AN ANALYSIS OF ACTUAL AND PREFERRED PATTERNS OF FACULTY ACTIVITY IN THE COLLEGE OF ENGINEERING AT MICHIGAN STATE UNIVERSITY

by

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ABSTRACT

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Increasing demands for educational and fiscal accountability have, in recent years, emphasized the need to critically evaluate program priorities in higher education. Fundamental to this evaluative process is the problem of developing effective means to assess the disposition of faculty to various institutional programs. Since a program may be generally defined as an organized set of activities designed to achieve predetermined goals, it appears reasonable to approach this problem from the perspective of institutional goals (through goal preference assessment) or through careful analyses of attitudes toward organizational activities.

Considering the interpretive problems associated with goal preference assessment, this study was predicated on the need to explore activity analysis as a means to identify faculty perceptions of institutional programs. The central purpose of the study was to compare actual and preferred patterns of faculty effort within an academic organization. The population consisted of all faculty members associated with the College of Engineering at Michigan State University. The study was based upon four operational assumptions:

1. Since institutional programs may be defined as organized sets of activities, it was assumed that perceptions of these programs could be evaluated in terms of the specific activities from which they are comprised.
2. It was suggested that the value or "importance" of a program-related activity could be defined quantitatively as an amount of professional resources devoted to that activity.
3. Recognizing that all organizational resources including faculty are finite in nature, it was assumed that an evaluation of the "importance" of a single activity must necessarily be weighed against the "importance" of all other activities.
4. Finally, it was assumed that organizational activities and programs are the result of a complex interaction between individual needs and organizational expectations. Thus, it was deemed essential to consider the evaluation of activities from both an individual and organizational perspective.

With these assumptions in mind, an instrument defining thirty categories of program-related activity was developed and distributed to the sample. Respondents were asked to provide percentage estimates of (1) actual individual effort, (2) preferred individual effort, (3) perceived organizational effort, and (4) preferred organizational effort for each of the activity categories. Percentage distributions were employed to achieve an understanding of the "relative value" of each activity in terms of professional resources. Since percentage distributions

assumed finite resource availability, the procedure roughly simulated the process of priority assessment which naturally occurs within an organization.

An ANOVA of repeated measures and a Tukey post hoc procedure were used to determine whether differences existed between actual and preferred effort at both individual and organizational levels. As a result of the analysis, the following conclusions were drawn:

1. There was no evidence to suggest that the combined individual effort preferences of faculty members differed from the pattern of faculty effort which actually occurs within the college. It appeared then, that if assignments were made solely on the basis of individual faculty needs and interests, the resultant pattern of professional resource allocation over programs could not be significantly different than that which was currently in effect.
2. The analysis also failed to describe significant differences between perceived and preferred patterns of organizational effort. This finding was particularly significant in that it evaluated faculty attitudes toward the priority structure which exists within the College of Engineering. Since no significant differences were found, it appeared that the faculty as a whole was content with the priority structure which they perceived to exist within the College.
3. In comparing individual effort patterns (actual and preferred) with organizational effort patterns (perceived and preferred), the following four observations were made: (a) the comparison of actual individual with perceived

organizational effort suggested that faculty perceptions of the actual pattern of professional resource allocation are generally accurate; (b) in comparing actual individual with preferred organizational effort, it appears that the faculty's perception of an ideal pattern of resource distribution is not significantly different from that which currently exists; (c) the analysis of preferred individual and perceived organizational effort suggested that if faculty were assigned according to their personal interests and needs, the resultant pattern of resource allocation would not be significantly different from that which they feel currently exists; (d) the results of the comparison of preferred individual with preferred organizational effort suggested that the combined individual preferences of the faculty generally agreed with their preferences for organizational activity.

Exceptions to these observations were noted in certain activities. Substantive interpretation of these exceptions, however, was not attempted as the response rate achieved precluded accuracy in establishing organizational measures composed of the combined actual and preferred effort of individual faculty.

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CHAPTER I

THE PROBLEM

Introduction

Over the past several years, colleges and universities have experienced increasing demands for educational and fiscal accountability. Institutional budgets, which once were approved with little question, are now carefully scrutinized and often drastically reduced. Indeed, few administrators would argue that continued support of higher education is becoming increasingly conditional. This realization has emphasized the need for institutions to define and develop effective means to allocate and manage available resources in support of institutional goals.

The primary resource of any college or university is its faculty. Like all professional organizations, institutions of higher education depend largely, if not entirely, upon their professional academic staffs in achieving institutional objectives. In addition to being the key contributors to the outcomes of higher education, faculties are also the most costly of all institutional resources having salaries which often represent from sixty to eighty percent of operating budgets [4:63]. Considering the unique importance and high cost of faculty, it is apparent that the development of effective tools for resource management will heavily depend upon an understanding of the nature and effects of faculty activity.

Background and Need for Study

To achieve a better understanding of the nature of professional activity, a significant number of institutions have initiated or intensified efforts directed at investigating faculty workloads. Generally, these efforts have been designed to answer the following questions:

1. What types of activities are performed by faculty members in support of institutional objectives?
2. How do faculty members divide their time between these activities?
3. What are the results or effects of these activities in terms of achieving institutional objectives? [24:1]

The answers to these questions, provided through careful analyses of faculty activities, yield information which may be used in a variety of management functions including long range planning, program review and evaluation, budgeting, and resource utilization analysis [24:16].

A review of the literature concerning faculty activity analysis suggests that major efforts have been devoted to the identification and measurement of actual activity patterns. Little or no concern, however, has been given to the development of techniques designed to assess the preferred or valued activity patterns of faculty members. In fact, most studies of faculty activity imply the need to design methods of data collection which elicit responses devoid of personal or value judgment. Yet, an understanding of how faculty members value various activities would provide additional information which would be useful, if not critical, to many administrative decisions.

Consider, for example, the question of faculty assignments within an academic institution. Clearly, college and university professors

are multi-task professionals who may reasonably be expected to perform a variety of responsible functions within the university (e.g., teaching, research, public service, advising, committee work, etc.). Yet, it is equally important to recognize that most faculty display varying and constantly changing attitudes toward given institutionally assigned responsibilities. Staffing procedures which fail to consider these attitudes frequently result in faculty being asked to perform tasks which are totally alien to their personal and professional interests. Such assignments, if carried to an extreme, often form the basis of conflict which may ultimately effect the performance of an entire academic unit. A continuous evaluation of faculty preferences toward various activities could serve to identify possible areas of conflict between individual and institutional needs before problems arise.

In addition to monitoring faculty perceptions of their role within the institution, information derived from an analysis of actual and preferred activity patterns could significantly aid administrators in program planning and management. Systematic planning within organizations is a process which typically consists of four distinct phases: (1) specification of organizational goals, (2) translation of goals into sets of measurable objectives, (3) identifying and organizing sets of activities (programs) to achieve stated objectives, and (4) evaluating resources in terms of program requirements [20:28]. Considering their importance to program development, implementation, and maintenance, it is essential to carefully consider faculty perceptions of the organization throughout the planning process.

Frequently, these perceptions are assessed through surveys designed to identify faculty opinion regarding the various goals and/or

objectives of the institution. Faculty perceptions of institutional outcomes, as assessed through these techniques, could be supplemented by an analysis of actual and preferred activity patterns. Using this approach, a faculty member's perception of the importance of an institutional program could be evaluated in terms of his or her willingness to personally participate in the activities associated with the program. This added information would obviously be operationally significant in examining the resources available to meet "desired" institutional objectives.

It must be recognized, however, that individual faculty members who perceive a given objective or goal as valuