belief that applications for federal aid might be more successful if accompanied by evidence that PPBS principles were being applied was a major factor in its introduction to many campuses.

In higher education, the introduction of PPBS encountered some of the same difficulties that emerged upon the introduction of other tools of management science. Mostly, the difficulties have been in the inability to accurately define the outputs of higher education. According to Farmer (1970), there has been no accepted algorithm for determining the resource requirements for a unit of output, thus he believed that higher education is not fully amenable to the formal economic analysis applicable to business.

With encouragement and funding by the U. S. Office of Education, NCHEMS has developed a standard Program Classification Structure (PCS) that will enable users to have comparable data and to faciltitate statewide, regional, and national planning (Schroeder, 1973). NCHEMS

has perhaps functioned as the most visible promoter of PPBS in higher education.

In some states higher education was ordered to initiate PPBS along with other state agencies. In the state of Michigan, when George Romney was governor, a directive was issued that the budgets of the state's higher education institutions would have to be prepared in the PPBS format (Peterson, 1971). As a result of a Florida governmental reorganization law, a directive was issued to all state agencies to implement PPBS (Stephens and Denty, 1973). The mandate, which affected each of the 20 community colleges in Florida, allowed some latitude to institutions in their manner of responding. As might be expected, some institutions viewed the executive order as a political imposition while others viewed it as an opportunity.

The universities that have been most widely recognized for implementing PPBS are the University of California and Ohio State Unversity. PPBS was introduced at the University of California after the appointment of Charles Hitch as president (Terrey, 1968). Hitch had previously assisted Robert McNamara in the reorganization of the Defense Department during the Johnson administration.

Schroeder (1976) reported that the attempts to implement PPBS at both the University of California and Ohio State University have had disappointing results. Schroeder attributed these mediocre results at the university level to the enormous problems of reforming a bureaucratic system plus the technical difficulties in measuring outputs. At the federal level PPBS was not as successful as envisioned because it was not integrated into the decision making process. Technical changes were accomplished but managerial changes were not.

While some advocates of PPBS viewed it as a more meaningful way to accommodate differences in programs rather than applying a standard formula, a critique by Boutwell (1973) indicated that the introduction of PPBS in higher education failed to diminish the reliance on formula budgeting. Instead PPBS served to increase the reliance on mathematical relationships as cost-benefit analysis, mathematical simulation models and other costing procedures were used to support program planning budgeting. Areas that had previously escaped formula budgeting, e.g., administration and support services were now brought into the fore through the prorating of these costs to programs.

While there is no consensus regarding the appropriateness of PPBS in higher education, many institutions are using some form of program budgeting and others anticipate increased usage in the years ahead. Glenny (1976) reported that 55 percent of the university presidents responding to a survey expected extensive change in unit-cost studies by 1980, 47 percent expected extensive change in use of program budgeting by 1980, and 32 percent expected extensive change in use of NCHEMS products.

Some faculty members are pleased with the implementation of PPBS because they believe it has prompted more openness in budget building, which in turn provides for more communication between faculty and administrators. The distrust associated with the hidden budget is now being replaced with conflict as colleagues attempt to resolve differences which emerge during consideration of many alternatives for achieving maximum output.

A laboratory study conducted by Scurrah and Shani (1974) confirmed the hypothesis that groups using a conventional budgeting approach would

have a greater amount of interindividual conflict than PPBS groups. The investigators warned, however, that this first-of-its-kind research should be viewed cautiously until further research confirms or rejects their findings.

While some faculty feared that PPBS would have the effect of centralizing the university planning function, Peterson (1971) believes this is not necessarily the case. Administrators can, if they so choose, use PPBS as a mechanism for opening communications regarding goals, objectives, inputs, and outputs. The system allows for various management styles. It provides a network for either participative or directive management. When administrators are serious about participative management, there may be a point where faculty grow weary of involvement in what they term administrative matters. Peterson (1971) provided the following example:

> each program (and there may be multiple layers of programs) requires three levels of decision-policy and objectives, programming, and budget. At least in the academic area, faculty and students should be involved in these academic program decisions. In order to maintain a flexible and viable university, the three levels of decision, no doubt, need to be reviewed almost annually (perhaps less often at the objectives level). Thus, PPBS may prove unwieldly for participative management unless faculty are motivated by their progress toward goals which they have established. (p. 9)

It can be seen from the preceeding discussion that PPBS, as applied in university operations, has both advantages and disadvantages. One of the chief problems lies in the difficulty of describing the desired products of higher education. It is a rigorous system that can be adapted to varying management styles. It is no panacea, but in view of the fact that its use has been mandated in several states, it is worthy

of further study and evaluation. When used by administrators and faculty who have carefully examined its implications and are courageous enough to confront the critical decisions it requires, PPBS may be a very effective technique for higher education governance.

Program Evaluation and Review Technique

A fourth management tool which has emerged and grown in popularity in the last two decades is Program Evaluation Review Technique (PERT). According to Haga (1965), "PERT is a powerful management tool for project schedule monitoring and control. The basic element is a work flow network defining sequential relationships and dependencies of each of the steps, or milestones, in a project" (p. 72). Another source (PERT Handbook, 1965) defined PERT as:

> a set of principles, methods, and techniques for effective planning of objective-oriented work, thereby establishing a sound basis for effective scheduling, costing, controlling, and replanning in the management of programs or projects. (p. 1)

A more specific definition of PERT is given by Cochran (1969):

> Program Evaluation and Review Technique is a planning and control technique which is applied to projects which have many interrelated tasks. It is designed to (1) evaluate progress toward the attainment of project goals, (2) focus attention on potential and actual problems in the project, (3) determine the shortest time in which a project can be completed, (4) provide the researcher with frequent, accurate status reports, and (5) predict the likelihood of reaching project objectives. Specifically it is concerned with the identification of each goal in the project and the time required to complete it. (p. 19)

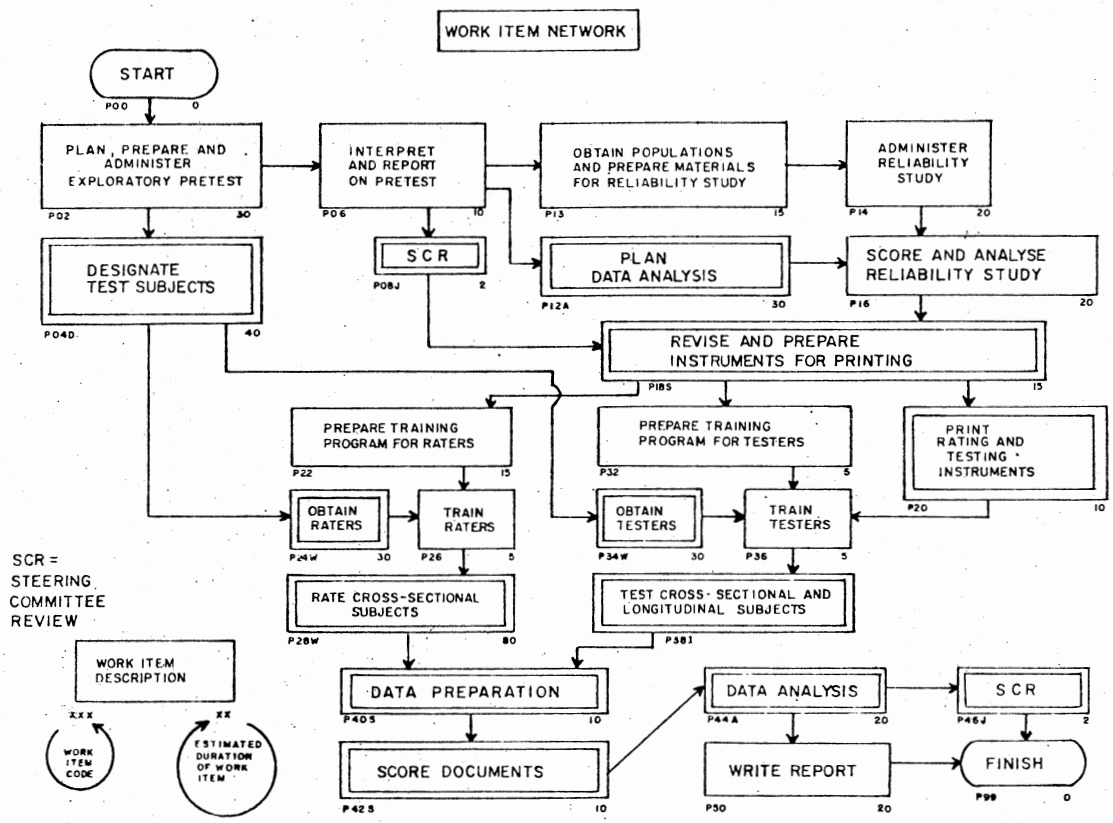
Most authors agree that the use of PERT involves a networking procedure, i.e., a diagram which shows how each part of the project relates to other parts must be prepared. Case (1969) described the network diagram as having the following features:

1. It has work items (the boxes).
2. It shows the precedence relations among the work items (the lines and arrows).
3. It shows expected time durations of work items (the numbers in the lower right corners). (p. 80)

A visual example of a network is shown in Figure 1.

Like each of the tools previously discussed PERT originated outside of the university community. PERT was developed by the Department of Navy in response to the need for a more effective project control system (Cook, 1966). According to Maier (1970) PERT was developed by the Navy Special Projects Office in the late 1950's where it was used extensively on the Navy Polaris missile project. Van Dusseldorp (1971) gives credit to two groups, working simultaneously, for the development of PERT. By his account, at the same time that the research team for the U. S. Navy Special Projects Office was proceeding, a second group consisting of representatives of E. I. du Pont de Nemours and Company and the Sperry Rand Corporation was trying to develop a better way of responding to crucial contractual arrangements with the government. The resulting effort of the second group was a planning technique known as Critical Path Method (CPM) which is very similar to PERT. A major difference in the two techniques is that PERT provides for three separate time esimates on each activity while CPM provides only one.

While the history is fairly consistent on the origin of PERT, it is less so for the origin of CPM. One author (Terrey, 1968) gives the credit for developing CPM as a modification of PERT to the UNIVAC Division of Sperry Rand. Whatever the case, the period of the late 1950's seemed to spawn much creative effort in behalf of improved management techniques.



Source: C. M. Case, Educational Technology, 1969, 9(10), 80.

Figure 1. Work Item Network

Many uses for PERT have been suggested in the literature. Perhaps the most frequent use has been with projects funded for a specific time period. Other uses have included the development of new degree programs (Cook, 1966), the planning of faculty research (Case, 1969), the planning of student research (Cochran, 1969), curriculum planning (Colvin and Fielding, 1975), preparing a departmental budget (Maier, 1970), planning for search and screening committee activities (Terrey, 1968), fund raising and development (Maier, 1970; Anderson, 1973), and planning for campus building projects (Terrey, 1968). Unfortunately most of the contributions to the literature regarding uses of PERT are proposals for how it could be used rather than reports of actual use. Case (1969), Glenny et al. (1976), and Cook (1966), however, reported uses of program evaluation techniques.

Case (1969) reported the use of PERT in a large scale longitudinal study of disadvantaged preschool children. In planning the study an IBM PERT-type computer package called Project Control System was used. This sophisticated use of PERT demonstrates its flexibility as it can be applied in very complex as well as very simple projects. One of the things that Case noticed as the research progressed was that the PERT chart, a detailed and explicit document, helped to maintain momentum toward project goals and that project morale benefitted by this momentum. The researcher suggested that projects should be planned jointly by all participants so that the resulting PERT chart would be a visual reminder of initial cooperation and coordination.

Cook (1966) discussed the uses of PERT in higher education by distinguishing between two types of planning: (1) long range planning and (2) planning activities which are generally limited in scope and

brief in duration. It is with the latter type of planning that PERT is being used most frequently. Most university research and development projects fall within the last category. Even though there are similar processes from one project to another, the projects are primarily "one-shot" or non-repetitive in nature. Projects of this type are generally characterized by a great deal of uncertainty. The uncertainty may relate to which goals are most appropriate, which methods can be most effective in achieving goals, and very importantly, which time allocation is most feasible for the various activities in the project. As a planning tool, PERT is useful in reducing the level of these uncertainties.

In the Glenny et al. (1976) study of management techniques and practices, 27 percent of the administrators reported extensive change in use of program evaluation techniques from 1968 to 1974. Sixty-eight percent anticipated extensive change from 1974 to 1980, 30 percent anticipated some change and only 2 percent anticipated very little change. The change anticipated in the use of program evaluation techniques was greater than that of any other technique in the study.

Some have ventured that the use of planning systems such as PERT increased a proposal's attractiveness to reviewers. Cook (1966) raised the possibility that the utilization of PERT may be an important aspect of applications for federal funds.

> The increasing amounts of money becoming available for education . . . requires that planning be a more explicit function than ever before on the part of those having managerial responsibilities for federally supported projects. The establishment of large and complex programs of research development as represented by the research and development centers in education, the Regional Education Laboratories, the Vocational and Technical Education Centers, will require that the directors and administrative staff of such programs become highly skilled planners as well as doers of research. (p. 10)

While a link between winning proposals and applications utilizing PERT may not be documented, one could safely conclude that demonstrated skills in project planning could not hurt an application.

One factor that makes PERT attractive to project directors is that it is a management tool that can be implemented on a very selective basis. In other words, the entire university does not have to use it in order for a director of a single research project to use it. In implementing PERT, information may be obtained from other systems in current use, but these systems would not be a prerequisite to the use of PERT. There is some feeling, however, that PERT does not work well when selectively applied within a project. Terrey (1968) cautioned that:

> The first--and most important--decision in the successful utilization of PERT is a firm decision to use PERT for planning and control of the entire project. To put the issue differently, it is worse to use PERT as a supplementary tool of planning and control than it is not to use it at all. (p. 28)

As a planning tool in higher education, PERT has been reported to have several benefits or advantages when correctly applied. Cook (1966) suggested six such advantages which include: (1) clearer statements of objectives and goals, (2) more explicit articulation of means of achieving objectives, (3) clearer definition of actual tasks to be accomplished, (4) early identification of trouble spots, (5) knowledge of where to replan when for some reason the original plan proves inappropriate, and (6) easier communication facilitated by graphic plans. Case (1969) believed that a major advantage is the visibility provided by the graphic presentation of the project. He also implied that employee relations may be strengthened by using the PERT network as an impersonal entity to represent the will of all project participants.

Unlike other systems discussed earlier, there has been little negative reaction to the use of PERT. Most authors seem very positive about its use and provide encouragement for others to explore its possibilities for their own situations. Maier (1970) related that while it is not a panacea, it can be one of the most valuable quantitative techniques available. While it does not solve administrative problems, in the hands of intelligent and perceptive managers, it can contribute a great deal to the timely achievement of desired objectives.

The Delphi Technique

Usually, when an opinion from a group of persons is needed, the method for obtaining the opinion has been to arrange for a round table discussion and through this method, work toward consensus. In recent years, decision makers have recognized weaknesses in this method. Cyphert and Gant (1971) pointed out that:

> The final position, usually a compromise, is often derived under the undue influence of certain psychological factors, such as specious persuasion by the group member with the greatest supposed authority or even merely the loudest voice, an unwillingness to abandon publicly expressed opinions, and the bandwagon effect of majority opinion. (p. 272)

Tersine and Riggs (1976) gave further emphasis to the negative effects of grouping "experts" for the purpose of obtaining opinion. They reported that:

> Emergent leaders (high status, expressive or strong individuals) tend to dominate activities either because of their knowledge or informal influence. Personalities and organizational status affect decisions because credibility is influenced by perceptions of the person offering an idea, or his position. . . . Group processes often leave participants exhausted, discouraged and frustrated because of endless meanderings and a lack of resolution. (p. 51)

Dalkey (1969) is another who noted problems with traditional means of obtaining group opinion. In addition to the problems cited above, Dalkey referred to the biasing effects of "semantic noise," explained as the communication in a discussion group that has to do with individual and group interest, not with problem solving. Another concern was group pressure for conformity that often interferes with free and deliberate expression of worthy ideas and serves to distort individual judgment.

The Delphi technique has been utilized in various settings as a means of overcoming some of the problems in obtaining group consensus. According to Tersine and Riggs (1976), "Delphi is a method to systematically solicit, collect, evaluate and tabulate independent opinion without group discussion" (p. 51). The use of Delphi replaces direct debate with a carefully structured program of individual interrogation, usually a series of questionnaires. Interaction among respondents is avoided and the experts are not identified to each other. In explaining the rationale for Delphi, Tersine and Riggs (1976) offered the following:

> The Delphi technique is a general methodology for achieving a reliable consensus of opinion from a group of experts concerning the impact or implications of some unknown or uncertain future event. It is accomplished through the use of a series of intensive questionnaires interspersed with controlled opinion feedback. The process is based on the notion that single experts may hold incorrect opinions regarding future occurrences, but increased accuracy is achieved by collecting the opinions of a number of experts. That is, the collective opinion corrected for individual biases and misinformation will result in a more reliable forecast or estimate. (p. 56)

Uhl (n. d.) agreed with the above definition and described Delphi as a four-step process:

> First, each participant is asked to write his opinion on a specific topic.

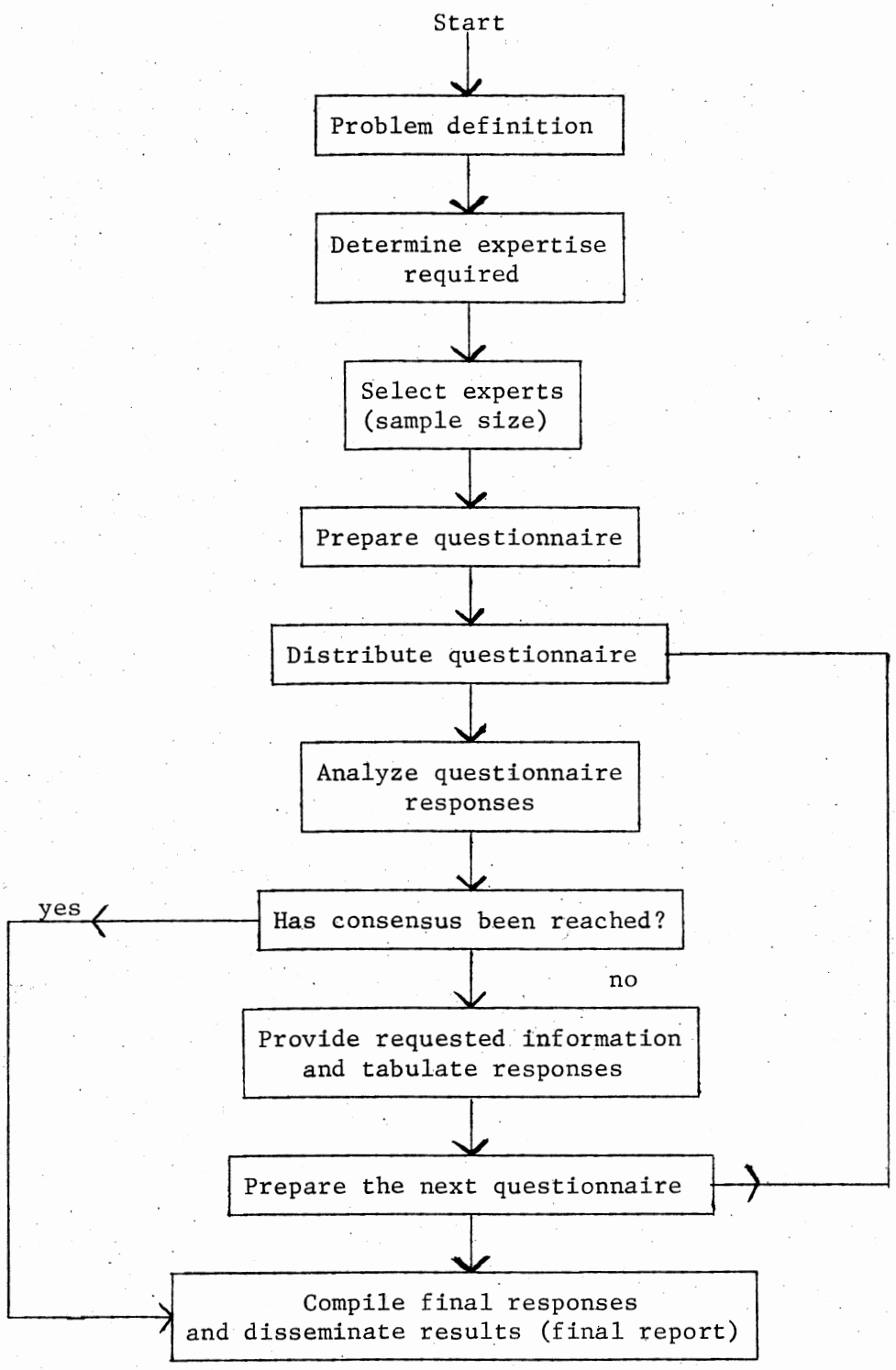
> Second, each participant is asked to evaluate all of the opinions in terms of a given criterion.
>
> Third, each participant receives the list and a summary of the responses, and if his view differs from the most frequent response, he is asked either to revise his opinion or to indicate his reason for not doing so.
>
> Finally, each participant receives the list with an updated summary including minority opinions, and is asked to repeat or revise his own opinion. (p. 2)

A schematic drawing of the Delphi process as developed by Tersine and Riggs (1976) is shown in Figure 2.

The RAND Corporation, in an effort to overcome the negative effects of group interaction and to obtain expert opinions more efficiently, developed the Delphi technique. It was originally developed in the early 1950's and like PPBS and PERT, its first use was in military applications (Tersine and Riggs, 1976).

Since its early days the RAND Corporation has been involved in a series of studies concerned with the problem of using group information more efficiently. In 1953, iteration and controlled feedback were added to previous developments and what emerged was a set of procedures now known as Delphi (Dalkey, 1969; Dalkey and Helmer, 1968). The technique was reportedly named Delphi after the greatest of all Greek oracles, Apollo's Delphic Oracle (Strauss and Zeigler, 1975). Olaf Helmer and Norman Dalkey are the innovators most often credited with the development of Delphi. According to Dalkey (1969), the naming of the procedure, Delphi, is "a somewhat misleading appelation, since there is little that is oracular about the methods" (p. 414).

In recent years, Delphi had been used primarily as a forecasting technique (Dalkey, 1969; Judd, 1970; Tersine and Riggs, 1976). Other uses include obtaining perspectives on changes that have occurred



Source: R. J. Tersine and W. E. Riggs, Business Horizons, 1976, 19(2), 53.

Figure 2. Delphi Technique

(Cyphert and Gant, 1971), identification of the world's greatest political philosophers (Strauss and Ziegler, 1975), designing curricula (Tersine and Riggs, 1976), and reaching educational policy decisions, and examining current public health and public transportation needs (Dalkey, 1969).

Strauss and Ziegler (1975) reported that there are generally three types of Delphis: numeric, policy, and historic. The distinctions are as follows:

> The goal of the numeric Delphi is to specify a single or a minimum range of numeric estimates or forecasts on a problem. The goal of the policy Delphi is to define a range of answers or alternatives to a current or anticipated policy problem. And, the goal of the historic Delphi is to explain the range of issues that fostered a specific decision or identification of the range of possible alternatives that could have been poised against a certain past decision. (p. 253)

Each of these Delphi types have had some use in higher education.

The National Laboratory for Higher Education (NLHE) and Educational Testing Service (Uhl, n. d.) cooperated on a project which used policy Delphi to assist five universities in establishing goals. The method consisted of the repeated sampling of the opinions of administrators, faculty, students, trustees, alumni, and community leaders regarding present and preferred goals for their institutions. A series of three questionnaires was used. The sample consisted of 989 persons. On the first questionnaire there was an 85 percent return. For the second, 78 percent of the original sample replied. For the third questionnaire, 75 percent of the original participants responded. For all institutions, the lowest percentage of returns was drawn from off campus leaders and the highest was from students. This was not surprising since the

participating students were promised a $10 honorarium upon completion of the third questionnaire.

The primary purpose of the NLHE experiment was to determine whether the Delphi could be successfully used in an institutional goal setting process. After analysis the experiment was deemed successful. Delphi has been shown to be an effective means of moving divergent individuals and groups toward consensus and it had done so at five institutions with quite different characteristics (Uhl, n. d.).

A curriculum study for a new branch campus of a liberal arts college is another example of the use of policy Delphi. Again it was concluded that the Delphi process was effective. The curriculum committee chairman noted:

> I would use the Delphi method wherever I knew there would be quite a variety of attitudes in an organization, such as a faculty, and where I wanted to ascertain what kind of consensus you could achieve. I think it aided us tremendously in knowing what we were 'getting into.' We came out of this Delphi experience with a highly innovative and experimental type of curricular program that has been adopted by an extremely conservative faculty. (Judd, 1970, p. 30)

Another example of a study aimed at future policy was conducted by the School of Education at the University of Virginia (Cyphert and Gant, 1971). The initial sample included 421 persons selected from six major categories of clientele. Respondents were asked to suggest areas on which the School of Education should focus its energies for the next decade. Questionnaire I was returned by 68 percent of the sample while Questionnaire IV, the final form, was returned by 62 percent of the original population. In commenting on the survey, the dean of the school commented that:

> besides giving the satisfaction of planning the future with the assistance of data, this survey made the influential

> persons in the commonwealth aware of the school's existence and gave them a vested interest in its future accomplishments. (p. 273)

Other examples of policy Delphi are a study conducted by the Institute of Government and Public Affairs at the University of California in Los Angeles (UCLA) and a UCLA study which forecast gross national product, defense expenditures and 14 other business indices (Cyphert and Gant, 1971).

A use of numeric Delphi is illustrated by a long-range forecasting study which solicited estimates from a panel of scientists and technicians on scientific breakthroughs in physical and biological technologies, world population growth, innovations in automation, progress in space, new weapon systems, and the causes and preventions of war (Strauss and Zeigler, 1975). The first use of this Delphi study was in 1964. When it was repeated in 1969 the forecasting behaviors of the panels composed of different sets of experts were found to be quite similar.

Historic Delphi was used by Strauss and Zeigler (1975) to examine systematically the great political philosophers of the past and apply their wisdom and logic to a solution of contemporary and anticipated societal problems. Ten classical philosophers were selected and 10 panels of six experts each were organized to correspond to the 10 philosophers. Through three rounds of questioning a range of options or solutions to specific contemporary problems was developed.

Some of the problems users have identified with the early use of the Delphi technique are that it is usually quite slow and time consuming, especially if conducted by mail. It deprives respondents of the stimulation that comes from face-to-face encounters, e.g., the momentum and enthusiasm which encourage new ideas. There is a chance

that respondents will not understand the written instructions. Panels may be too homogeneous and thus produce skewed data. Participants may not understand or appreciate the theoretical foundations of the technique (Strauss and Zeigler, 1975). Sackman (1974) added to the list of problems by warning that some of the assumptions on which Delphi is based are scientifically untenable. He referred specifically to the claim of superiority for group over individual opinion and the superiority of remote and private opinion over face-to-face encounter. Research reported by Dalkey (1969), however, supported the superiority of Delphi. Sackman (1974) also speculated that by providing anonymity, Delphi reinforces unaccountability in method and findings. Finally, Sackman saw Delphi as a threat to interdisciplinary science and noted:

> Delphi had been characterized by isolation from the mainstream of scientific questionnaire development and behavioral experimentation, and has set an undesirable precedent for interdisciplinary science in the professional planning of policy studies community. (p. 3)

Judd (1970) commented on Delphi's vulnerability to the "garbage in--garbage out" syndrome. The dedication of the respondents in answering questionnaires honestly and vigorously is critical. In other words, the quality of the results is only as good as the quality of the experts. Another problem is to convince respondents that by participating they are doing something significant.

Although introduced more than two decades ago, the Delphi technique is still in its developmental stage. It has been widely suggested as a planning tool for university managers. One of its strengths lies in its simplicity. It does not require computer assistance or advanced mathematical skill for its design, implementation, and analysis. Like PERT, Delphi can be used by a single individual without impinging in any

way upon the management preferences of others. MBO, PPBS, and MIS are not accorded this convenience as they tend to be "total systems" that can not be implemented without the involvement of other persons. Like PERT, the use of Delphi has not elicited the fears and anxieties about the erosion of institutional autonomy and faculty participation in governance that have been associated with MBO, PPBS, and MIS.

In summary, Delphi's corporate applications have been to explore a firm's future external environment, to analyze evolutionary product lines, and to predict likely inventions, new technologies and product application (Tersine and Riggs, 1976). In education, Delphi has been used to design new curricula, predict the impact of socioeconomic developments, to conduct research in the social sciences, and to establish institutional goals and policy directions. Government uses have been to predict the impact of land use policy, to establish priorities and to obtain solutions for social problems. It has become a multiple-use tool and has been regarded as effective in business, education, and government arenas. Its future uses are expected to be pervasive.

Uses of Management Tools at the Department Level

There is nothing in the literature to suggest that that the managerial revolution in the university began at the departmental level. Studies cited previously in this review (Glenny, 1972; Glenny et al., 1976; Heim, 1975; Schroeder, 1973; Wyatt and Zeckhauser, 1975) reported the activities and opinions of presidents, vice presidents, deans, institutional research personnel, and budget officers. While it is widely acknowledged that the effective implementation of most management

tools depends on widespread involvement, vertically and horizontally, there is little evidence that this is the case.

Two factors that help explain the level of departmental participation in the managerial revolution are: (1) the preparation for department leadership or the lack of it and (2) a communications gap between upper level administrators and department chairmen. Dilley (1972) pointed out:

> The mantle of leadership has descended upon us, but unfortunately all too often we have not been prepared to receive it. Neither the vision of leadership nor its tools are usually provided us. A chairman is selected from faculty ranks, is given a copy of his budget for the year, is introduced to other chairmen, his faculty and his secretary, and perhaps inherits a few fragmentary files from his predecessor. Who provides an orientation program on the chairmanship? Who sees that the new chairman receives literature on the chairmanship, newsletters and pamphlets of the relevant kind. . . ? The newsletters that reach higher administration usually stop at the dean's desk and so do all the journals and books. Moreover, university plans about future levels of funding, new buildings, new programs and so on usually stop circulating just beyond your eager reach. (p. 29)

Additional emphasis on the lack of administrator involvement in the selection and use of management tools was provided by Henle (1972) who stated that:

> We found that in a study of 200 colleges and universities that administrators did not know what data was being collected in their own institutions and where it was available. Administrators did not know what kind of information they needed nor did they know how to make use of the information they had. (p. 227)

Dressel (1970) is another who decried the absence of department heads in determining university management and planning policies. Because departments have, historically, been relatively well cared for by formula budgeting with yearly increments, they "have proved almost invulnerable to any attempt to introduce scientific management into the university" (p. 190).

These reports and others lead one to believe that most attempts at institutional management reform are implemented from the top down. Two prime examples, self studies and management systems, are usually mandated by the highest level of university administration in response to some motive other than departmental reform.

Perhaps an explanation for the above situation is that department chairmen see themselves primarily as academic leaders with the responsibility of providing creative leadership in the educational, scholarly and scientific enterprises of the department. They do not readily see themselves as administrators and tend to disdainfully regard the "mounting load of busy-work" that seems to be required by the administrator role. The reward system presently recognizes the scholarly enterprise, not excellence in administration. Therefore, it is not surprising that department heads spend little effort on improving management skills. Creative efforts expended are primarily in the interest of the academic specialty. When the department chairman chooses to conduct research and write manuscripts, the focus is on the area of academic expertise, not on management practice.

In spite of a general malaise with regard to management reform at the departmental level, there have been some innovative efforts. Masters and Munsterman (1975) reported the use of a computerized departmental planning-budgeting system (DPBS). Through the use of computer terminals, the department head can call for departmental information at any time. The system was programmed to handle many input variables. Budget computations are generated by the computer in a manner of seconds at a minimal cost. The DPBS is reported to be a more viable budget system, one that allows department heads to spend more of their time on decision

making, academic endeavors, and administering the department. Other examples of departmental uses of management science techniques include MBO (Lahti, 1970), Faculty Activity Analysis (Bogue, 1972) and PPBS (Baughman, 1972; Turnbull, 1972).

Kingston (1972) reviewed the many forms of managerialization of higher education has taken including: (1) increased reliance on the computer, (2) improved operating information and reporting systems, (3) more sophisticated planning and budgeting systems, and (4) improved accounting and auditing techniques. When commenting on the role of the department in management reform, he stated:

> As a part of the university, the academic department head has likwise moved toward the adoption of increasingly sophisticated management techniques. The responsibility for implementation and maintenance of the new systems ulitimately falls on the shoulders of the chairman. (p. 52)

The Need for Administrator Development

In recent years, more attention has been paid to the training of academic administrators as managers. Administrator development programs are being conducted at institutions of varying size and scope. Repeatedly, emphasis is placed on management skill as well as scholarship. According to Grassell (1971):

> Today's academic leaders must have more than scholarship. They must have an appreciation of the complex factors which enter into administrative decision-making and the formulation of academic policy. They must understand the basic principles of management by objectives, administrative efficiency and effectiveness, and personal leadership, and be able to apply these concepts with prudence and candor toward meeting the unique needs of each particular institution and of the distinctive enterprise of American higher education in general. (p. 28)

While speaking to the need for better training of administrators, Lahti (1971) stated:

> There is a crucial need for trained, efficient administrators who can use management systems which maximize the resources at their disposal in order to cope with contemporary problems. (p. 33)

In another discussion, Lahti (1970) presented a justification for initiating administrator development programs. He based the argument for management development on four basic facts:

> (1) there is presently a critical shortage of competent managers in the field of education, (2) the need for well-trained managers is going to increase drastically, (3) the primary source of administrators will be upward mobile academicians, and (4) these recruits lack experience and training in the managerial skills. . . . (p. 62)

Balderston (1974) acknowledged the need for administrators to be prepared to make more explicit, rigorous decisions. This skill is needed by all of the institutions of contemporary society if they are to be accountable in the allocation of scarce resources. Balderston noted that:

> In the past, many important questions were buried by collegial consensus-making or were left to happenstance. Such questions require examination of goals, clarifying information, consideration of elements that are difficult to reconcile, and courageous choices among alternatives. (p. 5)

The increasing emphasis now given to explicitness in decision making places a greater premium on managerial skill. Explicitness, rigor, and quantification, are qualities associated with the tools of management science, not with the traditional judgment or wisdom that administrators have exercised in decision making.

Problems that accure to institutions that are unable to meet the need for greater competence in management are goal ambiguity, poor scheduling, inefficient space utilization, unrealistic budgeting, and inadequate long-range planning. Failure to develop and implement corrective management behavior may result in an accountability crunch.

The tolerance level for poor university management seems to be declining in direct proportion to available resources.

Some of the managerial skills needed by today's administrators are tool specific, while others are more general. Lahti (1972) reported that the implementation of MBO requires the skills to: (1) write well articulated objectives in performance terms, (2) delegate efficiently and properly, (3) motivate and coach faculty and staff, and (4) fairly appraise progress toward goals.

While the development of administrator skills seems very appropriate in the face of today's concern for greater effectiveness in the utilization of scarce resources, some serious questions have been raised. For example, Saurman and Nash (1975) were concerned that the managerial revolution might have an adverse effect on personal development and growth priorities. Their viewpoint was illustrated as follows: "We need leadership in higher education that has a sound grasp of management ideas and tools, and their use need not be antithetical to the humanistic missions of educational institutions" (p. 181). Another concern about the managerialization of department heads was offered by Kingston (1972) who noted:

> the more proficient the chairman becomes as a manager, the less likely he is to endear himself to his faculty. He runs the danger of becoming too closely identified with the bureaucratic, provincial interests of the professional administrator. (p. 53)

Other critics of management science have perceived the greater use of management tools as a threat to institutional autonomy and to faculty participation in governance. Perhaps these anxieties indicate that a program of administrator development should be parallel to or integrated with a program of faculty development.

A report by Lawrence (1977) may help to allay some of the fears expressed by faculty regarding the movement toward managerialization. Lawrence contended that quantitative information cannot and should not replace other types of information such as experience, intuition, judgment, and plain old gut-level feeling. At the same time, Lawrence reported from his study that the use of management tools was perceived by users to have had a favorable effect on the credibility of higher education. Relatively few users sensed that tool use had reduced the autonomy of their institutions or contributed to increased tensions between institutions and external groups. While no specific measures of decision quality were available to document the advantages of tool use, most administrators felt that the availability of management information and techniques was beneficial.

CHAPTER III

DESIGN OF THE STUDY

Population

Home economics department administrators in state universities and land grant colleges having institutional membership in the Association of Administrators of Home Economics in September, 1976, were the subjects of the study. Administrators were selected from institutions having two or more department administrators reporting to the chief administrative offficer of the home economics unit.

A listing of eligible administrators was obtained from the results of a letter of inquiry directed to the chief administrative officer of each home economics unit (Appendix C).

Responses were received from all but 14 of the institutions on the 1976 Association of Administrators of Home Economics (AAHE) list. The investigator's place of employment, Oklahoma State University (OSU), was not included in the study since some of the OSU administrators had been involved in the various stages of questionnaire development. A follow-up of the 13 non-responding institutions revealed that in each case the institution did not meet the qualifying criteria. For the responding institutions, the usual form of response was a listing of names, titles, and addresses of department administrators at the institution or an indication that the institution did not meet the characteristics of the population frame.

The 90 responding institutions provided names of 244 individuals who at that time were serving in administrative positions other than chief administrative officer of the home economics unit. The resulting group of institutions and individuals was examined in terms of qualifying criteria. Only 194 departmental administrators from 43 institutions were found to meet all criteria. Since the specifics of the population frame had reduced the number of eligible participants to this number, it was decided that a census would be taken.

Characteristics of the population are shown in Tables I and II. Regional designations are the same as those used by Cooperative State Research Service (CSRS). The National Center for Education Statistics (1976) was used as the source of enrollment data. Institutional size is determined by the total undergraduate and graduate enrollment. Academic areas are the same as those used in the annual report of home economics degrees and enrollment data for member institutions of the National Association of State Universities and Land Grant Colleges (Harper, 1975).

Instrument Construction

The data collection instrument (Appendix A) was developed with four major sections. Section I was designed to obtain data regarding administrator use of management tools. Given only the names and acronyms of selected tools, the respondent was asked to use a nine-point scale in indicating the extent to which he or she was using each tool.

Section II of the questionnaire contained five subsections, each dealing in a more detailed way with the five tools selected for intensive

TABLE I

DESCRIPTION OF SURVEY POPULATION
BY REGION AND ACADEMIC AREA

	Frequencies[a]
Region[b]	
Northeastern	24
North Central	70
Western	34
Southern	58
Academic Area	
Art and design	2
Child development, family relationships, human development	41
Communications and journalism	1
Extension, welfare, community service	1
Foods, nutrition, dietetics	40
General home economics	5
Home economics education	26
Housing, equipment	19
Home management, family economics	22
Institution, hotel, restaurant management	4
Textiles, clothing, merchandising	32
Other	1

[a] N = 194 for each variable.

[b] A list of states in each region may be found in Appendix B.

TABLE II

DESCRIPTION OF SURVEY POPULATION BY INSTITUTIONAL SIZE

Institutional Size	No. of Institutions	No. of Persons
2,501-5,000	2	8
5,001-7,500	3	15
7,501-10,000	5	22
10,001-12,500	3	13
12,501-15,000	1	4
15,001-17,500	7	32
17,501-20,000	3	13
21,001-22,500	6	30
22,501-25,000	3	12
25,001-27,500	0	0
27,501-30,000	3	12
30,000 or more	7	33
Total	43	194

study. In each subsection, various descriptors or components of a specific tool were listed and the respondent again recorded a personal assessment on a nine-point scale.

Section III of the questionnaire sought information about the respondent and the institution where he or she was employed. Subsections related to age, academic preparation, experience and work assignment of the administrator. Enrollment data, departmental functions, geographic location, and number of faculty and students under administrator's supervision were the major kinds of institutional information requested.

Institutional and personal participation and interest in administrator development were the foci of Section IV. Questions related to the presence or absence of external pressures toward improved institutional management, the extent to which an administrator development program existed, the administrator's personal participation in administrator development programs and the administrator's interest in administrator development opportunities for self and others.

The tools selected for the study (MBO, MIS, PPBS, PERT, and Delphi) were chosen because the investigator believed that these were the tools most visible in the literature relating to higher education management. A secondary consideration was that the tools did not necessarily require complex electronic data processing or mathematical modeling skills as a prerequisite to their use.

A review of the literature relating to each tool provided the descriptors or components most commonly associated with a given tool. These commonalities became the basis of individual item construction.

The data collection instrument went through three revisions before emerging in its final form (Appendix A). The first draft was reviewed by selected members of the doctoral committee. Their suggestions were noted and revisions made. Each of the six members of the doctoral committee was asked to review the second draft. The investigator then had personal conferences with each of these individuals for the purpose of seeking a clear understanding of each suggestion made. All suggestions were noted and analyzed. Conflicting suggestions were reviewed by the investigator and the committee chairman. A decision was then made on how to resolve the conflict and appropriate suggestions were incorporated into a third draft.

As a means of establishing content validity, the third draft of the instrument was reviewed by a panel of five experts considered especially knowledgeable in the area of higher education administration. The panel consisted of two deans, one chairman of a department of higher education administration and two professors of higher education administration. A transmittal letter (Appendix C) asked each expert to review the instrument and make comments regarding the subject matter accuracy of the questions and the overall potential of the instrument for obtaining data. Follow up conferences with members of the expert panel were used as a means of seeking a thorough understanding of reactions and comments.

The third draft of the instrument was tested by two groups at the Oklahoma State University. One group included academic department heads in the College of Education, the College of Business Administration and the Division of Agriculture. A letter of transmittal (Appendix C) provided special instructions for these participants. The second

group to test the instrument included 12 persons enrolled in a graduate course studying home economics administration in higher education. These students were asked by their professor to assume the role of an administrator and complete the questionnaire with this role in mind. The class was also asked to comment on the clarity of questions and ease of response.

The suggestions from the expert panel and the results from the pilot groups were considered in creating the fourth and final draft. This draft was gain reviewed by members of the doctoral committee prior to being printed for distribution to the survey population.

Data Collection

Data were collected in the spring and summer of 1977. The questionnaires with attached cover letters and "Record of Participation" forms (Appendix A) were mailed to participants during the last week of March. A return date of April 15 was suggested. On April 18, 1977, a mailing (Appendix C) was sent to those whose responses had not been received. A return date of April 30 was suggested. On May 18, 1977, a third request for participation (Appendix C) was sent to those who had not responded. As a supplement to the third request, special letters (Appendix C) were sent to a few administrators whom the investigator believed could be influential in obtaining the participation of others at an institution.

All mailings were by first class mail. Prestamped, self-addressed envelopes and "Record of Participation" forms were enclosed for participant use. The "Record of Participation" form which could be easily

removed and returned separately from the questionnaire provided anonymity of response.

Responses were received from 155 of the 194 persons on the final list. Twenty of these responses were not usable for the following reasons:

10	blank form returned, no reason given
4	some sections of questionnaire not completed
4	respondents reported that the questionnaires were not applicable to their job responsibilities
2	respondents too busy to complete the questionnaire
20	

Tables XLVI and XLVII in Appendix D present a record of usable and nonusable responses by dates. For purposes of considering the number of responses received from each mailing, a period of one week was added to the first and second deadline dates. Therefore, responses received through April 22 were considered a response to the first mailing. Responses received April 23 through May 6 were judged to be responses to the second mailing and all others, responses to the third mailing.

Preparation of Data

As responses were received, an acquisition number and date of receipt were noted on each questionnaire. A codebook (Appendix E) was developed to identify and locate variables on the data coding form. All data were then numerically coded, keypunched, and checked for errors.

Analysis of Data

Analyses were conducted using Statistical Analysis System (SAS) (Barr and Goodnight, 1972; Barr, Goodnight, Sall, and Helwig, 1976).

Statistical procedures were selected to assist the investigator in reaching four research objectives. The research objectives for the study were:

1. describe the present utilization of five specific management tools: MBO, MIS, PPBS, PERT, and the Delphi Technique,
2. identify personal, professional, and institutional variables that may be related to the utilization of selected management tools,
3. determine if the descriptions of systems (tools) in the literature were consistent with actual administrative practices, and
4. assess the extent of interest in and perceived need for administrator development programs related to the use of management tools.

Table III presents a summary which shows the relationships of research objectives, null hypotheses, and statistical procedures.

Summary

This chapter has presented the overall design of the study. Survey population, instrument construction, data collection, and data analysis were discussed. In the following chapter, results of the study are presented.

TABLE III

SUMMARY OF RESEARCH OBJECTIVES, NULL HYPOTHESES AND STATISTICAL PROCEDURES

Null Hypotheses	Research Objectives	Statistical Procedures
1. There is no difference in tool use by administrators in various regions	No. 2	Chi Square
2. There are no interrelationships among items associated with institutional participation in administrator development.	No. 2	Pearson r
3. There is no consistency between clusters of practices defined as management systems in the literature and the clusters of practices reported by the administrators.	No. 3	Factor Analysis
4. There is no difference in factor means between groups with and without formal preparation in: a. quantitative methods b. higher education administration c. home economics administration	No. 2	Student's t
5. There is no difference in factor means between groups who did or did not administer: a. resident instruction budgets b. university extension budgets c. Cooperative Extension budgets d. research budgets	No. 2	Student's t
6. There is no difference in factor scores for groups categorized by: a. age b. degree c. region d. years in administration e. research dollars as percent of total budget	No. 2	AOV
7. There is no difference in factor scores for groups categorized by: a. number of graduate assistants supervised b. number of faculty supervised	No. 2	AOV

TABLE III (Continued)

Null Hypotheses	Research Objectives	Statistical Procedures
8. There is no difference in factor scores for groups categorized by: a. percent of time assigned to administration b. percent of time assigned to research	No. 2	AOV
9. There is no difference in factor scores for groups categorized by: a. total enrollment b. undergraduate enrollment c. graduate enrollment	No. 2	AOV
10. There is no difference in the extent to which administrators: a. express personal interest in administrator development b. perceive need for others to develop administrator skill	No. 4	Chi Square

CHAPTER IV

RESULTS AND DISCUSSION

This chapter presents the findings of the study in the following order. First, some demographic data about the administrators surveyed are presented. More detailed demographic information may be found in Appendix D, Tables XLVIII through LVI. Following the discussion of demographic data is a discussion of the extent to which the administrators used the management tools.

The demographic data are followed by results of chi square tests of significance regarding difference in tool use by regions and differences in personal interest in administrator development and perceived need for others to develop administrator skills.

Results of Pearson r correlation procedure are then discussed. The Pearson r was used to determine what relationships existed between variables associated with institutional participation in administrator development programs.

Next in order are results of a factor analysis procedure. The FACTOR PROCEDURE with VARIMAX ROTATION was used to determine which tool components were being used together, i.e., the patterns of behavior which described administrative practice. A brief discussion of each factor is presented.

Following discussion of the FACTOR PROCEDURE are results of t tests which were used to test differences among groups with and without formal

preparation in selected academic areas. T tests were also used to test for differences between groups who did and did not administer budgets of various types.

A final section presents results of the analysis of variance procedure which was used to test for differences in factor mean scores by regions, degrees, age, number of years in administration, amount of time assigned to administration, and amount of time assigned to research. Results of AOV tests for differences in factor mean scores by number of faculty, number of graduate assistants, proportion of research funding in total budget, institutional enrollment, departmental undergraduate enrollment, and departmental graduate enrollment are also presented.

Description of Respondents

The 135 departmental administrators who participated in the study are described in Tables IV through XI. Regional data in Table IV show that the largest group of respondents was located in the North Central region. The size of this group is explained by the fact that the nation's largest state universities and land grant institutions having home economics programs are located in this region. Examples of these institutions are Kansas State, Michigan State, Iowa State, University of Minnesota, University of Missouri, University of Nebraska, North Dakota State, and Ohio State. Relatively speaking, home economics programs at these institutions tend to be large. Departmentalization is usually a function of enrollment; therefore, the larger the enrollment, the greater the number of department heads. The number of respondents varied from 17 in the Northeastern region to 54 in the North Central

region. The percentage of responses by region varied from 63 percent in the Northeastern region to 73 percent in the Southern region. Differences in number of respondents was related more to the number of home economics department heads in the region than it was to the percentage of responses.

TABLE IV

DISTRIBUTION OF RESPONDENTS BY REGION[a]

Region	Number of Respondents[b]	Number in Sample
North Central	54	78
Northeastern	17	27
Southern	40	55
Western	24	34

[a]For a listing of states by region, see Appendix B.

[b]N = 135.

Table V presents the respondents by institutional size. About one-half of the respondents were employed in institutions with enrollments of more than 17,000. Approximately one-sixth were from institutions of 7,500 or less and one-third were from institutions ranging in size from 7,501 to 17,500.

Age information was provided by 132 of 135 respondents (Table VI). Seventy percent of the respondents were in the two age groups, 41 to 50

TABLE V

DISTRIBUTION OF RESPONDENTS BY INSTITUTIONAL SIZE

Size	Frequency[a]
7,500 or less	22
7,501-12,500	21
12,501-17,500	24
17,501-22,500	30
22,501 or more	38

[a]N = 135.

TABLE VI

DISTRIBUTION OF RESPONDENTS BY AGE

Age	Frequency[a]
40 or under	24
41-50	49
51-60	44
61 or over	15
Age not given	3

[a]N = 135.

and 51 to 60. The mode was in the age group 41 to 50. Only 15 (11 percent) of the respondents were in the age category of 61 or over, indicating that retirement will not have a drastic effect upon the immediate supply of administrators.

One hundred thirty four respondents provided information about the highest degrees held (Table VII). Fifteen percent reported masters degrees while 85 percent reported doctoral degrees. The Ed.S. degree was also listed on the survey instrument; however, none of the respondents reported having that degree. Several who reported masters degrees noted that they were nearing completion of doctoral programs.

TABLE VII

DISTRIBUTION OF RESPONDENTS BY HIGHEST DEGREE HELD

Degree	Frequency[a]
M.A. or M.S.	20
Ed.D.	17
Ph.D.	97
Not listed	1

[a]N = 135.

Table VIII presents a distribution of respondents by the numer of years they had served as administrators. The mode for this distribution was for the least number of years, one to five. Seventy-seven percent

of the respondents had been administrators for 10 or fewer years while only 11 percent had served for 16 years or over.

TABLE VIII

DISTRIBUTION OF RESPONDENTS BY YEARS IN ADMINISTRATION

Years	Frequency[a]
1-5	59
6-10	43
11-15	16
16-20	7
21-25	3
26-30	4
31-35	0
36-40	1
Not given	2

[a]N = 135.

The number of years that administrators had served in their present positions is reported in Table IX. The mode for this distribution is at the one to two year level. More than one-half (61 percent) of the respondents had served for six or fewer years. Only 18.5 percent had served for 11 years or more.

TABLE IX

DISTRIBUTION OF RESPONDENTS BY YEARS IN PRESENT POSITION

Years	Frequency[a]
1-2	42
3-4	23
5-6	17
7-8	14
9-10	14
11 or more	25

[a]N = 135.

Academic rank of respondents is presented in Table X. Data for this table were obtained from answers to question number one on page seven of the Management Tools System (MTS) Questionnaire (Appendix A). Specificity with regard to academic rank was not requested, however approximately one half of the respondents provided both an administrative title and an academic title. Of those providing academic rank information, 21 percent reported the rank of full professor.

Table XI presents the distribution of respondents by area of specialization in degree programs. At the bachelors level, 92 respondents (68 percent) held degrees in home economics. Within this group, the mode was in home economics education where approximately 60 percent of those holding home economics degrees had specialized. The next highest group had specialized in food, nutrition, and diatetics. Six

respondents did not list an area of specialization at the bachelors level. Thirty seven persons reported areas of specialization in an assortment of 26 areas in the broad fields of education, psychology, agriculture, science, and others.

TABLE X

DISTRIBUTION OF RESPONDENTS BY ACADEMIC RANK

Rank	Frequency[a]
Professor	54
Associate professor	8
Assistant professor	4
Lecturer	1
Not listed	68

[a]N = 135.

At the masters level, 94 respondents listed areas of specialization in the field of home economics. Within this group there was bimodel representation in home economics education and clothing, textiles, and merchandising. The largest number of degrees reported from outside the field of home economics was in education where 10 degrees were from seven areas of specialization.

At the doctoral level, the number of home economics degrees had slipped from the high of 94 at the masters level to 71, a decrease of

TABLE XI

DISTRIBUTION OF RESPONDENTS BY SPECIALIZATION IN DEGREE PROGRAMS

Area of Specialization	Number of Responses for Each Degree Level		
	Bachelors	Masters	Doctoral
Home Economics			
Child and family development	2	16	16
Clothing, textiles, and merchandising	9	25	11
Family economics and home management	2	14	10
Food, nutrition, and diatetics	13	12	16
General home economics	8	0	0
Home economics education	56	25	15
Hotel management	1	0	1
Housing and design	1	2	3
Subtotal	92	94	71
Education			
Administration and supervision	0	1	1
Art education	1	0	1
Business education	1	0	0
Counseling and guidance	0	1	1
Curriculum and instruction	0	3	4
Education (no specialty given)	0	2	0
Elementary education	1	0	0
Foundations	0	0	1
Higher education	0	0	3
Learning systems	0	0	1
Measurement	0	1	0
Secondary education	2	1	1
Special education	0	0	1
Vocational education	0	1	3
Subtotal	5	10	17
Psychology			
Child psychology	1	0	1
Developmental psychology	0	0	2
General psychology	7	2	3
Social psychology	0	0	2
Subtotal	8	2	7
Agriculture			
Agriculture economics	1	1	1
Agriculture science	1	0	0
Animal nutrition	0	1	1
Animal science	2	0	0
Dairy	1	0	0
General agriculture	2	0	0
Subtotal	7	2	2

TABLE XI (Continued)

Area of Specialization		Number of Responses for Each Degree Level		
		Bachelors	Masters	Doctoral
Science				
Biology		1	1	0
Chemistry		2	0	0
General science		1	0	0
Organic chemistry		1	2	1
	Subtotal	5	3	1
Other				
Architecture		1	0	0
Art and design		1	3	0
Economics		2	1	1
Gerontology		0	0	1
History		1	0	0
Journalism		1	1	0
Marketing		0	0	1
Nursing		1	0	0
Philosophy		1	0	0
Pre medicine		1	0	0
Public health		1	0	0
Social science		1	0	0
Sociology		1	1	0
	Subtotal	12	6	3
Area of Specialization Not Listed		6	18	13
	Subtotal	6	18	13
	Total	135	135	114

24 percent. The number of degrees earned in home economics education decreased from a high of 56 at the bachelors level to 15 at the doctoral level, a 73 percent decrease. The number of degrees reported in clothing, textiles, and merchandising decreased from a high of 25 at the masters level to 11 at the doctoral level, a 56 percent decrease. Outside the field of home economics, the largest group of degrees was

reported in education; the majority of these were in the areas of curriculum and instruction, higher education, and vocational education.

Those not listing areas of specialization ranged from six at the bachelors level to 18 at the masters level.

Other data describing the respondents may be found in Table XLVIII through Table LVI in Appendix D.

Use of Management Tools by Administrators

Objective 1 of the study was to describe the present utilization of five specific management tools: MBO, MIS, PPBS, PERT, and Delphi Technique. Management tools are described in two ways in this chapter: (1) by the discussion of descriptive data and (2) by the results of factor analysis procedure. In this section descriptive data are reported.

In an initial phase of data analysis the administrators' use of management tools was determined by responses given in Section II, pages 3 through five of the MTS Questionnaire (see Appendix A). "Tool use" for any individual was defined as a score of six or above (one to nine point scale) on each of the items associated with the tool. For example, to be counted as using MBO, an administrator would have checked a score of six or above on each of the six items which described MBO. A score of five or less on any item in the group placed the respondent in the "non-use" category. This classification scheme was used for two reasons: (1) score values of six and above indicated agreement that components of the tools were descriptive of administrative practices

and (2) review of the literature indicated that each component of a tool was crucial to its use as a system.

Table XII presents the results of the "use" and "non-use" classification. These data show that the use of all tools was relatively low. MBO had the highest use of any of the total systems. Only 33 percent of the administrators checked a score of six or above on each of its components. The least used tool was Delphi. Approximately seven percent of the administrators reported a score of six or above on each of its components.

TABLE XII

DISTRIBUTION OF RESPONDENTS BY USE OF ALL COMPONENTS OF EACH MANAGEMENT TOOL

Tool	Classification	Frequency[a]	Percent
MBO	Non-use	90	66.67
	Use	45	33.33
MIS	Non-use	124	91.85
	Use	11	8.15
PPBS	Non-use	124	91.85
	Use	11	8.15
PERT	Non-use	115	85.19
	Use	20	14.81
DELPHI	Non-use	126	93.33
	Use	9	6.67

[a]N = 135 for each tool.

The investigator included a section in the MTS Questionnaire which asked the administrators to indicate the extent of use of management tools as they presently understood them (see MTS Section I, p. 2). In this question the tools were not defined, they were only listed by name. The purpose of the item was to be able to compare administrators' perceptions of use with use as defined by the investigator. Table XIII presents this comparison. The tool having the greatest discrepancy between use as perceived by administrators and use as defined by the investigator was MBO. The use rankings were very similar. By each system MBO was the most used and Delphi, the least used.

The relatively low level of use indicated by the "tool use" scores prompted the researcher to visually examine mean scores on each component of each system. By this procedure it was found which components of a system were more extensively used by the administrators as a group. Table XIV presents the mean score data for each item. It should be noted that only 8 of 34 items across the five systems had a mean score of 6.0 or above. Five of the eight items were in the MBO system, one was in MIS and two were in PPBS.

The one MBO item having a mean of less than 6.0 dealt with specificity of objectives, i.e., measurable terms and target dates. This is understandable as other studies and experience have shown that people resist the greater level of specificity when stating objectives, preferring instead to state objectives in general terms. In this case, however, specificity of objectives is crucial. Without this essential MBO step the others are less meaningful.

The one MIS item showing a mean of 6.0 or above dealt with the increasing demands on departments to utilize quantitative data in making

TABLE XIII

COMPARISON OF TOOL USE AS PERCEIVED BY ADMINISTRATORS AND DEFINED BY INVESTIGATOR

Tool	Administrators' Perceptions[a]		Investigator's Definition	
	Use[b]	Non-use[c]	Use[d]	Non-use[e]
MBO	92	43	45	90
DELPHI	24	111	9	126
MIS	43	92	11	124
PPBS	47	88	11	124
PERT	55	80	20	115

[a] N = 135 for each tool.

[b] Those who scored six or above on the item (see Section I of the MTS Questionnaire).

[c] Those who scored five or below on the item (see Section I of the MTS Questionnaire).

[d] Those who scored six or above on each of the items in this group of items associated with the tool (see Section II of the MTS Questionnaire).

[e] Those who scored five or below on any of the items in the group of items associated with the tool (see Section II of the MTS Questionnaire).

TABLE XIV

MEAN USE SCORES FOR EACH COMPONENT OF EACH MANAGEMENT TOOL[a]

Tool[b]	Item	Mean Score	Standard Deviation
MBO	1. The goals of the academic department are understood and agreed upon by most faculty and staff involved.	7.755	1.479
	2. Members of my faculty and staff usually express their performance objectives for the coming year in measurable terms and with target dates.	5.563	2.503
	3. As an administrator, I review performance objectives with each member of the academic team at the beginning of the year.	6.074	2.645
	4. As an administrator, I review progress toward objectives with each team member on a regular basis throughout the year.	6.007	2.316
	5. At the end of the year, each member of the team prepares a brief report which lists all major accomplishments, with comments on variances between results actually achieved and results expected.	6.348	2.832
	6. As an administrator, I discuss year-end appraisal or progress reports privately with each member of the faculty and staff.	7.148	2.466
MIS	1. There have been increasing demands on my department to utilize quantitative data in making and justifying decisions.	6.490	2.573
	2. There have been increasing demands on my department to utilize value (non-quantitative) data in making and justifying decisions.	4.807	2.573

TABLE XIV (Continued)

Tool[b]		Item	Mean Score	Standard Deviation
MIS cont'd	3.	Computer generated data are used in making long range plans or projections for my department	4.918	2.844
	4.	It is part of my administrative duties to prepare raw data reports for the institution's MIS.	5.119	3.132
	5.	As an administrator, I have initiated requests for incorporating new data storing and retrieval competencies into the institution's MIS.	3.437	2.774
PPBS	1.	Quantified written objectives are prepared for each area of administration.	4.489	2.718
	2.	The resource requirements for each program area are identified.	5.548	2.676
	3.	Students are invited to provide input for the budget building process.	3.193	2.478
	4.	Faculty are invited to provide input for the budget building process.	6.481	2.668
	5.	Administrators outside the department are invited to provide input for the budget building process.	4.333	2.998
	6.	Factors outside the immediate operating environment of the institution such as population trends, political developments, social currents, technological breakthroughs, national economic trends, and personnel attitudes are considered as inputs for long range planning.	6.311	2.602
	7.	Planning includes the systematic identification of alternative ways of carrying out each objective.	5.096	2.500
	8.	Planning includes the esimation of results expected for each alternative.	5.163	2.618

TABLE XIV (Continued)

Tool[b]		Item	Mean Score	Standard Deviation
PPBS cont'd	9.	The cost implications of alternative means of reaching program objectives are identified.	4.933	2.635
	10.	Program decisions are usually made on the basis of systematic comparisons of outputs and inputs.	4.667	2.545
	11.	Output measures are used to show the extent to which the department is achieving its objectives.	5.378	2.545
PERT	1.	Various activities to be completed in complex projects are identified.	5.948	2.702
	2.	A network (diagram) is drawn to show the sequence of activities within a project.	3.452	2.506
	3.	Estimates are made of the time (days) required to achieve each sub-goal.	4.148	2.538
	4.	Attention is focused on aspects likely to impede or delay the project.	4.630	2.524
	5.	Alternative plans and schedules are developed.	4.459	2.608
	6.	Total time required to complete an entire project and the time at which each step must be completed in order for the project to be completed on time are computed.	4.252	2.614
	7.	Reports and concurrent evaluations of progress against the scheduled plan are made.	4.570	2.711
DELPHI	1.	The needs, desires, and opinions of clientele groups served by my academic department are regularly assessed.	5.348	2.763

TABLE XIV (Continued)

Tool[b]	Item	Mean Score	Standard Deviation
DELPHI cont'd	2. A consensus of expert opinion is sought prior to making decisions which would result in significant program changes.	5.763	2.866
	3. Methods of opinion gathering which deemphasize direct (face-to-face) confrontation among respondents are used.	4.296	2.615
	4. Opinion gathering techniques designed to obtain answers to a central problem and to bring out the reasoning which led a respondent to answer in a given way are used.	4.163	2.686
	5. The opinions of experts are obtained through a series of intensive questionnaires interspersed with controlled feedback.	2.741	2.172

[a]Scale values: 1 to 9.

[b]N = 135 for each tool.

and justifying decisions. By contract, a similar item dealing with increasing demands to utilize "soft" data showed a mean score of 4.807. The lowest mean score in MIS (3.437) dealt with administrator involvement in determining which data are incorporated into the institution's MIS.

The two items in PPBS that showed mean scores of 6.0 or above dealt with faculty input for budget decisions and consideration of the

socioeconomic-political milieu when making long range plans.

The highest of all mean scores was 7.755 on the first item in MBO. This item related to consensus-reaching regarding departmental goals. Only 7.4 percent of all respondents checked this item at five or below on the nine-point scale. The mode for this particular item was at the highest value, nine. Thirty-six percent of the respondents scored themselves at this point on the scale.

The lowest of all mean scores was 2.741 on the last item in DELPHI. This item related to the method of obtaining opinions of experts. Critical features of DELPHI involve obtaining expert opinions without face-to-face confrontation of the respondents and obtaining opinions through a series of intensive questionnaires interspersed with controlled feedback. The low means on these items indicate that when the opinions of experts are obtained, other methods are used. In Table XII it was shown that DELPHI was the least used of the five systems with only 6.67 percent of the respondents using the system in its entirety.

In general it can be said from analyzing mean scores that the lowest means were obtained on items that required the greatest specificity.

Relationship of Region to Tool Use

Objective 2 of the study was to identify personal, professional, and institutional variables that may be related to the utilization of selected management tools. Hypotheses 1, 2, 3, 4, 6, 7, 8, and 9 relate to this objective (see list of objectives, Chapter I, page 5).

Statistical procedures used for the analysis of data related to objective 2 included Chi square, Pearson r, Student's t, and analysis

of variance. Each procedure is described as the relationships between independent and dependent variables are discussed.

Previous discussion described how the continuous data from the one to nine scale in the MTS Questionnaire were classified into two categories: use and non-use. After converting the continuous data into two discrete categories as shown in Table XII, Chi square was used to test Hypothesis 1 (actually a set of five hypotheses): There is no difference in tool use by administrators in various regions. Appendix B provides a list of states by regions. Table XV presents the Chi square values obtained. None of the values was large enough to justify the rejection of the set of null hypotheses.

TABLE XV

CHI SQUARE VALUES OBTAINED IN TESTING THE NULL HYPOTHESES OF NO SIGNIFICANT DIFFERENCES IN TOOL USE BY REGIONS

Tool	Chi Square Value	Degrees of Freedom	Probability
MBO	1.319	3	0.7247
MIS	3.639	3	0.3032
PPBS	4.238	3	0.2369
PERT	1.630	3	0.6527
DELPHI	3.543	3	0.3152

At least one study ("EDP Leads," 1973) has indicated that region was a variable related to the use of management tools by corporations of various sizes. However, it should be pointed out that the conclusion was derived by visual comparison of average scores. In the present study, the chi square test did not produce results to substantiate the conclusion that region makes a difference.

Institutional Participation in Administrator Development

In Section IV A of the MTS Questionnaire (see Appendix A), administrators were asked to respond to a grouping of items believed to be related to institutional participation in administrator development. Visual examination of Table XVI, indicates that the overall participation level is low. Item 1 related to the presence of an ongoing program of administrator development. The mean for that item was 3.963 on a one to nine scale where five was neutral and one to four were various levels of disagreement with the statement or item.

To obtain another perspective on institutional participation in administrator development, the investigator examined individual scores on Item 1. By this procedure it was found that 46 respondents had scores of six or above on Item 1. For these 46 individuals, 15 reported a score of nine, therefore 15 of the individuals in the sample (N = 134) strongly agreed that their institutions had ongoing programs of administrator development.

Item 2 was designed to obtain data regarding the involvement of department heads in administrator development programs. Again, the low mean indicated very little involvement. Reference to individual scores

TABLE XVI

MEAN SCORES FOR ITEMS ON INSTITUTIONAL PARTICIPATION IN ADMINISTRATOR DEVELOPMENT

	Item	Mean[a]	Standard Deviation
1.	The institution where I am employed has an ongoing program of administrator development.	3.963	2.814
2.	Administrator development at this institution is provided for those in department administration.	3.746	2.652
3.	Administrators in all academic areas of the university have been encouraged to participate in management development programs.	3.925	2.509
4.	The chief administrative officer of the home economics unit has encouraged department heads to participate in administrator development seminars, workshops, conferences, and training programs.	4.903	2.953
5.	The state coordinating board has encouraged university administrators to implement modern management techniques.	3.888	2.482
6.	State legislators have encouraged higher education administrators to implement management science tools.	3.851	2.553
7.	To my knowledge, administrators of my level have attended administrator development seminars, workshops, and conferences within the last 12 months.	3.993	2.970
8.	In my opinion university administrators at this institution need more preparation in the use of management tools.	6.955	2.522

[a] $N = 134$.

indicated that 42 respondents had scores on this item of six or above. The mean for these 42 individuals was 7.000. Of these individuals, only nine had scores of nine. It should be noted that both the mean and the number strongly agreeing with the item decreased from Item 1 to Item 2.

Item 4 related to encouragement from the home economics chief administrator to participate in management development programs. The mean for this item was slightly higher than for Items 1 and 2, although it was still on the "disagree" side of the scale. Again, individual scores were examined. Sixty-five respondents had scores of six or above on this item. Twenty had a maximum score of nine. Thirty-six had a score of one. Therefore, there is little indication that home economics chief administrative officers communicated to their subordinates a strong interest in administrator development.

Pearson r was used to test Hypothesis 2: There are no interrelationships among items associated with institutional participation in administrator development. Table XVII presents the results of this test. As noted on the table, intercorrelations among Items 1 through 7 were all significant. Item 8 did not correlate significantly with any of the other items. For the first seven items, the administrators responded similarly to each of the items in the group. If they scored low on one, they tended to score low on another. This was not true for Item 8 which related to the perceived need for administrators at the institutions to have more preparation in the use of management tools. By examiniation of individual scores on this item it was found that 59 (N = 134) persons strongly agreed at the maximum score of nine that administrator development was needed. The overall mean for Item 8 was distinctly different from the means for the other seven items.

What this may indicate is that there is a gap between what is needed in administrator development and what is actually provided.

Hypothesis 2 was rejected due to the intercorrelations among Items 1 through 7. There was no relationship between Item 8 and the other items.

TABLE XVII

INTERCORRELATIONS[a] AMONG ITEMS ON INSTITUTIONAL ADMINISTRATOR DEVELOPMENT[b]

Item	1	2	3	4	5	6	7	8
1								
2	.802							
3	.574	.610						
4	.505	.516	.639					
5	.442	.499	.576	.415				
6	.439	.517	.525	.315	.833			
7	.365	.417	.530	.429	.409	.388		
8	-.091	-.152	-.085	-.058	-.032	-.099	-.065	

[a]All correlations were significant at the .0001 or .0002 level except for item number eight which had no significant correlations.

[b]N = 134 for each item.

Practices Associated With Tools as Determined by Factor Analysis

Research Objective 3 was to determine if the practices related to each other as parts of a system (tool) in the literature were actually related to each other in administrative behavior. The SAS 76 FACTOR PROCEDURE using the VARIMAX ROTATION was used to test Hypothesis 3: There is no consistency between clusters of practices defined as management systems in the literature and the clusters of practices reported by the administrators. For the factor analysis procedure, the actual responses of one to nine were again used. Six meaningful factors were produced. These were labeled according to the major performance dimensions they described. The factors are:

I. PERT
II. MBO
III. PPBS-I
IV. DELPHI
V. MIS
VI. PPBS-II

The number of items making up each factor varied from two to six. One item was not included in any of the factors due to its low factor loadings on all factors. Another item was eliminated because it loaded on Factor III at a considerably lower level than the six items which were included and because its loading of .457 on Factor III was not very different from another item which loaded at .410 on Factor II but at .606 on Factor VI. Two other items were excluded for similar reasons. The four items not included were:

> There have been increasing demands on my department to utilize value (non-quantitative) data in making and justifying decisions.
>
> Quantified written objectives are prepared for each area of administration.

Students are invited to provide input for the budget building process.

Administrators outside the department are invited to provide input for the budget building process.

It was surprising to the investigator that the item regarding the preparation of quantified written objectives for each area of administration did not load on any of the factors. The mean score for that item was 4.489 on a scale from one to nine. Since quantified written objectives are a very important component in PPBS, in fact the very foundation, it seemed unusual that this item loaded on the factor lower than other components of the tool.

The six factors are presented in the following tables. Factor loadings, the number of each item as listed in the MTS Questionnaire and the items making up each factor are found.

Factor I: PERT

Each of the items used in the MTS Questionnaire to describe PERT is included in this factor. These items and their loadings on the factor are given in Table XVIII.

Factor I: PERT was one of the three factors which remained intact, i.e., each of the components listed as a part of the tool loaded together on the factor which was named for that tool.

Factor II: MBO

The six items identified as MBO practices in the MTS Questionnaire loaded together as a system and thus emerged as Factor II. Table XIX presents the items and respective loadings.

TABLE XVIII

ITEMS AND FACTOR LOADINGS FOR FACTOR I: PERT

Factor Loading	Item Number	Item
.773	II D 1	Various activities to be completed in complex projects are identified.
.697	II D 2	A network (diagram) is drawn to show the sequence of activities within a project.
.835	II D 3	Estimates are made of the time (days) required to achieve each sub-goal.
.870	II D 4	Attention is focused on aspects likely to impede or delay the project.
.834	II D 5	Alternative plans and schedules are developed.
.819	II D 5	Total time required to complete an entire project and the time at which each step must be completed in order for the project to be completed on time are computed.
.811	II D 7	Reports and concurrent evaluations of progress against the scheduled plan are made.

TABLE XIX

ITEMS AND FACTOR LOADINGS FOR FACTOR II: MBO

Factor Loading	Item Number	Item
.534	II A 1	The goals of the academic department are understood and agreed upon by most faculty and staff involved.
.700	II A 2	Members of my faculty and staff usually express their performance objectives for the coming year in measurable terms and with target dates.
.785	II A 3	As an administrator, I review performance objectives with each member of the academic team at the beginning of the year.
.719	II A 4	As an administrator, I review progress toward objectives with each team member on a regular basis throughout the year.
.709	II A 5	At the end of the year, each member of the team prepares a brief report which lists all major accomplishments, with comments on variances between results actually achieved and results expected.
.664	II A 6	As an administrator, I discuss year-end appraisal or progress reports privately with each member of the faculty and staff.

Factor III: PPBS-I

Of the 11 practices associated with PPBS in the literature and in the MTS Questionnaire, eight emerged in factors. As shown in Table XX, Items 6 through 11 loaded together as Factor III. Items 2 and 4 loaded together as Factor VI (see Table XXIII). Those items not loading with either factor related to quantification of objectives, student input for budget building, and input of external administrators in budget building. Since items associated with PPBS emerged in two factors, the first of these, Factor III, was named PPBS-I. PPBS-I is characterized by a program planning emphasis while PPBS-II is characterized by budgetary concerns. A table of mean scores for factors is located in Appendix D.

Factor IV: DELPHI

Table XXI presents the items that loaded together as the DELPHI factor. It should be noted that this factor contains each of the items identified with the Delphi Technique in the MTS Questionnaire.

Factor V: MIS

Factor V is made up of all but one of the items associated with MIS. The item that did not load with the others was Item 2 which related to increasing demands on departments to utilize value (non-quantitative) data in making and justifying decisions. Table XXII presents the items included in Factor V: MIS.

Factor VI: PPBS-II

As stated earlier two factors contain items associated with PPBS in

TABLE XX

ITEMS AND FACTOR LOADINGS FOR FACTOR III: PPBS-I

Factor Loading	Item Number	Item
.557	II C 6	Factors outside of the immediate operating environment of the institution such as population trends, political developments, social currents, technological breakthroughs, national economic trends, and personal attitudes are considered as inputs for long range planning.
.857	II C 7	Planning includes the systematic identification of alternative ways of carrying out each objective.
.821	II C 8	Planning includes the estimation of results expected for each alternative.
.840	II C 9	The cost of implications of alternative means of reaching program objectives are identified.
.774	II C 10	Program decisions are usually made on the basis of systematic comparisons of outputs and inputs.
.638	II C 11	Output measures are used to show the extent to which the department is achieving its objectives.

TABLE XXI

ITEMS AND FACTOR LOADINGS FOR FACTOR IV: DELPHI

Factor Loading	Item Number	Item
.717	II E 1	The needs, desires, and objectives of clientele groups served by my academic department are regularly assessed.
.646	II E 2	A consensus of expert opinion is sought prior to making decisions which would result in significant program changes.
.817	II E 3	Methods of opinion gathering which deemphasize direct (face-to-face) confrontation among respondents are used.
.724	II E 4	Opinion gathering techniques designed to obtain answers to a central problem and to bring out the reasoning which led a respondent to answer in a given way are used.
.709	II E 5	The opinions of experts are obtained through a series of intensive questionnaires interspersed with controlled feedback.

TABLE XXII

ITEMS AND FACTOR LOADINGS FOR FACTOR V: MIS

Factor Loading	Item Number	Item
.697	II B 1	There have been increasing demands on my department to utilize quantitative data in making and justifying decisions.
.779	II B 3	Computer generated data are used in making long range plans or projections for my department.
.768	II B 4	It is part of my administrative duties to prepare raw data reports for the institution's MIS.
.657	II B 5	As an administrator, I have initiated requests for incorporating new data storing and retrieval competencies into the institution's MIS.

the literature and in the MTS Questionnaire. PPBS-II contains two of these items, one dealing with identification of resource requirements for each program area and the other with faculty input in the budget building process. Table XXIII identifies the items included in PPBS-II.

TABLE XXIII

ITEMS AND FACTOR LOADINGS FOR FACTOR VI: PPBS-II

Factor Loading	Item Number	Item
.606	II C 2	The resource requirements for each program area are identified.
.642	II C 4	Faculty are invited to provide input for the budget building process.

Summary

The intent of the factor analysis was to determine if practices associated with a given tool were actually related to each other in administrative behavior. Two problems: (1) low overall use of tools by the respondents and (2) the design of the MTS Questionnaire, created the need for caution in interpreting the results of the factor analysis.

Table LVII in Appendix D presents the overall mean scores for factors. It is noted that only two of the factors had means exceeding 6.0 on the one to nine scale where one through four indicated disagreement that a practice associated with a tool described personal

administrative behavior and six through nine indicated agreement that an item described personal behavior. Through factor analysis, items associated with specific tools emerged as systems but this was not due to extensive use of the practices by the administrators.

The design of the survey instrument may have unintentionally influenced respondents to score the items associated with a given tool in a similar manner. While each respondent was free to score each item at any point on the one to nine scale, for some individuals there may have been a self-imposed pressure to score items within a group in a like manner. Randomization of items may have produced different results.

After considering the results of factor analysis and the possible influences of the low level of tool use and the arrangement of items in the survey design on the results, the investigator rejected Hypothesis 3: There is no consistency between clusters of practices defined as management systems in the literature and the clusters of practices reported by the administrators. There was consistency between patterns to the extent that the factors resulting from factor analysis were identical to the clusters of practices known in the literature as MBO, PERT, and Delphi and only slightly different from MIS and PPBS as defined in the literature.

Use of Factor Scores in Testing for Differences

In the following sections, factor scores will be used in reporting results of tests for differences. The reader is reminded that for MBO, PERT, and DELPHI, the factors produced by factor analysis and the tools

as identified in the MTS Questionnaire were identical. In the other cases, the differences were minimal.

The Relationship of Tool Use to Formal Academic Preparation

The relationship of formal academic preparation in quantitative methods, higher education administration, and home economics administration to tool use was tested by TTEST PROCEDURE (Barr et al., 1976). "TTEST computes t statistics for testing the hypothesis that the means of two groups of data are equal" (p. 275). The procedure was used to test Hypotheis 4 (actually a set of hypotheses): There is no difference in factor means between groups with and without formal academic preparation in (a) quantitative methods, (b) higher education administration, and/or (c) home economics administration.

By use of the SAS 76 program (Barr et al., 1976), a t statistic is computed assuming the variances are equal in each group. An approximate t is also computed on the assumption that the variances in the two groups are unequal. For each t, degrees of freedom and probability level are given. The degrees of freedom associated with the approximate t are computed by Satterthwaite's approximation. "An F . . . statistic is computed to test for equality of the two variances" (Barr et al., 1976, p. 275).

Quantitative Methods

Table XXIV presents the results of t tests for differences in factor means between groups with and without formal preparation in selected academic areas. More detailed information is provided by

TABLE XXIV

RESULTS OF T TESTS FOR DIFFERENCES IN FACTOR MEANS BETWEEN GROUPS WITH AND WITHOUT FORMAL PREPARATION IN SELECTED ACADEMIC AREAS[a]

	Quantitative Methods		Higher Education Administration		Home Economics Administration	
FACTOR	Mean	t	Mean	t	Mean	t
PERT	3.888[b]		3.885		4.175	
	4.537	0.848	5.077	-3.233***	5.200	-2.542*
MBO	6.593		6.116		6.185	
	6.475	0.195	6.833	-2.413*	7.143	-3.406***
PPBS-I	3.222		4.924		5.065	
	5.403	-2.990***	5.577	-1.756	5.687	-1.546
DELPHI	4.000		4.330		4.372	
	4.495	-0.691	4.388	-0.722	4.662	-0.750
MIS	4.250		4.852		4.782	
	5.046	-1.042	5.127	-0.719	5.458	-1.654
PPBS-II	3.167		5.681		5.753	
	6.218	-3.850***	6.333	-1.577	6.595	-1.897

[a]For more detailed information, see Table LVIII through Table LX in Appendix D.

[b]In every instance, the first mean listed is for administrators who had no academic credit related to the variable and the second mean is for administrators who had one or more hours credit.

*Indicates $p < .05$.

***Indicates $p < .005$.

Table LVIII in Appendix D. For quantiative methods, results were significant for PPBS-I and PPBS-II at the .005 level. Those having formal academic preparation in quantitative methods had significantly higher means.

Higher Education Administration

Table XXIV presents a summary of results of t tests for differences in factor means between groups with and without formal preparation in selected academic areas. Table LIX in Appendix D presents detailed information regarding the relationship of higher education administration to the use of tools. The t values were significant at the .005 level for PERT and at the .05 level for MBO. In each case those with formal academic preparation in higher education administration had higher mean scores than those who had no preparation. Results were not significant for PPBS-I, PPBS-II, MIS, and DELPHI.

Home Economics Administration

Results of t tests for differences in factor means between groups with and without formal preparation in selected academic areas may be found in Table XXIV and Table LX, Appendix D. Formal academic preparation in home economics administration was significant at the .05 level for PERT and at the .005 level for MBO. Like higher education administration, home economics administration was not significant for PPBS-I, PPBS-II, MIS, and DELPHI.

Summary

Some of the t tests for differences in factor means between groups

with and without formal preparation in selected academic areas were significant. Quantitative methods were significant for PPBS-I and PPBS-II. Higher education administration and home economics administration were significant for MBO and PERT. These significant results led to the rejection of Hypothesis 4: There is no significant difference in each of six factor means between groups with and without formal preparation in quantitative methods, higher education administration, and home economics administration.

The Relationship of Tool Use to Types of Budgets Administered

The relationship of types of budgets administered to tool use was also tested by the SAS 76 TTEST PROCEDURE (Barr et al., 1976). This procedure was a test for Hypothesis 5: There is no difference in each of six factor means between groups who did or did not administer: (a) resident instruction budgets, (b) university extension budgets; (c) Cooperative Extension budgets, and (d) research budgets. The results of these tests are discussed in the following paragraphs.

Resident Instruction Budget

Table XXV presents the results of t tests for differences in factor means between groups who did and did not administer selected budgets. Table LXI in Appendix D provides additional information about the test regarding resident instruction budgets. Results indicate that differences between factor means for those administering and not administering resident instruction budgets were not significantly different for any factor.

TABLE XXV

RESULTS OF T TESTS FOR DIFFERENCES IN FACTOR MEANS BETWEEN GROUPS WHO DID AND DID NOT ADMINISTER SELECTED BUDGETS[a]

Factor	Budget for Resident Instruction		Budget for University Extension		Budget for Cooperative Extension		Budget for Research	
	Mean	t	Mean	t	Mean	t	Mean	t
PERT	4.548[b]		4.463		4.745		4.778	
	4.486	0.091	4.786	-0.479	3.683	2.400*	4.298	1.228
MBO	5.958		6.510		6.708		6.753	
	6.541	-0.793	6.278	0.436	5.792	2.637*	6.310	1.441
PPBS-I	4.694		5.193		5.364		5.283	
	5.316	-0.940	5.944	-1.139	4.927	0.988	5.244	0.104
DELPHI	4.633		4.416		4.706		4.707	
	4.439	0.307	4.867	-0.714	3.663	2.525*	4.288	1.148
MIS	3.917		4.938		4.902		4.681	
	5.088	-1.759	5.438	-0.742	5.242	-0.756	5.188	-1.301
PPBS-II	4.917		5.975		6.142		5.972	
	6.131	-1.670	6.500	-0.715	5.641	1.023	6.056	-0.196

[a]Degrees of freedom for each test were 8 and 125. For more detailed information, see Table LXI through Table LXIV in Appendix D.

[b]In each case, the first mean listed is for administrators who did not administer a budget of that type and the second mean is for administrators who did administer that budget type.

*Indicates $p < .05$.

University Extension Budget

Table XXV presents a summary of the tests for differences in factor means by different types of budgets. There were no significant differences between means on any factor for university extension budgets.

Cooperative Extension Budget

Results of the tests for differences in factors between groups who did and did not administer budgets of various types are found in Table XXV. Significance at the .05 level was obtained for PERT, MBO, and DELPHI. For each of the factors, the mean was lower for the group that did administer Cooperative Extension budgets.

Research Budget

Table XXV provides a summary of tests for differences in factor means between groups who did and did not administer selected budgets. The .05 level of significance was not obtained for any of the factors.

Summary

Tests were conducted to determine if the means for groups who did and did not administer budgets of various types were equal. The .05 criterion for significance was not met for any of the tools for resident instruction budgets, university extension budgets, and research budgets. Results of t tests for differences in factor means between groups who did and did not administer Cooperative Extension budgets were significant at the .05 level for PERT, MBO, and DELPHI. These results led to the

rejection of Hypothesis 5 (actually a set of hypotheses): There is no difference in factor means between groups who did and did not administer (a) resident instruction budgets, (b) university extension budgets, (c) Cooperative Extension budgets, and/or (d) research budgets.

The Relationship of Selected Demographic Variables to Tool Use

Research Objective 2 was to identify personal, professional, and institutional variables that may be related to the utilization of selected management tools. In earlier sections of the chapter, means of testing hypotheses related to this objective have been discussed. This section of the report will include discussion of analysis of variance, another procedure used to test the relationship of independent variables to tool use. The SAS 72 ANOVA Procedure (Barr and Goodnight, 1972) was used to conduct tests for determining differences in each of six factor means for four groups of variables: (1) selected demographic variables, (2) amount of time assigned to specific functions, (3) number of persons supervised, and (4) enrollment. The first tests to be discussed were used to test Hypothesis 6 (actually a set of hypotheses): There is no difference in factor scores for groups categorized by (a) age, (b) degree, (c) region, (d) years in administration, and (e) research dollars as percent of total budget.

Age

Table XXVI presents the probability values resulting from the AOV test for differences in factor means by age. None of the values reached the criterion of .05, therefore differences in factor mean scores cannot

be attributed to age. Table XXVII presents the detailed results of the tests.

TABLE XXVI

PROBABILITY VALUES DETERMINED BY ANALYSES OF VARIANCE FOR DIFFERENCES IN FACTOR SCORES BY SELECTED DEMOGRAPHIC VARIABLES

Factor	Age	Degree	Region	Years Administration	Percent of Budget Research
PERT	.896	.688	.269	.711	.364
MBO	.104	.555	.102	.085	.756
PPBS-I	.993	.901	.925	.612	.681
DELPHI	.855	.166	.044*	.670	.752
MIS	.502	.511	.573	.151	.087
PPBS-II	.518	.291	.764	.755	.753

*$p < .05$.

Degree

Probability values for differences in factor means by academic degree are given in Table XXVI. Table XXVIII presents detailed results of the AOV tests. None of the probability values met the criterion of .05; therefore, differences in factor mean scores cannot be attributed to academic degree held.

TABLE XXVII

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS OF DIFFERENT AGE LEVELS[a]

Factor	Mean Square Age	Mean Square Residual	F Value[b]	Probability
PERT	0.985	4.910	0.201	0.896
MBO	6.372	3.050	2.089	0.104
PPBS-I	0.136	4.841	0.028	0.993
DELPHI	1.144	4.406	0.260	0.855
MIS	3.985	5.014	0.795	0.502
PPBS-II	4.447	5.803	0.766	0.518

[a]Factor mean scores by age are given in Table LXV, Appendix D.

[b]Degrees of freedom for each AOV were 3 and 127.

TABLE XXVIII

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS WITH DIFFERENT ACADEMIC DEGREES[a]

Factor	Mean Square Degree	Mean Square Residual	F Value[b]	Probability
PERT	1.873	4.892	0.382	0.688
MBO	1.850	3.082	0.600	0.555
PPBS-I	0.489	4.696	0.104	0.901
DELPHI	0.581	4.187	1.810	0.166
MIS	3.612	4.954	0.729	0.511
PPBS-II	7.042	5.653	1.246	0.291

[a]Factor mean scores by degrees are given in Table LXVI, Appendix D.

[b]Degrees of freedom for each AOV are 2 and 131.

Region

Table XXVI provides information regarding the probability values determined by analysis of variance for differences in factor means by selected demographic variables. Table XXIX presents specific results for regions. In Table XXVI it is shown that region was significant ($p < .05$) for Factor IV: DELPHI. In an earlier section of the report, results of chi square tests for differences in tool use by region were discussed (see Table XV). By the chi square test, no significant differences were found. For the AOV test, however, actual participant scores were used as opposed to the classification of "use" equals a score of one to five and "non-use" equals a score of six to nine. The use of the actual scores permitted a more precise examination of data.

To meet the criterion for significance at the .05 level, regional scores on Factor IV: DELPHI were required to vary by the value of .979. Both the Southern and Western regions varied from the North Central region by a value > .979. The Northeastern region did not vary from any other region by a significant value.

Even though a more rigorous test produced a significant difference in Factor IV means by regions, the investigator elected to acknowledge this as inconclusive. Since there is a discrepancy between the AOV results and the chi square results discussed in an earlier section and since by chance alone some tests would appear significant, differences in factor means were not attributed to regional variation.

Years in Administration

Data in Table XXVI and Table XXX show that the number of years in

TABLE XXIX

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS REPRESENTING FOUR GEOGRAPHIC REGIONS[a]

Factor	Mean Square Region	Mean Square Residual	F Value[b]	Probability
PERT	6.475	4.902	1.321	0.269
MBO	6.290	2.994	2.101	0.102
PPBS-I	0.762	4.862	0.157	0.925
DELPHI	11.483	4.161	2.759	0.044*
MIS	3.340	4.961	0.673	0.573
PPBS-II	2.319	5.938	0.390	0.764

[a]Factor mean scores by regions are given in Table LXVII, Appendix D.

[b]Degrees of freedom for each AOV were 3 and 130.

*$p < .05$.

TABLE XXX

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS WITH VARYING NUMBERS OF YEARS IN ADMINISTRATION[a]

Factor	Mean Square Yrs. Adm.	Mean Square Residual	F Value[b]	Probability
PERT	2.310	4.958	0.466	0.711
MBO	6.268	2.789	2.247	0.085
PPBS-I	2.963	4.839	0.612	0.612
DELPHI	2.307	4.391	0.525	0.670
MIS	8.371	4.673	1.791	0.151
PPBS-II	2.370	5.890	0.402	0.755

[a]Factor mean scores by years in administration are given in Table LXVIII, Appendix D.

[b]Degrees of freedom for each AOV were 3 and 129.

administration was not a significant source of variation for any factor. Although there were no significant sources of variation, the low probability value for Factor II: MBO prompted the investigator to compare means for the varying lengths of administrative service. The least significant difference (LSD) value of .813 was required for significance at the .05 level. By this criterion the 6 to 10 years group and the 16 or more years group had factor means significantly larger than the 11 to 15 years group for MBO. The one to five years group did not vary significantly from any of the other groups on this factor. The group having the lowest mean on MBO was the group with 11 to 15 years of administrative service. While this is an interesting observation, the criterion for significance was not met, therefore the investigator discounted number of years in administration as a significant source of variation in factor means.

Research Funds as Percent of the Total Budget

Table XXVI presents probability values determined by analysis of variance for differences in factor means by selected demographic variables. Table XXXI presents specific data for the AOV tests for differences in factor means by varying proportions of research funding in the total budget. Results show that percent of research funding in total budget is not a significant source of variation.

Summary

The series of tests reported in the previous discussion related to Hypothesis 6: There is no difference in factor scores for groups

TABLE XXXI

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS HAVING VARYING PROPORTIONS OF RESEARCH FUNDING[a] FOR TOTAL BUDGET

Factor	Mean Square Res. Funding	Mean Square Residual	F Value[b]	Probability
PERT	5.338	4.891	1.091	0.364
MBO	1.350	2.833	0.476	0.756
PPBS-I	2.778	4.791	0.580	0.681
DELPHI	2.139	4.437	0.482	0.752
MIS	9.739	4.695	2.073	0.087
PPBS-II	2.830	5.893	0.480	0.753

[a]Factor mean scores by percent of research funding in total budget are given in Table LXIX, Appendix D.

[b]Degrees of freedom for each AOV were 4 and 123.

categorized by (a) age, (b) degree, (c) region, (d) years in administration, and/or (e) research dollars as a percent of the total budget. A significance level of .044 was obtained for region on Factor IV: DELPHI. With this exception, the set of 30 hypotheses was rejected.

The Relationship of the Number of Persons Supervised to Tool Use

Discussion in this section relates to the tests of Hypothesis 7 (actually a set of hypotheses): There is no difference in factor scores for groups categorized by (a) number of graduate assistants supervised and (b) number of faculty supervised.

Number of Graduate Assistants Supervised

Table XXXII provides probability values determined by analyses of variance for differences in factor scores by number of persons supervised. Table XXXIII provides specific results of analyses of variance for differences in factor scores by number of graduate assistants supervised. Table XXXII shows the number of graduate students supervised was a significant source of variance for Factor I: PERT and Factor III: PPBS-I. For Factor I: PERT, an LSD value of 1.532 was needed for significance at the .01 level. Administrators who had one to three graduate assistants and those having seven to nine graduate assistants had significantly different (higher) scores on PERT from those who had 10 or more graduate assistants. Administrators who had four to six graduate assistants did not differ significantly from any other group.

TABLE XXXII

PROBABILITY VALUES DETERMINED BY ANALYSES OF VARIANCE FOR DIFFERENCES IN FACTOR SCORES BY NUMBER OF PERSONS SUPERVISED

Factor	Number of Graduate Assistants	Number of Faculty
PERT	.001***	.049*
MBO	.122	.039*
PPBS-I	.007**	.827
DELPHI	.145	.582
MIS	.804	.556
PPBS-II	.542	.221

*$p < .05$.

**$p < .01$.

***$p \leq .001$.

TABLE XXXIII

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS SUPERVISING VARYING NUMBERS OF GRADUATE ASSISTANTS[a]

Factor	Mean Square No. Assts.	Mean Square Residual	F Value[b]	Probability
PERT	24.606	4.287	5.739	0.001***
MBO	5.684	3.068	1.853	0.122
PPBS-I	16.281	4.374	3.721	0.007**
DELPHI	7.319	4.214	1.737	0.145
MIS	2.098	5.135	0.409	0.804
PPBS-II	5.573	6.073	0.918	0.542

[a]Factor mean scores by number of graduate assistants are given in Table LXX, Appendix D.

[b]Degrees of freedom for each AOV were 4 and 122.

**p < .01

***p < .001.

The number of graduate assistants supervised was also significant for Factor III: PPBS-I. An LSD value of 1.548 was needed for significance at the .01 level. The group of administrators having 10 to 15 graduate assistants had a significantly lower mean for Factor III than for any other groups. For two of six factors, the number of graduate assistants supervised was a significant source of variation.

Number of Faculty Supervised

Probability values determined by analyses of variance for differences in factor scores by number of persons supervised may be found in Table XXXII. Detailed results for the number of faculty supervised are found in Table XXXIV. Results show that the number of faculty supervised was a significant source of variance at the .05 level for Factor I: PERT and Factor II: MBO. The LSD value of 1.209 was the criterion for significance at the .05 level on Factor I: PERT. Comparison of the means with the required LSD value indicated that administrators who supervised one to three faculty had significantly higher scores than did administrators who supervised 16 or more faculty. Those who supervised 4 to 6 or 10 to 15 faculty were not significantly different from other administrators on PERT. These results are similar to the results obtained by analyzing the differences in PERT means by number of graduate students supervised. In both cases, administrators who supervised one to three or seven to nine persons had significantly different scores on PERT.

Table XXXII also indicates that number of faculty supervised was significant for Factor II: MBO. Table XXXIV gives more detailed information. The LSD value required for significance at the .05 level

TABLE XXXIV

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS SUPERVISING VARYING NUMBERS OF FACULTY[a]

Factor	Mean Square No. of Faculty	Mean Square Residual	F Value[b]	Probability
PERT	11.878	4.852	2.448	0.049*
MBO	7.630	2.942	2.593	0.039*
PPBS-I	1.829	4.882	0.375	0.828
DELPHI	3.085	4.281	0.721	0.582
MIS	3.762	4.953	0.759	0.556
PPBS-II	8.510	5.880	1.447	0.221

[a]Factor mean scores by number of faculty supervised are given in Table LXXI, Appendix D.

[b]Degrees of freedom for each AOV were 4 and 125.

*$p < .05$.

was .942. Those administrators supervising four to six faculty had significantly higher scores than those supervising 16 or more faculty. There were no other significant differences between means for the varying numbers of faculty supervised.

Summary

The number of faculty supervised was a significant source of variation for Factor I: PERT and Factor II: MBO. The number of graduate assistants supervised was a significant source of variation for Factor I: PERT and Factor III: PPBS-I. These results led the investigator to reject Hypothesis 7: There is no difference in each of six factor means for groups categorized by (a) number of graduate students supervised and (b) number of faculty supervised.

The Relationship of the Amount of Time Assigned to Specific Functions and Tool Use

Discussion in this section relates to the tests of Hypothesis 8 (actually a set of hypotheses): There is no difference in factor scores for groups categorized by (a) percent of time assigned to administration and (b) percent of time assigned to research.

Percent of Time Assigned to Administration

Table XXXV presents probability values determined by analysis of variance for differences in factor scores by time allocated to specific functions. Table XXXVI presents more detailed data relating to the amount of time assigned to administration. According to the tables,

TABLE XXXV

PROBABILITY VALUES DETERMINED BY ANALYSES OF VARIANCE FOR DIFFERENCES IN FACTOR SCORES BY TIME ALLOCATED TO SPECIFIC FUNCTIONS

Factor	Percent of Time Administration	Percent of Time Research
PERT	.003**	.969
MBO	.017*	.016*
PPBS-I	.718	.370
DELPHI	.042*	.049
MIS	.360	.219
PPBS-II	.233	.564

*$p < .05$

**$p < .01$.

TABLE XXXVI

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS WITH VARYING AMOUNTS OF TIME ASSIGNED TO ADMINISTRATION[a]

Factor	Mean Square % Time Adm.	Mean Square Residual	F Value[b]	Probability
PERT	19.321	4.458	4.333	0.003**
MBO	8.928	2.870	3.110	0.017*
PPBS-I	2.535	4.802	0.528	0.718
DELPHI	10.477	4.108	2.550	0.042*
MIS	5.372	4.885	1.100	0.360
PPBS-II	8.105	5.750	1.409	0.233

[a]Factor mean scores by amount of time assigned to administration are given in Table LXXII, Appendix D.

[b]Degrees of freedom for each AOV were 4 and 130.

*$p < .05$.

**$p < .01$.

percent of time assigned to administration was a significant source of variation for three factors: PERT, MBO, and DELPHI.

For PERT, an LSD value of 1.502 was required for significance at the .01 level and a value of 1.137 was required at the .05 level of significance. At the .01 level administrators with 25 percent or less time assigned to administration had significantly higher scores than those assigned to administration for 76 to 100 percent of time. At the .05 level, administrators in all other percent of time categories had significantly higher scores than those who were assigned for 76 to 100 percent of time.

For MBO, those individuals assigned to administration responsibilities for five percent or less of their time and those assigned for 76 to 100 percent of their time had significantly lower mean scores than those assigned to administration for 26 to 50 percent of their time.

For DELPHI, those assigned to administration for 6 to 25 percent of time and those assigned for 26 to 50 percent of time had significantly higher means at the .01 level than those assigned for 76 to 100 percent of time. Those assigned for five percent of time or less had significantly higher scores at the .05 level than those assigned for 75 to 100 percent of time.

The pattern consistent across the three factors was that those assigned the greatest percent of time (75 to 100 percent) to administration had the lowest mean scores on the factors.

Percent of Time Assigned to Research

Table XXXV presents probability values determined by analysis of variance for differences in factor means by time allocated to specific

functions. Table XXXVII presents more detailed information for tests regarding percent of time assigned to research. The tables show that percent of time assigned to research was a significant source of variation for MBO and DELPHI. For MBO those assigned to research for 21 or more percent of time had significantly higher scores at the .05 level than did those assigned to research for 20 percent or less of time. For DELPHI, those with no research assignment had significantly higher scores than those who were assigned research responsibility for one to five percent of time.

Summary

Percent of time assigned to administration was a significant source of variation for PERT, MBO, and DELPHI. Percent of time assigned to research was a significant source of variation for MBO and DELPHI. There was an inverse relationship between percent of time assigned to administration and factor scores, i.e., the higher the percentage of time, the lower the score. This relationship was not characteristic of the variable: percent of time assigned to research. Since both percent of time assigned to administration and percent of time assigned to research were shown to be significant sources of variation on two or more factors, the investigator rejected Hypothesis 8: There is no difference in each of six factor means for groups categorized by (a) percent of time assigned to administration and (b) percent of time assigned to research.

The Relationship of Enrollment to Tool Use

This section of the report relates to tests for Hypothesis 9

TABLE XXXVII

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS HAVING VARYING AMOUNTS OF TIME ASSIGNED TO RESEARCH[a]

Factor	Mean Square % Time Research	Mean Square Residual	F Value[b]	Probability
PERT	0.161	4.974	0.032	0.969
MBO	12.407	2.909	4.265	0.016*
PPBS-I	4.764	4.734	1.007	0.370
DELPHI	12.724	4.171	3.051	0.049*
MIS	7.424	4.861	1.527	0.219
PPBS-II	4.920	5.834	0.843	0.564

[a]Factor mean scores by amount of time assigned to research are given in Table LXXIII, Appendix D.

[b]Degrees of freedom for each AOV were 2 and 132.

*$p < .05$.

(actually a set of hypotheses): There is no difference in factor scores for groups categorized by (a) total enrollment, (b) undergraduate enrollment, and (c) graduate enrollment.

Total Enrollment of the Institution

Table XXXVIII presents probability values determined by analyses of variance for differences in factor scores by enrollment. Table XXXIX provides data related to total enrollment of the institution. According to these tables, institutional enrollment was not a significant source of variation.

TABLE XXXVIII

PROBABILITY VALUES DETERMINED BY ANALYSES OF VARIANCE FOR DIFFERENCES IN FACTOR SCORES BY ENROLLMENT

Factors	Total Enrollment	Undergraduate Enrollment	Graduate Enrollment
PERT	.213	.013*	.407
MBO	.300	.125	.122
PPBS-I	.673	.080	.994
DELPHI	.222	.050*	.064
MIS	.515	.171	.603
PPBS-II	.858	.259	.510

*$p \geq .05$.

TABLE XXXIX

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS REPRESENTING INSTITUTIONS WITH ENROLLMENTS OF VARYING SIZES[a]

Factor	Mean Square Tot. Enroll.	Mean Square Residual	F Value[b]	Probability
PERT	7.179	4.868	1.475	0.213
MBO	3.751	3.048	1.231	0.300
PPBS-I	2.853	4.829	0.591	0.673
DELPHI	6.166	4.269	1.444	0.222
MIS	4.076	4.950	0.823	0.515
PPBS-II	1.970	5.977	0.330	0.858

[a]Factor mean scores by total enrollment are given in Table LXXIV, Appendix D.

[b]Degrees of freedom for each AOV were 4 and 129.

Undergraduate Enrollment

Table XXXVIII presents probability values determined by analysis of variance for differences in factor scores by enrollment. For more detailed information regarding undergraduate enrollment, see Table XL. These tables show that undergraduate enrollment was a significant source of variation for PERT and DELPHI.

TABLE XL

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS HAVING VARYING NUMBERS OF UNDERGRADUATE STUDENTS[a]

Factor	Mean Square Und. Students	Mean Square Residual	F Value[b]	Probability
PERT	15.322	4.616	3.320	0.013*
MBO	5.498	2.997	1.836	0.125
PPBS-I	9.832	4.612	2.132	0.080
DELPHI	10.073	4.148	2.428	0.050*
MIS	7.839	4.833	1.622	0.171
PPBS-II	7.755	5.798	1.338	0.259

[a]Factor mean scores for undergraduate enrollment are given in Table LXXV, Appendix D.

[b]Degrees of freedom for each AOV were 4 and 129.

*$p \leq .05$.

For PERT, those administrators whose departmental undergraduate enrollment was 300 or less had significantly higher means at the .01

level than those having larger enrollments. For DELPHI, those administrators whose departmental undergraduate enrollment was 200 or less had significantly higher scores at the .05 level than those having larger enrollments. For these two factors, PERT and DELPHI, the lower the enrollment, the higher the score. This did not hold across the other four factors.

Graduate Enrollment

Tables XXXVIII and LXI provide results of analysis of variance on factor scores for groups having varying numbers of graduate students. According to the tables, graduate students were not a significant source of variation on factor scores.

Summary

Undergraduate enrollment was a significant source of variation for two factors: PERT and DELPHI. On the strength of this result, the investigator rejected Hypothesis 9: There is no difference in each of six factor scores for groups categorized by (a) total enrollment, (b) undergraduate enrollment, and (c) graduate enrollment.

The Relationship of Personal Interest in Administrator Development to the Perceived Need for Others to Develop Administrative Skill

Research Objective 4 related to the extent of personal interest in and perceived need for administrator development programs. Section IV

TABLE XLI

SUMMARY OF ANALYSES OF VARIANCE ON FACTOR SCORES FOR GROUPS HAVING VARYING NUMBERS OF GRADUATE STUDENTS[a]

Factors	Mean Square Grad. Students	Mean Square Residual	F Value[b]	Probability
PERT	5.037	4.921	1.024	0.407
MBO	4.967	2.799	1.774	0.122
PPBS-I	0.379	4.981	0.076	0.994
DELPHI	9.004	4.197	2.145	0.064
MIS	3.601	4.920	0.732	0.603
PPBS-II	5.100	5.899	0.865	0.510

[a]Factor mean scores by graduate enrollment are given in Table XLLVI, Appendix D.

[b]Degrees of freedom for each AOV were 5 and 126.

of the MTS Questionnaire asked for responses regarding personal needs for administrator development and the perceived need of other administrators for administrative training. (A copy of the MTS Questionnaire may be found in Appendix A.) Table XLII provides a comparison of responses to the two questions cited above. For every area of need the frequencies were higher for the question relating to the needs of others. Why this pattern was obtained is not answered by the data.

Chi square was used to test Hypothesis 10 (actually a set of hypotheses): There is no difference in the extent to which administrators (a) express personal interest in administrator development and (b) perceive need for others to develop administrator skill. Because the investigator believed that many of the respondents had recently attended workshops on budgeting and collective bargaining, these items were not included in the chi square tests. Table XLIII presents results of the tests. Each was significant at the .0001 level, therefore Hypothesis 10 was rejected. For each area of need, administrators responded differently to (a) expressions of personal interest in administrator development and (b) perceptions of need for others to develop administrator skills.

Chapter Summary

This chapter has presented results of the study. Following a description of the respondents; research objectives, related hypotheses, and statistical procedures were discussed. Chi square tests produced results which led to the rejection of the null hypothesis of no difference in personal interest in administrator development and perceived need for others to develop administrator skill. Pearson r procedures

TABLE XLII

COMPARISON OF RESPONSES TO QUESTIONS REGARDING ADMINISTRATOR DEVELOPMENT[a]

Area of Need	Items	
	I am interested in getting together with other administrators to develop administrative skill in:	In my opinion, there is a general need for university administrators to have more pre-service and/or in-service preparation in:
Needs Analysis	58[b]	87
Planning	61	87
Budgeting	45	82
Evaluation	75	97
Performance Appraisal	77	96
Internal Health Audits	9	26
Organization Development	57	79
Forecasting	53	75
Collective Bargaining	8	41

[a]N = 135 for each item.

[b]Numbers given are for "yes" responses.

TABLE XLIII

CHI SQUARE TESTS REGARDING PERSONAL INTERESTS IN AND NEEDS OF OTHERS FOR DEVELOPING ADMINISTRATOR SKILLS

Administrator Skill	Chi Square Value	Degrees of Freedom	Probability
Needs Assessment	36.450	1	0.0001
Planning	40.839	1	0.0001
Evaluation	33.871	1	0.0001
Performance Appraisal	21.639	1	0.0001
Internal Health Audits	30.065	1	0.0001
Organization Development	19.999	1	0.0001
Forecasting	43.316	1	0.0001

produced results which led to the rejection of the null hypotheses of no significant relationship among items associated with institutional participation in administrator development. Table XLIV summarizes results of t tests and analyses of variance. Independent variables that were significant sources of variation are noted along with their respective significance levels.

Eight of the 10 null hypotheses were rejected. In addition to the two discussed above (Hypotheses 2 and 10), the others rejected were:

No consistency between clusters of practices defined as management systems in the literature and the clusters of practices reported by administrators (Hypothesis 3).

No difference in factor means between groups with and without formal academic preparation in (a) quantitative methods, (b) higher education administration, and/or (c) home economics administration (Hypothesis 4).

No difference in factor means between groups who did and did not administer budgets for (a) resident instruction, (b) university extension, (c) Cooperative Extension, and/or (d) research (Hypothesis 5).

No difference in factor means for groups by number of persons supervised (a) number of graduate assistants supervised and/or (b) number of faculty supervised (Hypothesis 7).

No difference in factor means for groups by time allocation to specific functions (a) percent of time assigned to administration and/or (b) percent of time assigned to research (Hypothesis 8).

No difference in factor means for groups by enrollment (a) total institution enrollment, (b) undergraduate enrollment, and/or (c) graduate enrollment (Hypothesis 9).

The two hypotheses not rejected related to:

No difference in tool use by regions (Hypothesis 1).

No difference in factor means for groups categorized by (a) age, (b) degree, (c) region, (d) years in administration, and/or (e) research dollars as percent of total budget (Hypothesis 6).

TABLE XLIV

SUMMARY OF SIGNIFICANCE LEVELS OF SIGNIFICANT DIFFERENCES IN FACTOR MEANS BY INDEPENDENT VARIABLES

Independent Variable	Factors					
	PERT	MBO	PPBS-I	DELPHI	MIS	PPBS-II
Quantitative Methods[a]			.005			.005
Higher Education Administration[a]	.005	.05				
Home Economics Administration[a]	.05	.005				
Cooperative Extension Budget[a]	.05	.05		.05		
Region[b]				.05		
Number of Graduate Assistants[b]	.001		.01			
Number of Faculty[b]	.05	.05				
Time Assigned to Administration[b]	.01	.05		.05		
Time Assigned to Research[b]	.05			.05		
Undergraduate Enrollment[b]	.05			.05		

[a]Determined by t test.

[b]Determined by AOV.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Summary

The study is summarized in this section. Information is provided about the problem, objectives, hypotheses, sample designation, instrument design, data collection, statistical treatment, and results and conclusions.

Statement of the Problem

The problem in this study was to determine the extent to which some of the tools associated with scientific management have been adopted by department chairmen in home economics units in state universities and land grant institutions. A measure of interest in management or administrator development was also obtained.

Objectives

The specific objectives of the study were:

1. describe the present utilization of five specific management tools: Management by Objectives (MBO), Management Information System (MIS), Program Planning Budgeting System (PPBS), Program Evaluation Review Technique (PERT), and the Delphi Technique,
2. identify personal, professional, and institutional variables

that may be related to the utilization of selected management tools,

3. determine if the practices related to each other as parts of a system (tool) in the literature were related to each other in administrative behavior, and
4. assess the extent of interest in and perceived need for administrator development programs related to the use of management tools.

Hypotheses

Ten null hypotheses were tested in this study. Briefly, they related to:

1. variation in tool use by regions,
2. relationships among the several items associated with institutional participation in administrator development,
3. consistency between clusters of practices defined as management systems in the literature and the clusters of practices reported by administrators,
4. formal academic preparation in selected subjects as sources of variation in factor means,
5. types of budgets administered as sources of variation in factor means,
6. demographic variables as sources of variation in factor means,
7. number of persons supervised as a source of variation in factor means,
8. time allocated to specific functions as a source of variation in factor means,

9. size of enrollment as a source of variation in factor means, and
10. relationship of personal interest in administrator development and perceived need for others to develop administrator skills.

The hypotheses are more fully stated in the summary table (Table XLV) discussed in the Results and Conclusions section of this chapter.

Survey Population

Home economics department administrators in state universities and land grant colleges having institutional memberships in the Association of Administrators of Home Economics in September, 1976, were the subjects of the study. Administrators were selected from institutions having two or more department administrators reporting to the chief administrative officer of the home economics unit. A listing of eligible administrators was obtained from the results of a letter of inquiry directed to the chief administrative officer of each home economics unit. Administrators from the investigator's institution of employment, Oklahoma State University, were excluded from the study.

Instrument Design

A Management Tools Study (MTS) Questionnaire was developed with four major sections: Section I--Use of Management Tools, Section II--Use of Selected Management Tools, Section III--Descriptive Information, and Section IV--Administrator Development. A copy of the MTS Questionnaire is found in Appendix A. During the questionnaire development process, the investigator sought input from practicing departmental chairmen, a university class consisting of prospective administrators,

a panel of experts in the field of higher education administration, and the doctoral committee comprised of higher education administrators, a professor of higher education, and a professor and consultant in statistics and survey research.

Data Collection

MTS Questionnaires were mailed to 194 administrators who met the population criteria. Follow up letters were used to obtain a return rate of 80 percent. Twenty returned questionnaires were classified as "nonusable." The final number of respondents was 135.

Procedures

Analyses were conducted using Statistical Analysis System (SAS) (Barr and Goodnight, 1972; Barr, Goodnight, Sall, and Helwig, 1976). Specifically, factor analysis was used to reduce the data for easier handling and chi square, Pearson r, t, and AOV were used as appropriate to test the various hypotheses.

Results and Conclusions

Given the design of this study, analysis of the data has indicated that:

1. Management tool utilization does not vary with region.
2. An apparent gap exists between what administrators believe is needed in administrator development and what is actually provided.
3. The clusters of practices identified with tools in the

literature were consistent with the clusters of practices reported by the administrators.

4. Management tool utilization varies with formal academic preparation in higher education administration and home economics administration.
5. Responsibility for managing Cooperative Extension Service (CES) budgets is a source of variation in tool utilization; the greater the responsibility for CES budgets, the lower the tool utilization.
6. Demographic variables such as age, degree, region, years in administration, and research dollars as percent of total budget are not significant sources of variation in tool use.
7. The number of persons supervised was a significant source of variation in tool use. The direction of difference was not a clear pattern.
8. Percent of time assigned to administrative duties and percent of time assigned to research are significant sources of variation in the utilization of some tools; the greater the amount of time assigned to administration, the less utilization of PERT, MBO, and DELPHI; the greater the amount of time assigned to research, the greater the utilization of PERT and DELPHI.
9. Undergraduate enrollment was a significant source of variation for PERT and DELPHI; the lower the enrollment, the higher the score. Graduate enrollment and total enrollment of the institution did not significantly affect factor means.
10. There was a significant difference between personal interest in administrator development and the perceived need for others

to develop administrator skill. The administrators tended to score the needs of others to develop skills at a higher level than their own personal interest in developing the same skills.

Table XLV summarizes the decisions made for each null hypothesis. For explanations and fuller discussion of the findings and conclusions, the reader should refer to Chapter IV.

In addition to the findings previously listed, the data also suggested that the administrators as a group were not experts in the administration of higher education. They, like most academic administrators, had been prepared as subject matter experts in disciplines other than management or administration. The majority had no academic preparation in higher education administration or home economics administration. They were selected for their positions primarily because of their expertise in the discipline advanced by the department and not because of their expertise in administration.

The management behavior of the group seemed to be dominated by a concern for human relationships. Faculty involvement in goal setting, resource allocation, and performance evaluation are examples of the extent to which administrators sought the counsel of colleagues prior to decision making. Consideration for others seemed more descriptive of administrative behavior than did a high concern for structure.

As a group, the administrators were not avid users of the specific management tools examined by the study. There seemed to be a general avoidance of tool components that required a high level of precision or rigor. Components requiring less precision were utilized by larger numbers.

TABLE XLV

SUMMARY OF CONCLUSIONS REGARDING HYPOTHESES

Null Hypothesis	Test	Conclusion
1. There is no difference in tool use by administrators in various regions.	Chi Square	Do not reject.
2. There are no interrelationships among items describing institutional participation in administrator development.	Pearson r	Reject.
3. There is no consistency between clusters of practices as defined as management systems in the literature and the clusters of practices reported by the administrators.	Factor Analysis	Reject on basis of consistency reported.
4. There is no difference in factor means between groups with and without formal preparation in: a. quantitative methods b. higher education administration c. home economics administration	t	Reject.
5. There is no difference in factor means between groups who did or did not administer: a. resident instruction budgets b. university extension budgets c. Cooperative Extension budgets d. research budgets	t	Reject.
6. There is no difference in factor means for groups categorized by: a. age b. degree c. region d. years in administration e. research dollars as percent of total budget	AOV	Do not reject.
7. There is no difference in factor scores for groups categorized by: a. number of graduate assistants supervised b. number of faculty supervised	AOV	Reject.

TABLE XLV (Continued)

Null Hypothesis	Test	Conclusion
8. There is no difference in factor scores for groups categorized by: a. percent of time assigned to administration b. percent of time assigned to research	AOV	Reject.
9. There is no difference in factor scores for groups categorized by: a. total enrollment b. undergraduate enrollment c. graduate enrollment	AOV	Reject.
10. There is no difference in the extent to which administrators (a) express personal interest in administrator development and (b) perceive need for others to develop administrator skill.	Chi Square	Reject.

Although not academically prepared as administrators, members of the group were desirous of opportunities to improve administrative skills. Many had previously attended workshops and seminars that focused on management development and the majority was interested in getting together with other administrators to develop administrative skills.

Recommendations for Further Study

While the present study has given some indication of interest in administrator development and has identified variables that may be related to management tool utilization, it is suggested that these findings be regarded as tentative until verified by other studies.

Design of the Study

The instrument developed was lengthy. Some respondents commented that a shorter questionnaire might elicit a higher rate of return. Future studies should relate to tool utilization or administrator development, not tool utilization and administrator development.

In other studies, investigators might want to consider the feasibility of random arrangement of items related to tools as opposed to a tool by tool arrangement of items. Randomization would perhaps negate the effect of "response set" or the self-imposed pressure to respond to related items in a similar way.

Related Studies

In order to make studies regarding tool utilization more meaningful, there is a need for measures of quality, i.e., indicators of sound administrative decisions. The relationship between use of tools and quality decisions needs to be studied. If there is no indication that the use of the tools and techniques of management yield better decisions or more effectively managed departments, continued research regarding tool utilization may be unjustified.

The investigator is aware of the difficulties that would accrue to measuring decision quality. Perhaps a start would be to compare units that do and do not use the selected management tools on quantifiable bases such as student credit hours, salaries, state support, extramural funds, and student placement. Indicators of quality are missing elements in many areas of program evaluation. Research in this area would provide linkages to other areas of study.

Another relationship that could be studied is the relationship between tool use and the amount of elapsed time since the introduction of the tool in American management practice. In the present study, the investigator suspected that the amount of elapsed time might be a more important variable than demographic variables identified.

Assessment of administrator development priorities is another area of suggested research. This study provided opportunity for respondents to indicate an interest in developing skills in need analysis, planning, budgeting, program evaluation, performance appraisal, collective bargaining, internal health audits, organization development, and forecasting. Many areas of administrative concern were not examined, nor were the priorities among concerns identified. An assessment of this type would be helpful for planning pre-service and in-service administrator development programs.

Management competencies needed by academic department heads should be identified. By present practice, administrators are rarely selected for their management skills. The literature, however, leads one to believe that management expertise will be a more important factor in future placement. An identification of the competencies needed should be helpful to prospective administrators and the academic departments they wish to serve.

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APPENDIXES

APPENDIX A

MANAGEMENT TOOLS STUDY QUESTIONNAIRE

Oklahoma State University
DIVISION OF HOME ECONOMICS
STILLWATER, OKLAHOMA 74074

M A N A G E M E N T T O O L S S T U D Y

March, 1977

Dear Administrator:

This letter is to request your participation in a nation wide administrator development study funded by the Association of Administrators of Home Economics. The research is designed to assess the present use of selected management tools and to determine which, if any, are important to pre-service and/or in-service administrator education programs.

In the past few years higher education administration has been affected by the emergence of various management tools. Coinciding with the emergence of new management tools, the Association of Administrators of Home Economics has placed the preparation of administrators among its top priorities. It is hoped that the results of this study will be helpful to administrator development programs and to the preparation of home economics administrators in particular.

The time (approximately 20 minutes) that you take to complete the survey will be greatly appreciated. Specific instructions for completing the parts of the survey are provided at the beginning of each section. The principle of confidentiality will apply to any information provided by respondents. Oral and written reports of results will not identify particular individuals and/or institutions.

Thank you very much for your cooperation.

Sincerely yours,

Beulah M. Hirschlein

Beulah M. Hirschlein

INVESTIGATOR: Beulah M. Hirschlein

Ms. Hirschlein is a 1976-77 recipient of a small grant from the Association of Administrators of Home Economics. She is employed by the Oklahoma State University Division of Home Economics as Director of University Extension and Assistant Professor of Home Economics Education.

GRADUATE COMMITTEE

Dr. D. Elaine Jorgenson, Professor and Head of Home Economics Education
Dr. Beverly Crabtree, Dean, Division of Home Economics
Dr. Marguerite Scruggs, Associate Dean, Division of Home Economics
Dr. Donald Robinson, Dean and Professor of Higher Education, College of Education
Dr. John Creswell, Assistant Professor, Higher Education
Dr. William Warde, Assistant Professor, Statistics

PLEASE RETURN BY _____

MANAGEMENT TOOLS STUDY

Directions:

1. The response scale to be used in this survey is as follows:

D	N	A	
1 2 3 4 5 6 7 8 9			D = disagree N = neutral A = agree

   Values on the scale should be used to indicate degrees of agreement or disagreement with the accuracy of the statement. If you strongly disagree, a "1" should be circled. If you strongly agree, a "9" should be circled. A "5" should be used to indicate that you neither agree nor disagree. Values between 1 and 5 should indicate degrees of disagreement. Values between 5 and 9 should indicate degrees of agreement.

2. Please complete the questionnaire in the same order in which it is presented.

3. If there are cases where you feel unsure about the accuracy of your answer, please estimate to the best of your ability. You are not expected to resort to files or take the time to locate exact data.

//

SECTION I: USE OF MANAGEMENT TOOLS

Listed below are several planning/management techniques now being used to some extent in higher education administration. Using the scale at the left indicate the extent to which you agree or disagree with the statement as it pertains to your present use of each of the management tools listed. Responses should be based on your present understanding of each tool.

I am currently using the following planning/management tools:

D N A		
1 2 3 4 5 6 7 8 9	1.	Management by Objectives (MBO)
1 2 3 4 5 6 7 8 9	2.	Management Information System (MIS)
1 2 3 4 5 6 7 8 9	3.	Program Planning Budgeting System (PPBS)
1 2 3 4 5 6 7 8 9	4.	Program Evaluation Review Technique (PERT)
1 2 3 4 5 6 7 8 9	5.	Delphi Technique
1 2 3 4 5 6 7 8 9	6.	Cost Simulation Models (CSM)
1 2 3 4 5 6 7 8 9	7.	Unit Cost Analysis (UCA)
1 2 3 4 5 6 7 8 9	8.	Market Surveys
1 2 3 4 5 6 7 8 9	9.	Faculty workload studies
1 2 3 4 5 6 7 8 9	10.	NCHEMS products (Check below each product that has been used.)

____ Data Element Dictionary (DED)
____ Program Classification Structure (PCS)
____ Space Analysis Manual (SAM)
____ Facilities Inventory Classification Manual (FICM)
____ Cost Estimation Model (CEM)
____ Induced Course Load Matrix (ICLM)
____ Resource Requirements Prediction Model (RRPM)
____ Faculty Activity Analysis Manual (FAAM)
____ Cost Analysis Manual (CAM)
____ Higher Education Finance Manual (HEFM)
____ Manpower Accounting Manual (MAM)
____ Information Exchange Procedures Manual (IEPM)
____ NCHEMS Costing and Data Management System (IEP Software)

//

SECTION II: USE OF SELECTED MANAGEMENT TOOLS

In this section you will find descriptions of five management tools. Each will be followed by questions concerning your use of its component parts. The response scale for this section is the same as for Section I.

A. MANAGEMENT BY OBJECTIVES (MBO)

MBO is a process whereby initially the members of an organization define its goals. This is followed by identifying and defining the major areas of responsibility of each subunit and individual in terms of results expected. Results of these steps are then used as guides for managing the organization and assessing the contribution of each subunit and individual.

Listed below are some of the steps in the MBO process. Using the scale at the left, please indicate the extent to which you agree that the step is implemented in the academic program under your administration.

D N A		
1 2 3 4 5 6 7 8 9	1.	The goals of the academic department are understood and agreed upon by most faculty and staff involved.
1 2 3 4 5 6 7 8 9	2.	Members of my faculty and staff usually express their performance objectives for the coming year in measurable terms and with target dates.
1 2 3 4 5 6 7 8 9	3.	As an administrator, I review performance objectives with each member of the academic team at the beginning of the year.
1 2 3 4 5 6 7 8 9	4.	As an administrator, I review progress toward objectives with each team member on a regular basis throughout the year.
1 2 3 4 5 6 7 8 9	5.	At the end of the year, each member of the team prepares a brief report which lists all major accomplishments, with comments on variances between results actually achieved and results expected.
1 2 3 4 5 6 7 8 9	6.	As an administrator, I discuss year-end appraisal or progress reports privately with each member of the faculty and staff.

B. MANAGEMENT INFORMATION SYSTEM (MIS)

A Management Information System is primarily a computer-based system designed to collect and store information for use in decision making.

Listed below are some conditions that are commonly associated with the utilization of management information systems. Using the scale at the left, please indicate the extent to which you agree that the condition accurately describes your own administrative situation.

D N A		
1 2 3 4 5 6 7 8 9	1.	There have been increasing demands on my department to utilize quantitative data in making and justifying decisions.
1 2 3 4 5 6 7 8 9	2.	There have been increasing demands on my department to utilize value (non-quantitative) data in making and justifying decisions.
1 2 3 4 5 6 7 8 9	3.	Computer generated data are used in making long range plans or projections for my department.
1 2 3 4 5 6 7 8 9	4.	It is part of my administrative duties to prepare raw data reports for the institution's MIS.
1 2 3 4 5 6 7 8 9	5.	As an administrator, I have initiated requests for incorporating new data storing and retrieval competencies into the institution's MIS.

The following categories of computer generated data are available to me:

1 2 3 4 5 6 7 8 9	6.	Accounting, financial, and budgeting activities.
1 2 3 4 5 6 7 8 9	7.	Student data (e.g., enrollments, grades, directory information).
1 2 3 4 5 6 7 8 9	8.	Employed personnel.
1 2 3 4 5 6 7 8 9	9.	Facilities and equipment.

C. PROGRAM PLANNING BUDGETING SYSTEM (PPBS)

PPBS, also known as "program budgeting", is a management tool which may be used to improve resource allocation decisions. The essential activities involved in the application of PPBS are the identification of objectives, the organization of activities into programs designed to achieve those objectives, the identification of costs and other resource requirements, and the systematic analysis of alternatives to find the most effective means of achieving program objectives.

Listed below are some administrative behaviors that are commonly associated with the implementation of PPBS. Using the scale at the left, please indicate the extent to which you agree that the behavior accurately describes your own administrative behavior.

D	N	A		
1 2 3 4 5 6 7 8 9			1.	Quantified written objectives are prepared for each area of administration.
1 2 3 4 5 6 7 8 9			2.	The resource requirements for each program area are identified.
1 2 3 4 5 6 7 8 9			3.	Students are invited to provide input for the budget building process.
1 2 3 4 5 6 7 8 9			4.	Faculty are invited to provide input for the budget building process.
1 2 3 4 5 6 7 8 9			5.	Administrators outside the department are invited to provide input for the budget building process.
1 2 3 4 5 6 7 8 9			6.	Factors outside of the immediate operating environment of the institution such as population trends, political developments, social currents, technological breakthroughs, national economic trends, and personnel attitudes are considered as inputs for long range planning.
1 2 3 4 5 6 7 8 9			7.	Planning includes the systematic identification of alternative ways of carrying out each objective.
1 2 3 4 5 6 7 8 9			8.	Planning includes the estimation of results expected for each alternative.
1 2 3 4 5 6 7 8 9			9.	The cost implications of alternative means of reaching program objectives are identified.
1 2 3 4 5 6 7 8 9			10.	Program decisions are usually made on the basis of systematic comparisons of outputs and inputs.
1 2 3 4 5 6 7 8 9			11.	Output measures are used to show the extent to which the department is achieving its objectives.

D. PROGRAM EVALUATION REVIEW TECHNIQUE (PERT)

PERT is a planning and control technique which is applied to projects which have many interrelated tasks. The basic element is a work flow network defining sequential relationships and dependencies of each of the steps or milestones in a project. It is designed to evaluate progress toward the attainment of project goals, focus attention on potential and actual problems, determine the shortest time in which a project can be completed, provide the director with status reports and predict the likelihood of reaching project objectives.

Listed below are some of the steps in the Program Evaluation Review Technique. Using the scale at the left, please indicate the extent to which you agree that the step is implemented in the administration of your department.

D	N	A		
1 2 3 4 5 6 7 8 9			1.	Various activities to be completed in complex projects are identified.
1 2 3 4 5 6 7 8 9			2.	A network (diagram) is drawn to show the sequence of activities within a project.
1 2 3 4 5 6 7 8 9			3.	Estimates are made of the time (days) required to achieve each sub-goal.
1 2 3 4 5 6 7 8 9			4.	Attention is focused on aspects likely to impede or delay the project.
1 2 3 4 5 6 7 8 9			5.	Alternative plans and schedules are developed.
1 2 3 4 5 6 7 8 9			6.	Total time required to complete an entire project and the time at which each step must be completed in order for the project to be completed on time is computed.
1 2 3 4 5 6 7 8 9			7.	Reports and concurrent evaluations of progress against the scheduled plan are made.

E. THE DELPHI TECHNIQUE

The Delphi Technique is a means of obtaining expert convergent opinion without bringing the experts together in face-to-face confrontation. This convergent opinion of experts is usually gained through the use of successive questionnaires and feedback with each round of questions being designed to produce more carefully considered group opinions.

Listed below are some of the procedures commonly identified with the Delphi Technique. Using the scale at the left, please indicate the extent to which you agree that the step is implemented in your academic program under your administration.

D N A		
1 2 3 4 5 6 7 8 9	1.	The needs, desires, and opinions of clientele groups served by my academic department are regularly assessed.
1 2 3 4 5 6 7 8 9	2.	A consensus of expert opinion is sought prior to making decisions which would result in significant program changes.
1 2 3 4 5 6 7 8 9	3.	Methods of opinion gathering which deemphasize direct (face-to-face) confrontation among respondents are used.
1 2 3 4 5 6 7 8 9	4.	Opinion gathering techniques designed to obtain answers to a central problem and to bring out the reasoning which led a respondent to answer in a given way are used.
1 2 3 4 5 6 7 8 9	5.	The opinions of experts are obtained through a series of intensive questionnaires interspersed with controlled feedback.

The Delphi Technique has been used for the following departmental purposes:

1 2 3 4 5 6 7 8 9	6.	Projection of future enrollments.
1 2 3 4 5 6 7 8 9	7.	Developing program priorities.
1 2 3 4 5 6 7 8 9	8.	Establishing curriculum parameters.
1 2 3 4 5 6 7 8 9	9.	Providing personnel availability projections.
1 2 3 4 5 6 7 8 9	10.	Estimating resource requirements.
1 2 3 4 5 6 7 8 9	11.	Justifying and/or documenting proposals for extramural funding.
1 2 3 4 5 6 7 8 9	12.	The availability of employment opportunities for graduates.

//

SECTION III: DESCRIPTIVE INFORMATION

In this section you are asked to provide personal, employment, and institutional data. In a few cases, short descriptive answers are required. Each question in each subsection should be answered by each respondent.

Place a check (√) in the blank preceding the most accurate response.

A. PERSONAL DATA

1. Present age

____ a. 30 or under
____ b. 31-40
____ c. 41-50
____ d. 51-60
____ e. 61 or over

2. Highest degree held

____ a. B.A. or B.S.
____ b. M.A. or M.S.
____ c. Ed.S.
____ d. Ed.D.
____ e. Ph.D.
____ f. Other, please specify _____

B. ACADEMIC PREPARATION

1. List below your major area of study for each degree level. If in home economics, also indicate specialty.

Degree Level	Major area of study	Specialty
Baccalaureate	_____	_____
Masters	_____	_____
Doctoral	_____	_____

2. How many credit hours of work have you completed in courses specifically related to administration of higher education? (If exact number is not immediately available, please estimate.)

If semester hours, check below:
____ a. 0
____ b. 1-5
____ c. 6-10
____ d. 11-15
____ e. 16-20
____ f. 21-25
____ g. 26-30
____ h. 31-35
____ i. 36-40
____ j. 41 or more

If quarter hours, check below:
____ a. 0
____ b. 1-5
____ c. 6-10
____ d. 11-15
____ e. 16-20
____ f. 21-25
____ g. 26-30
____ h. 31-35
____ i. 36-40
____ j. 41 or more

3. How many credit hours of work have you completed that focused particularly on the administration of home economics programs in higher education? (If exact number is not immediately available, please estimate.)

If semester hours, check below:
____ a. 0
____ b. 1-5
____ c. 6-10
____ d. 11-15
____ e. 16-20
____ f. 21-25
____ g. 26-30
____ h. 31-35
____ i. 36-40
____ j. 41 or more

If quarter hours, check below:
____ a. 0
____ b. 1-5
____ c. 6-10
____ d. 11-15
____ e. 16-20
____ f. 21-25
____ g. 26-30
____ h. 31-35
____ i. 36-40
____ j. 41 or more

4. How many graduate credit hours of academic work have you completed that specifically related to quantitative methods? (e.g., math, statistics, computer science) (If exact number is not immediately available, please estimate.)

If semester hours, check below:
____ a. 0
____ b. 1-5
____ c. 6-10
____ d. 11-15
____ e. 16-20
____ f. 21-25
____ g. 26-30
____ h. 31-35
____ i. 36-40
____ j. 41 or more

If quarter hours, check below:
____ a. 0
____ b. 1-5
____ c. 6-10
____ d. 11-15
____ e. 16-20
____ f. 21-25
____ g. 26-30
____ h. 31-35
____ i. 36-40
____ j. 41 or more

C. EMPLOYMENT DATA

1. Present title _____

2. What academic area(s) are represented in your department's program of studies? (Check as many as apply.)

____ a. related art and design
____ b. business
____ c. child development, family relationships, human development
____ d. communications and journalism
____ e. extension, welfare, community service
____ f. foods, nutrition, dietetics
____ g. general home economics
____ h. home economics education
____ i. housing, equipment
____ j. home management, family economics
____ k. institution, hotel, restaurant management
____ l. textiles, clothing, merchandising
____ m. other, please list _____

3. Including this academic year, how many years have you held your present position?

____ a. 1-2 years
____ b. 3-4 years
____ c. 5-6 years
____ d. 7-8 years
____ e. 9-10 years
____ f. 11 or more years

4. Including this academic year, how many years have you been employed as an administrator in higher education?

____ a. 1-5 years
____ b. 6-10 years
____ c. 11-15 years
____ d. 16-20 years
____ e. 21-25 years
____ f. 26-30 years
____ g. 31-35 years
____ h. 36-40 years
____ i. 41 or more years

5. What percent of your budgeted time is allocated to administrative duties this semester?

____ %

6. What percent of your budgeted time is allocated to research this semester?

____ %

D. INSTITUTIONAL DATA

1. Which of the following ranges best estimates the head count (Fall, 1976) enrollment of graduate and undergraduate students at your college or university? (If a multi-campus system, estimate for main campus only.)

____ a. 2,500 or less
____ b. 2,501-5,000
____ c. 5,001-7,500
____ d. 7,501-10,000
____ e. 10,001-12,500
____ f. 12,501-15,000
____ g. 15,001-17,500
____ h. 17,501-20,000
____ i. 20,001-22,500
____ j. 22,501 or more

2. How many (head count) undergraduate student are enrolled in the degree programs for which you have administrative responsibility?

____ a. 1-50
____ b. 51-100
____ c. 101-150
____ d. 151-200
____ e. 201-250
____ f. 251-300
____ g. 301-350
____ h. 351-400
____ i. 401-450
____ j. 451-500
____ k. 501 or more

3. What was the (head count) enrollment of graduate students (Fall, 1976) in the degree program(s) for which you have administrative responsibility?

____ a. 0
____ b. 1-5
____ c. 6-10
____ d. 11-15
____ e. 16-20
____ f. 21-25
____ g. 26-30
____ h. 31-35
____ i. 36-40
____ j. 41-45
____ k. 46-50
____ l. 51 or more

4. How many (head count) faculty do you presently supervise?

____ a. 1-3
____ b. 4-6
____ c. 7-9
____ d. 10-12
____ e. 13-15
____ f. 16 or more

5. How many (head count) research and teaching assistants are assigned to your department?

____ a. 1-3
____ b. 4-6
____ c. 7-9
____ d. 10-12
____ e. 13-15
____ f. 16 or more

6. In what region of the country is your institution located?

____ a. SOUTHERN (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia)
____ b. NORTH CENTRAL (Alaska, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin)
____ c. NORTHEASTERN (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia)
____ d. WESTERN (Arizona, California, Colorado, Idaho, Hawaii, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming)

7. Which of the following budget categories do you administer? (Check as many as apply.)

____ a. resident instruction
____ b. general university extension
____ c. cooperative extension
____ d. research
____ e. other, please specify _____

8. Of the total funds budgeted from all sources for all purposes for FY 76, what percent was for research? (If data are not immediately available, please estimate.)

____ a. 0%
____ b. 1-5%
____ c. 6-10%
____ d. 11-15%
____ e. 16-20%
____ f. 21-25%
____ g. 26-30%
____ h. 31-35%
____ i. 36-40%
____ j. 41% or more

//

SECTION IV: ADMINISTRATOR DEVELOPMENT

In this section the respondent is asked to provide both personal and institutional data relating to administrator development.

A. INSTITUTIONAL PARTICIPATION

For the following items please use the scale at the left to indicate the extent to which you agree or disagree with the statement.

D N A	
1 2 3 4 5 6 7 8 9	1. The institution where I am employed has an ongoing program of administrator development.
1 2 3 4 5 6 7 8 9	2. Administrator development at this institution is provided for those in departmental administration.
1 2 3 4 5 6 7 8 9	3. Administrators in all academic areas of the university have been encouraged to participate in management development programs.
1 2 3 4 5 6 7 8 9	4. The chief administrative officer of the home economics unit has encouraged department heads to participate in administrator development seminars, workshops, conferences, and training programs.
1 2 3 4 5 6 7 8 9	5. The state coordinating board has encouraged university administrators to implement modern management techniques.
1 2 3 4 5 6 7 8 9	6. State legislators have encouraged higher education administrators to implement management science tools.
1 2 3 4 5 6 7 8 9	7. To my knowledge, administrators of my level have attended administrator development seminars, workshops, conferences within the last 12 months.
1 2 3 4 5 6 7 8 9	8. In my opinion university administrators at this institution need more preparation in the use of management tools.

B. PERSONAL PARTICIPATION

Place a check (√) in the blanks preceding accurate responses.

1. During the past five years, how many off-campus conferences have you attended which were primarily related to administrator or management development? (Check one.)

____ a. none
____ b. 1-3
____ c. 4-6
____ d. 7-9
____ e. 10 or more

If the answer to number 1 is "a", SKIP to question number 4 below.

2. Content of management development conferences you have attended has included: (Check as many as apply.)

____ a. PERT
____ b. MBO
____ c. DELPHI
____ d. PPBS
____ e. MIS
____ f. Decision Theory Analysis
____ g. Unit Cost Analysis
____ h. Systems Analysis
____ i. Leadership styles
____ j. Communication skills
____ k. supervision
____ l. collective bargaining
____ m. organization development
____ n. other, please specify _____

3. Please check any of the following groups that have sponsored or co-sponsored any administrative development seminars, workshops, conferences, etc., you have attended.

____ a. state coordinating board
____ b. private industry
____ c. private university
____ d. public university
____ e. WICHE-NCHEMS (Western Interstate Commission for Higher Education/National Center for Higher Education Management Systems)
____ f. Association of Administrators of Home Economics
____ g. American Management Association
____ h. American Association of Higher Education
____ i. other, please specify _____

4. I am interested in getting together with other administrators to develop administrative skills in: (Check as many as apply.)

____ a. needs analysis
____ b. planning
____ c. budgeting
____ d. evaluation (program)
____ e. performance appraisal
____ f. collective bargaining
____ g. internal health audits
____ h. organization development
____ i. forecasting
____ j. other, please specify _____

5. In my opinion, there is a general need for university administrators to have more pre-service and/or in-service preparation in:

____ a. needs assessment
____ b. planning
____ c. budgeting
____ d. program evaluation
____ e. performance appraisal
____ f. collective bargaining
____ g. internal health audits
____ h. organization development
____ i. forecasting
____ j. other, please specify _____

//

RECORD OF PARTICIPATION

Participating in this study has taken your time and thought. Your efforts are greatly appreciated. As you know the name of each respondent is needed in order to simplify follow-up procedures. Please provide the information requested on the card insert. If you prefer you may detach the card and mail it separately. Please return the completed survey in the enclosed stamped and addressed envelope to:

Beulah M. Hirschlein
MANAGEMENT TOOLS STUDY
Division of Home Economics
Oklahoma State University
Stillwater, Oklahoma 74074
Telephone: 405-624-6571

//

COMMENTS:

RECORD OF PARTICIPATION

M A N A G E M E N T T O O L S S T U D Y

Name _____ Office Telephone _____

Title _____

Institution Name _____

Address _____

_____

_____

_____

APPENDIX B

STATES BY REGIONS AS ASSIGNED BY COOPERATIVE STATE RESEARCH SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE

Northeastern Region

Connecticut
Delaware
Maine
Maryland
Massachusetts
New Hampshire
New Jersey
New York
Pennsylvania
Rhode Island
Vermont
West Virginia

North Central Region

Alaska
Illinois
Indiana
Iowa
Kansas
Michigan
Minnesota
Missouri
Nebraska
North Dakota
Ohio
South Dakota
Wisconsin

Western Region

Arizona
California
Colorado
Idaho
Hawaii
Montana
Nevada
New Mexico
Oregon
Utah
Washington
Wyoming

Southern Region

Alabama
Arkansas
Florida
Georgia
Kentucky
Louisiana
Mississippi
North Carolina
Oklahoma
South Carolina
Tennessee
Texas
Virginia

APPENDIX C

CORRESPONDENCE

OKLAHOMA STATE UNIVERSITY • STILLWATER

Department of Home Economics Education
372-6211, Ext. 486

74074

July 30, 1976

We are pleased that the Association of Administrators of Home Economics awarded us a small grant to conduct a research project entitled "Management Tools Used By Home Economics Department Heads." We now need your help in obtaining a listing of those persons who fit the criteria for inclusion in the survey sample.

The objectives of the research are to: (1) describe the present utilization of selected management tools by members of the sample, (2) assess the extent of interest in and perceived need for administrator development programs related to management tools, and (3) identify personal, professional and institutional factors that correlate with utilization of selected management tools.

The survey population is defined to include those individuals who are department or area chairpersons at a level reporting to the chief (or highest) administrator of the home economics unit in institutions having memberships in AAHE. The planned survey will not be directed toward deans or chief administrative officers, but rather to the department chairpersons reporting to them.

Would you please take the time to complete the enclosed form so that we will have an up-to-date and complete listing from which to select the actual sample. Enclose the completed form in the self-addressed envelope and return as soon as possible, hopefully by September 1.

Thank you so much for your help. We look forward to sharing the results of the study with you at a later date.

Sincerely yours,

Elaine Jorgenson

Dr. Elaine Jorgenson
Professor & Head

Beulah M. Hirschlein

Beulah M. Hirschlein
Assistant Professor

Enclosure

RETURN TO:

Dr. Elaine Jorgenson
Head, Home Economics Education
Oklahoma State University
Stillwater, OK 74074

CHAIRPERSONS OF DEPARTMENTS WITHIN THE
HOME ECONOMICS UNIT

Name of Institution_____

1. Department_____

   Chairperson_____

   Campus Address_____

   _____

2. Department _____

   Chairperson_____

   Campus Address_____

   _____

3. Department_____

   Chairperson_____

   Campus Address_____

   _____

4. Department_____

   Chairperson_____

   Campus Address_____

   _____

5. Department_____

   Chairperson_____

   Campus Address_____

   _____

6. Department_____

   Chairperson_____

   Campus Address_____

   _____

7. Department_____

   Chairperson_____

   Campus Address_____

   _____

8. Department_____

   Chairperson_____

   Campus Address_____

   _____

(Attach additional pages if necessary.)

Form completed by_____ Date_____

OKLAHOMA STATE UNIVERSITY · STILLWATER

Department of Home Economics Education
(405) 624-5046

74074

September 15, 1976

In late July we sent you information regarding the research we are now initiating under funding from the Association of Administrators of Home Economics. This project entitled "Management Tools Used by Home Economics Department Heads" has been designed to (1) describe present utilization of selected management tools, (2) assess the extent of interest in and perceived need for administrator development programs related to management tools, and (3) identify personal, professional and institutional factors that relate to the use of selected management tools.

One objective of our earlier correspondence was to obtain a listing of administrators from which a sample could be drawn. The survey population has been defined to include those individuals who are department or area chairpersons at a level reporting to the chief (or highest) administrator of the home economics unit in institutions having memberships in AAHE.

Just in case our letter to you was lost in the mail or somehow misplaced we are asking for your cooperation in sharing the names and addresses of administrators in your academic unit. Please complete and return the enclosed form at your earliest convenience.

Thank you so much for your assistance.

Sincerely yours,

Elaine Jorgenson

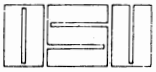
Dr. Elaine Jorgenson
Professor & Head

Beulah M. Hirschlein

Beulah M. Hirschlein
Assistant Professor

BH:kh

Enclosure



Oklahoma State University

DIVISION OF HOME ECONOMICS

STILLWATER, OKLAHOMA, 74074
137 HOME ECONOMICS WEST
(405) 624-6571

M A N A G E M E N T T O O L S S T U D Y

April, 1977

Recently I mailed to you a questionnaire that I am using to collect data for the Management Tools Study funded by the Association of Administrators of Home Economics. Since I have not received your record of participation, I would like to encourage you to complete the questionnaire at your earliest convenience and return it to me in the stamped self-addressed envelope that was enclosed.

I would like very much to receive your response by April 30th. If you have already completed and returned the questionnaire, just ignore this letter.

Thank you very much for your cooperation.

Sincerely yours,

Beulah Hirschlein

Oklahoma State University

DIVISION OF HOME ECONOMICS

STILLWATER, OKLAHOMA, 74074
137 HOME ECONOMICS WEST
(405) 624-6571

M A N A G E M E N T T O O L S S T U D Y

As of this date I have not received a record of your participation in the Management Tools Study. Therefore, I am enclosing a second copy which I hope you will complete and return to me as soon as possible.

This research is being funded by a small grant from the Association of Administrators of Home Economics. At this time the non-response rate is approximately 45%. I do hope you will help me obtain a higher proportion of participation.

Sincerely yours,

Beulah Hirschlein

GRADUATE COMMITTEE

Dr. D. Elaine Jorgenson, Professor and Head of Home Economics Education
Dr. Beverly Crabtree, Dean, Division of Home Economics
Dr. Marguerite Scruggs, Associate Dean, Division of Home Economics
Dr. Donald Robinson, Dean and Professor of Higher Education, College of Education
Dr. John Creswell, Assistant Professor, Higher Education
Dr. William Warde, Assistant Professor, Statistics

MANAGEMENT TOOLS STUDY
Division of Home Economics
Oklahoma State University
Stillwater, OK 74074
February 15, 1977

Since you are a person especially knowledgeable in the area of higher education administration, I am asking you to serve as one of five experts to critique the enclosed survey instrument.

You will note in the survey cover letter that data will be collected from home economics administrators at the departmental level in member institutions of the National Association of State Universities and Land Grant Colleges.

I would like your comments regarding (1) the subject matter accuracy of the questions appearing in Section 1 and 2 and (2) the overall potential of the instrument for obtaining data. Please feel free to write notes or questions on the instrument itself.

If you have the time, I would like to visit with you personally about your comments or suggestions. I will be calling you in a few days to see if an appointment can be arranged.

Any assistance that you can provide for the refinement of this questionnaire will be greatly appreciated.

Sincerely yours,

Beulah M. Hirschlein

Enclosures

MANAGEMENT TOOLS STUDY
Division of Home Economics
Oklahoma State University
Stillwater, OK 74074
February 15, 1977

I am asking for your participation in testing the instrument I plan to use in my doctoral research. Completion of the instrument will require approximately 20-25 minutes of your time.

You will notice in the survey cover letter that data will be collected from home economics administrators at the departmental level. Since some of the persons being asked to participate in the test are not home economics administrators, you will not be expected to respond to Question 5, page 11; Question 4, page 17, and the Record of Participation on the final page.

When you have completed the survey, please return it to me in the enclosed envelope. I would very much like to have your responses by February 25.

Any assistance that you can provide for the refinement of this questionnaire will be greatly appreciated.

Sincerely yours,

Beulah M. Hirschlein

Enclosures

APPENDIX D

ADDITIONAL TABLES

TABLE XLVI

RECORD OF USABLE RESPONSES BY DATES

Responses to Mailing No.	Date Responses Received	Number of Responses	Percent	Cumulative Percent
1	April 8 through April 22	78	57.778	57.778
2	April 23 through May 6	22	16.296	74.074
3	May 7 and after	35	25.926	100.
	Total	135	100.	

TABLE XLVII

RECORD OF NONUSABLE RESPONSES BY DATES

Responses to Mailing No.	Date Responses Received	Number of Responses	Percent	Cumulative Percent
1	April 8 through April 22	12	60	60
2	April 23 through May 6	1	5	65
3	May 7 and after	7	35	100
	Total	20	100	

TABLE XLVIII

DISTRIBUTION OF RESPONDENTS BY NUMBER OF FACULTY SUPERVISED

Number Supervised	Frequency[a]
1-3	17
4-6	19
7-9	28
10-12	18
13-15	11
16 or more	38
Not given	4

[a]N = 135.

TABLE XLIX

DISTRIBUTION OF RESPONDENTS BY NUMBER OF GRADUATE ASSISTANTS SUPERVISED

Number Supervised	Frequency[a]
1-3	51
4-6	30
7-9	14
10-12	12
13-15	5
16 or more	16
Not given	7

[a]N = 135.

TABLE L

DISTRIBUTION OF RESPONDENTS BY BUDGET CATEGORIES ADMINISTERED

Budget Category	Frequency[a]	Percent of Respondents
Resident instruction	123	91.11
University extension	12	8.89
Cooperative Extension	32	23.70
Research	80	59.26
Other	10	7.41

[a]N = 135.

TABLE LI

DISTRIBUTION OF RESPONDENTS BY PERCENTAGE OF TOTAL FUNDS BUDGETED FOR RESEARCH

Percent of Funds	Frequency[a]
0%	30
1-5%	27
6-10%	25
11-15%	11
16-20%	11
21-25%	8
26-40%	9
41% or more	8
Not given	6

[a]N = 135.

TABLE LII

DISTRIBUTION OF RESPONDENTS BY HOME ECONOMICS UNDERGRADUATE ENROLLMENT IN THE DEPARTMENT

Departmental Enrollment	Frequency[a]
100 or less	36
101-200	34
201-300	26
301-500	23
501 or more	16

[a] N = 135.

TABLE LIII

DISTRIBUTION OF RESPONDENTS BY GRADUATE ENROLLMENT IN THE DEPARTMENT

Graduate Enrollment	Frequency[a]
0	11
1-10	28
11-20	26
21-30	25
31-40	13
41-50	7
51 or more	23
Not given	2

[a]N = 135.

TABLE LIV

DISTRIBUTION OF RESPONDENTS BY PERCENTAGE OF TIME ASSIGNED TO RESEARCH

Research Time Assigned	Frequency[a]
0%	59
1-5%	18
6-10%	16
11-15%	7
16-20%	12
21-25%	10
26-30%	5
31-50%	6
51-100%	2

[a]N = 135.

TABLE LV

DISTRIBUTION OF RESPONDENTS BY PERCENTAGE OF TIME ASSIGNED TO ADMINISTRATION

Percent of Time	Frequency[a]
0-5%	14
6-25%	37
26-50%	40
51-75%	21
76-100%	23

[a]N = 135.

TABLE LVI

DISTRIBUTION OF RESPONDENTS BY ADMINISTRATIVE TITLE

Title	Frequency[a]
Chairperson	50
Head	45
Coordinator	5
Dean, acting dean[b]	4
Associate dean, assistant dean	4
Director	4
Department administrator	3
Teacher educator	1
Not listed	19

[a] N = 135.

[b] In some cases a dean also served as a department head and a department head served as acting dean.

TABLE LVII

OVERALL MEANS FOR FACTORS

Factor Number	Factor Name	Overall Mean
I	PERT	4.494
II	MBO	6.483
III	PPBS-I	5.258
IV	DELPHI	4.462
V	MIS	4.993
VI	PPBS-II	6.015

TABLE LVIII

RESULTS OF T TESTS FOR DIFFERENCES IN FACTOR MEANS BETWEEN GROUPS WITH AND WITHOUT FORMAL ACADEMIC PREPARATION IN QUANTITATIVE METHODS

Factor	N	Mean	Std. Dev.	Probability	D. F.
PERT	9[a]	3.888	3.062		
	126	4.537	2.151	.398	133
MBO	9	6.593	1.845		
	126	6.475	1.747	.846	133
PPBS-I	9	3.222	2.749		
	126	5.403	2.067	.003	133
DELPHI	9	4.000	2.970		
	126	4.495	2.007	.491	133
MIS	9	4.250	2.613		
	126	5.046	2.185	.299	133
PPBS-II	9	3.167	2.872		
	126	6.218	2.255	.0002	133

[a]For each factor, the first N represents those who had no formal academic preparation in quantitative methods; the second N represents those who did have formal academic preparation in quantitative methods.

TABLE LIX

RESULTS OF T TESTS FOR DIFFERENCES IN FACTOR MEANS BETWEEN GROUPS WITH AND WITHOUT FORMAL ACADEMIC PREPARATION IN HIGHER EDUCATION ADMINISTRATION

Factor	N	Mean	Std. Dev.	Probability	D. F.
PERT	66[a]	3.885	2.202		
	69	5.077	2.078	.002	133
MBO	66	6.116	1.942		
	69	6.833	1.467	.017	120.9[b]
PPBS-I	66	4.924	2.099		
	69	5.577	2.215	.081	133
DELPHI	66	4.330	2.015		
	69	4.588	2.135	.471	133
MIS	66	4.852	2.249		
	69	5.127	2.187	.473	133
PPBS-II	66	5.682	2.474		
	69	6.333	2.326	.117	133

[a]For each factor, the first N represents those who had no formal academic preparation in higher education administration; the second N represents those who did have formal academic preparation in higher education administration.

[b]In cases of unequal variance, Satterthwaite's approximation was used to compute the degrees of freedom associated with the t.

TABLE LX

RESULTS OF T TESTS FOR DIFFERENCES IN FACTOR MEANS BETWEEN GROUPS WITH AND WITHOUT FORMAL ACADEMIC PREPARATION IN HOME ECONOMICS ADMINISTRATION

Factor	N	Mean	Std. Dev.	Probability	D. F.
PERT	93[a]	4.175	2.124		
	42	5.201	2.270	.012	133
MBO	93	6.185	1.830		
	42	7.143	1.346	.001	105.3[b]
PPBS-I	93	5.065	2.109		
	42	5.687	2.284	.125	133
DELPHI	93	4.372	2.061		
	42	4.662	2.111	.454	133
MIS	93	4.782	2.242		
	42	5.458	2.101	.101	133
PPBS-II	93	5.753	2.372		
	42	6.595	2.428	.060	133

[a]For each factor, the first N represents those who had no formal academic preparation in home economics administration; the second N represents those who did have formal academic preparation in home economics administration.

[b]In cases of unequal variance, Satterthwaite's approximation was used to compute the degrees of freedom associated with the t.

TABLE LXI

RESULTS OF T TESTS FOR DIFFERENCES IN FACTOR MEANS BETWEEN GROUPS WHO DID AND DID NOT ADMINISTER A RESIDENT INSTRUCTION BUDGET

Factor	N	Mean	Std. Dev.	Probability	D. F.
PERT	12[a]	4.548	2.459		
	122	4.486	2.208	.927	132
MBO	12	5.958	2.489		
	122	6.541	1.667	.443	12[b]
PPBS-I	12	4.694	1.929		
	122	5.316	2.207	.349	132
DELPHI	12	4.633	2.357		
	122	4.439	2.061	.759	132
MIS	12	3.917	2.432		
	122	5.088	2.180	.081	132
PPBS-II	12	4.917	2.976		
	122	6.131	2.345	.097	132

[a]For each factor, the first N represents those who did not administer a resident instruction budget; the second N represents those who did administer a resident instruction budget.

[b]In cases of unequal variance, Satterthwaite's approximation was used to compute the degrees of freedom associated with the t.

TABLE LXII

RESULTS OF T TESTS FOR DIFFERENCES IN FACTOR MEANS BETWEEN GROUPS WHO DID AND DID NOT ADMINISTER A UNIVERSITY EXTENSION BUDGET

Factor	N	Mean	Std. Dev.	Probability	D. F.
PERT	122[a]	4.463	2.259		
	12	4.786	1.862	.633	132
MBO	122	6.510	1.727		
	12	6.278	2.061	.664	132
PPBS-I	122	5.193	2.194		
	12	5.944	2.038	.257	132
DELPHI	122	4.416	2.119		
	12	4.867	1.654	.476	132
MIS	122	4.939	2.243		
	12	5.438	1.983	.459	132
PPBS-II	122	5.975	2.459		
	12	6.500	2.000	.476	132

[a]For each factor, the first N represents those who did not administer a university extension budget; the second N represents those who did administer a university extension budget.

TABLE LXIII

RESULTS OF T TESTS FOR DIFFERENCES IN FACTOR MEANS BETWEEN GROUPS WHO DID AND DID NOT ADMINISTER COOPERATIVE EXTENSION BUDGETS

Factor	N	Mean	Std. Dev.	Probability	D. F.
PERT	102[a]	4.745	2.207		
	32	3.683	2.105	.018	132
MBO	102	6.708	1.703		
	32	5.792	1.750	.009	132
PPBS-I	102	5.364	2.153		
	32	4.927	2.282	.325	132
DELPHI	102	4.706	2.049		
	32	3.663	2.007	.013	132
MIS	102	4.902	2.177		
	32	5.242	2.365	.451	132
PPBS-II	102	6.142	2.435		
	32	5.641	2.370	.308	132

[a]For each factor, the first N represents those who did not administer a Cooperative Extension budget; the second N represents those who did administer a Cooperative Extension budget.

TABLE LXIV

RESULTS OF T TESTS FOR DIFFERENCES IN FACTOR MEANS BETWEEN GROUPS WHO DID AND DID NOT ADMINISTER RESEARCH BUDGETS

Factor	N	Mean	Std. Dev.	Probability	D. F.
PERT	54[a]	4.778	2.241		
	80	4.298	2.202	.222	132
MBO	54	6.753	1.521		
	80	6.310	1.880	.152	132
PPBS-I	54	5.284	2.090		
	80	5.244	2.258	.917	132
DELPHI	54	4.707	2.077		
	80	4.288	2.077	.253	132
MIS	54	4.681	2.136		
	80	5.187	2.264	.196	132
PPBS-II	54	5.972	2.572		
	80	6.056	2.328	.844	132

[a]For each factor, the first N represents those who did not administer a research budget; the second N represents those did administer a research budget.

TABLE LXV

FACTOR MEAN SCORES BY AGE

Factor	31-40 Yrs. N = 23	41-50 Yrs. N = 49	51-60 Yrs. N = 44	61 Yrs. or Over N = 15
PERT	4.584	4.417	4.607	4.133
MBO	7.261	6.323	6.401	5.989
PPBS-I	5.355	5.224	5.333	5.256
DELPHI	4.548	4.282	4.627	4.653
MIS	5.478	5.158	4.744	4.583
PPBS-II	6.565	5.714	6.227	5.900

TABLE LXVI

FACTOR MEAN SCORES BY DEGREES

Factor	M. A. or M. S. N = 20	Ed. D. N = 17	Ph. D. N = 97
PERT	4.292	4.916	4.498
MBO	6.300	6.118	6.572
PPBS-I	5.483	5.186	5.268
DELPHI	5.140	4.883	4.285
MIS	4.513	4.765	5.126
PPBS-II	6.100	5.206	6.191

TABLE LXVII

FACTOR MEAN SCORES BY REGIONS

Factor	Southern N = 40	North Central N = 54	Northeastern N = 16	Western N = 24
PERT	4.943	4.185	3.973	4.773
MBO	6.983	6.444	5.823	6.208
PPBS-I	5.383	5.290	3.239	5.000
DELPHI	4.940	3.863	4.500	4.958
MIS	4.806	4.838	5.078	5.542
PPBS-II	6.050	5.954	5.594	6.417

TABLE LXVIII

FACTOR MEAN SCORES BY NUMBER OF YEARS IN ADMINISTRATION

Factor	1-5 Yrs. N = 59	6-10 Yrs. N = 43	11-15 Yrs. N = 16	16 or More Yrs. N = 15
PERT	4.440	4.704	4.527	3.924
MBO	6.339	6.915	5.813	6.900
PPBS-I	5.373	5.357	5.323	4.544
DELPHI	4.210	4.726	4.550	4.533
MIS	4.703	5.663	5.000	4.700
PPBS-II	5.831	6.349	5.875	6.000

TABLE LXIX

FACTOR MEAN SCORES BY PERCENT OF RESEARCH FUNDING IN TOTAL BUDGET

Factor	0% N = 30	1-5% N = 26	6-10% N = 25	11-25% N = 30	26% or More N = 17
PERT	4.448	4.907	4.189	4.729	3.613
MBO	6.300	6.769	6.667	6.400	6.824
PPBS-I	4.817	5.295	5.487	5.628	5.275
DELPHI	4.527	4.915	4.200	4.380	4.200
MIS	4.092	5.096	5.350	5.217	5.750
PPBS-II	5.683	6.538	5.960	5.950	6.235

TABLE LXX

FACTOR MEAN SCORES BY NUMBER OF GRADUATE ASSISTANTS

Factor	1-3 N = 50	4-6 N = 30	7-9 N = 14	10-15 N = 17	16 or More N = 16
PERT	5.234	4.386	5.143	2.882	3.357
MBO	6.663	6.822	6.690	6.010	5.573
PPBS-I	5.247	5.339	6.083	3.539	5.844
DELPHI	4.576	5.040	4.071	3.800	3.700
MIS	4.735	5.150	4.893	4.824	5.484
PPBS-II	6.330	5.933	5.714	5.059	6.188

TABLE LXXI

FACTOR MEAN SCORES BY NUMBER OF FACULTY SUPERVISED

Factor	1-3 N = 17	4-6 N = 19	7-9 N = 28	10-15 N = 29	16 or More N = 37
PERT	5.462	4.406	5.020	4.384	3.699
MBO	6.402	7.289	6.631	6.718	5.829
PPBS-I	5.225	5.588	5.262	5.511	4.955
DELPHI	4.612	4.758	4.814	4.441	4.032
MIS	4.426	4.855	4.806	5.526	4.932
PPBS-II	6.265	6.026	6.054	6.707	5.297

TABLE LXXII

FACTOR MEAN SCORES BY PERCENT OF TIME ASSIGNED TO ADMINISTRATION

Factor	0-5% N = 14	6-25% N = 37	26-50% N = 40	51-75% N = 21	76% or More N = 23
PERT	5.704	5.050	4.279	4.619	3.124
MBO	5.655	6.694	7.058	6.310	5.804
PPBS-I	5.893	5.428	5.020	5.024	5.225
DELPHI	4.771	4.789	4.840	4.200	3.330
MIS	4.768	4.568	5.038	5.810	4.989
PPBS-II	6.036	6.054	6.275	6.548	5.000

TABLE LXXIII

FACTOR MEAN SCORES BY PERCENT OF TOTAL TIME ASSIGNED TO RESEARCH

Factor	0% N = 59	1-20% N = 53	21% or More N = 23
PERT	4.446	4.553	4.484
MBO	6.266	6.314	7.428
PPBS-I	5.170	5.104	5.841
DELPHI	4.871	3.932	4.638
MIS	4.708	5.026	5.652
PPBS-II	5.915	5.868	6.609

TABLE LXXIV

FACTOR MEAN SCORES BY TOTAL ENROLLMENT

Factor	7,500 or Less N = 22	7,501-12,500 N = 21	12,501-17,500 N = 24	17,501-22,000 N = 30	22,501+ N = 37
PERT	4.597	5.388	3.809	4.462	4.386
MBO	7.189	6.143	6.236	6.500	6.423
PPBS-I	5.803	5.159	4.868	5.117	5.365
DELPHI	4.564	4.924	4.733	4.660	3.784
MIS	4.966	4.369	5.448	4.775	5.209
PPBS-II	6.363	6.333	5.688	5.900	5.959

TABLE LXXV

FACTOR MEAN SCORES BY UNDERGRADUATE ENROLLMENT

Factor	100 or Less N = 36	101-200 N = 34	201-300 N = 26	301-500 N = 23	501 or More N = 15
PERT	4.773	5.042	4.802	3.112	4.143
MBO	6.458	6.873	6.872	5.819	6.056
PPBS-I	4.963	5.662	5.378	4.391	6.189
DELPHI	4.900	4.994	4.208	3.565	3.973
MIS	4.493	4.963	5.202	4.772	6.150
PPBS-II	6.472	6.206	5.634	5.196	6.467

TABLE LXXVI

FACTOR MEAN SCORES BY GRADUATE ENROLLMENT

Factor	0% N = 10	1-10% N = 28	11-20% N = 26	21-30% N = 25	31-50% N = 20	51% or More N = 23
PERT	5.343	4.505	4.720	4.737	3.829	3.963
MBO	6.600	6.714	6.878	6.633	6.742	5.609
PPBS-I	5.283	5.464	5.244	5.220	5.117	5.152
DELPHI	4.340	5.179	4.585	4.648	4.350	3.339
MIS	4.725	4.875	4.423	5.480	5.188	5.272
PPBS-II	6.700	6.357	6.288	5.740	6.200	5.261

APPENDIX E

CODING BOOK FOR MANAGEMENT TOOLS STUDY

CARD 1

Column	Item
1	Card number
2	Blank
3-5	Assigned number
6	Blank
7-9	Date
10	Blank
11	Participation Card 1 = yes 0 = no
12	Blank
13	All answers completed 0 = no 1 = yes
14	Blank
15	Section I, Question 1
16	I-2
17	I-3
18	I-4
19	I-5
20	I-6
21	I-7
22	I-8
23	I-9
24	I-10
25	Blank
26	I-11 0 = no 1 = yes
27	I-12 0 = no 1 = yes
28	I-13
29	I-14
30	I-15
31	I-16
32	I-17
33	I-18 0 = no 1 = yes
34	I-19
35	I-20
36	I-21
37	I-22
38	I-23
39	Blank

CARD 1

Column	Item
40	Section II-A-1
41	II-A-2
42	II-A-3
43	II-A-4
44	II-A-5
45	II-A-6
46	Blank
47	Section II-B-1
48	II-B-2
49	II-B-3
50	II-B-4
51	II-B-5
52	Blank
53	Section II-B-6
54	II-B-7
55	II-B-8
56	II-B-9
57	Blank
58	Section II-C-1
59	II-C-2
60	II-C-3
61	II-C-4
62	II-C-5
63	II-C-6
64	II-C-7
65	II-C-8
66	II-C-9
67	II-C-10
68	II-C-11
69	Blank
70	Section II-D-1
71	II-D-2
72	II-D-3
73	II-D-4
74	II-D-5
75	II-D-6
76	II-D-7
76-80	Blank

CARD 2

Column	Item
1	Card number
2	Blank
3-5	Assigned number
6	Blank

CARD 2 (Continued)

Column	Item
7	Section II-E-1, page 5
8	II-E-2
9	II-E-3
10	II-E-4
11	II-E-5
12	Blank
13	Section II-E-6
14	II-E-7
15	II-E-8
16	II-E-9
17	II-E-10
18	II-E-11
19	II-E-12
20	Blank
21	Section III-A-1 (Age) a = 1 b = 2 c = 3 d = 4 e = 5
22	Section III-A-2 (Degree) a = 1 ..... f = 6
23	Blank
24-25	Section III-B-1 (Academic preparation - baccalaureate major) 00 = not listed 01 = home economics 02 = education 03 = sociology 04 = psychology 05 = agriculture 06 = history 07 = animal science 08 = architecture 09 = chemistry, physical science 10 = public health 11 = social science 12 = economics 13 = biological science 14 = business 15 = liberal arts
26-27	Section III-B-1 (Academic preparation - baccalaureate specialty) 00 = not listed 01 = general home economics 02 = clothing & textiles 03 = housing & int. design 04 = psychology 05 = home mgt. & fam econ. 06 = foods, nutr., dietetics 07 = animal science 08 = dairy 09 = general home economics 10 = history 11 = art education 12 = agriculture science 13 = secondary education 14 = child and family studies 15 = chemistry

CARD 2

Column	Item
26-27	Section III-B-1 (Academic preparation - baccalaureate specialty, continued) 16 = public health 17 = social science 18 = journalism 19 = math 20 = nursing 21 = elementary education 22 = business education 23 = economics 24 = hotel management 25 = philosophy 26 = organic chemistry 27 = pre medicine 28 = agriculture economics 29 = home econ. educ. 30 = agriculture 31 = architecture 32 = general science 33 = biological science 34 = liberal arts 35 = sociology 36 = art 37 = child psychology
28-29	Section III-B-1 (Academic preparation - masters major) 00 = not listed 01 = home economics 02 = education 03 = sociology 04 = agriculture 05 = psychology 06 = journalism 07 = foods & nutrition 08 = biochemistry 09 = chemistry 10 = psychology 11 = educational psychology 12 = philosophy 13 = theology 14 = human development 15 = animal science 16 = social work
30-31	Section III-B-1 (Academic preparation - masters specialty) 00 = not listed 01 = home economics education 02 = clothing & textiles 03 = education 04 = housing & interior design 05 = family economics & home management 06 = foods, nutrition, dietetics 07 = child development and family life 08 = journalism 09 = curriculum & instruction 10 = sociology 11 = psychology 12 = counseling & guidance 13 = art & design 14 = occupational education

CARD 2

Column	Item
30-31	Section III-B-1 (Academic preparation - masters specialty, continued) 15 = organic chemistry 16 = physiology 17 = animal nutrition 18 = secondary education 19 = biology 20 = educational measurement 21 = economics 22 = educational administration 23 = agriculture economics
32-33	Section III-B-1 (Academic preparation - doctoral major) 00 = none listed 01 = home economics 02 = education 03 = sociology 04 = psychology 05 = fine arts 06 = biochemistry 07 = agriculture 08 = consumption economics 09 = chemistry 10 = public health 11 = nutrition 12 = food science 13 = human development
34-35	Section III-B-1 (Academic preparation - doctoral specialty) 00 = not listed 01 = home economics education 02 = clothing, textiles, related art 04 = foods, nutrition, food science 03 = child development, family 05 = family economics & home management 06 = biochemistry 07 = vocational education 08 = social psychology 09 = curriculum & instruction 10 = special education 11 = marriage & family 12 = psychology 13 = administration & supervision 14 = art education 15 = higher education 16 = developmental psychology 17 = gerontology 18 = housing & design 19 = organic chemistry 20 = educational foundations 21 = public health

CARD 2

Column	Item
34-35	Section III-B-1 (Academic preparation - doctoral specialty, continued) 22 = animal nutrition 23 = secondary education 24 = economics 25 = marketing 26 = counseling & guidance 27 = agriculture economics 28 = learning systems
36	Blank
37-38	Section III-B-2 (Semester hours - administration - higher education) a = 01 ..... j = 10
39-40	Section III-B-2 (Quarter hours - administration - higher education) a = 01 ..... j = 10
41	Blank
42-43	Section III-B-3 (Semester hours - administration - home economics) a = 01 ..... j = 10
44-45	Section III-B-3 (Quarter hours - administration - home economics) a = 01 ..... j = 10
46	Blank
47-48	Section III-B-4 (Semester hours - quantitative methods) a = 01 ..... j = 10
49-50	Section III-B-4 (Quarter hours - quantitative methods) a = 01 ..... j = 10
51	Blank
52	Section III-C-1 (Present title - academic rank) 0 = not listed 1 = professor 2 = associate professor 3 = assistant professor 4 = lecturer
53	Section III-C-1 (Present title - administration) 0 = none given 1 = head 2 = chairman 3 = dean, acting dean 4 = director 5 = coordinator 6 = associate dean, assistant dean 7 = department administrator 8 = teacher educator 9 = specialist
54	Blank
55	Section III-C-2-a 0 = no 1 = yes
56	III-C-2-b 0 = no 1 = yes

CARD 2

Column	Item
57	Section III-C-2-c 0 = no 1 = yes
58	III-C-2-d 0 = no 1 = yes
59	III-C-2-e 0 = no 1 = yes
60	III-C-2-f 0 = no 1 = yes
61	III-C-2-g 0 = no 1 = yes
62	III-C-2-h 0 = no 1 = yes
63	III-C-2-i 0 = no 1 = yes
64	III-C-2-j 0 = no 1 = yes
65	III-C-2-k 0 = no 1 = yes
66	III-C-2-l 0 = no 1 = yes
67-68	III-C-2-m 00 = none 01 = architecture 02 = consumer science 03 = child development center
69	Blank
70	Section III-C-3 (Years in present position)
71	III-C-4 (Years as academic administrator)
72	Blank
73-75	Section III-C-5 (Percent of time - administration)
76	Blank
77-78	Section III-C-6 (Percent of time - research)
79-80	Blank

CARD 3

Column	Item
1	Card number
2	Blank
3-5	Assigned number
6	Blank
7-8	Section III-D-1 (Enrollment a = 01 ..... j = 10
9-10	III-D-2 (Undergraduates in degree program) a = 01 ..... k = 11
11-12	III-D-3 (Graduate students in program) a = 01 ..... 1 = 12
13	Blank
14	Section III-D-4 (Faculty) a = 1 ..... f = 6

CARD 3

Column	Item	
15	Section III-D-5 (Research & teaching assistants) a = 1 ..... f = 6	
16	III-D-6 (Region)	a = 1 ..... d = 4
17	Blank	
18	Section III-D-7-a	0 = no 1 = yes
19	III-D-7-b	" "
20	III-D-7-c	" "
21	III-D-7-d	" "
22	III-D-7-e	0 = none, 1 = div. w/dept. of h. e., 2 = preschool 3 = grants 4 = Ag. Exp. Sta.
23	Blank	
24-25	Section III-D-8	a = 01 ..... j = 10
26	Blank	
27	Section IV-A-1	
28	IV-A-2	
29	IV-A-3	
30	IV-A-4	
31	IV-A-5	
32	IV-A-6	
33	IV-A-7	
34	IV-A-8	
35	Blank	
36	Section IV-B-1	a = 1 ..... e = 5
37	Blank	
38	Section IV-B-2-a	0 = no 1 = yes
39	IV-B-2-b	" "
40	IV-B-2-c	" "
41	IV-B-2-d	" "
42	IV-B-2-e	" "
43	IV-B-2-f	" "
44	IV-B-2-g	" "
45	IV-B-2-h	" "
46	IV-B-2-i	" "
47	IV-B-2-j	" "
48	IV-B-2-k	" "
49	IV-B-2-l	" "
50	IV-B-2-m	" "
51	IV-B-2-n	0 = none, 1 = interviewing effectiveness, 2 = faculty eval., 3 = prog. dev. & eval., 4 = research funding, 5 = university structure and organization
52	Blank	

CARD 4

Column	Item		
53	Section	IV-B-3-a	0 = no 1 = yes
54		IV-B-3-b	" "
55		IV-B-3-c	" "
56		IV-B-3-d	" "
57		IV-B-3-e	" "
58		IV-B-3-f	" "
59		IV-B-3-g	" "
60		IV-B-3-h	" "
61		IV-B-3-i	0 = none, 1 = Am. Dietetic Assoc., 2 = Home Ec. Org., 3 = Collective Bargaining agency, 4 = State Dept. of Voc. Educ., 5 = Professional societies, 6 = USOE, 7 = own institution
62	Blank		
63	Section	IV-B-4-a	0 = no 1 = yes
64		IV-B-4-b	" "
65		IV-B-4-c	" "
66		IV-B-4-d	" "
67		IV-B-4-e	" "
68		IV-B-4-f	" "
69		IV-B-4-g	" "
70		IV-B-4-h	" "
71		IV-B-4-i	" "
72		IV-B-4-j	0 = none 1 = leadership
73-80	Blank		

CARD 3

Column	Item		
1	Card number		
2	Blank		
3-5	Assigned number		
6	Blank		
7	Section	IV-B-5-a	0 = no 1 = yes
		IV-B-5-b	" "
		IV-B-5-c	" "
		IV-B-5-d	" "
		IV-B-5-e	" "
		IV-B-5-f	" "
		IV-B-5-g	" "
		IV-B-5-h	" "
		IV-B-5-i	" "
		IV-B-5-j	1 = none, 1 = personal relations 2 = political behavior, 3 = communications skills
17-80	Blank		

VITA

Beulah Marie Hirschlein

Candidate for the Degree of

Doctor of Philosophy

Thesis: MANAGEMENT TOOLS USED BY HOME ECONOMICS DEPARTMENT HEADS

Major Field: Home Economics--Home Economics Education

Biographical:

Personal Data: Born in Mangum, Oklahoma, January 16, 1935, the daughter of John A. and Zelda J. Luker.

Education: Graduated from City View High School, Granite, Oklahoma, in May, 1952; received Bachelor of Science degree in Home Economics Education from Oklahoma State University in 1958; received Master of Science degree in Home Economics Education, Oklahoma State University, 1965; enrolled in doctoral program as part-time student at the University of Oklahoma, 1967-70; completed requirements for the Doctor of Philosophy degree at Oklahoma State University in July, 1978.

Professional Experience: Vocational Home Economics teacher: Crescent, Oklahoma, 1958-61, Stillwater, Oklahoma, 1961-65 Catoosa, Oklahoma, 1965-66; Curriculum Specialist, Oklahoma State Department of Vocational and Technical Education, 1965-69; Curriculum Specialist, Oklahoma Center for Continuing Education, University of Oklahoma, 1969-70; Assistant Professor, Home Economics Education, Oklahoma State University, 1970-75; Director, Home Economics University Extension and Assistant Professor, Home Economics Education, Oklahoma State University, 1975-78.

Professional Organizations: American Home Economics Association, American Vocational Association, National University Extension Association, Adult Education Association of the United States of America, Phi Delta Kappa, The Delta Kappa Gamma Society International, Oklahoma Home Economics Association, Oklahoma Vocational Association, Oklahoma Adult and Continuing Education Association, Oklahoma Community Education Association.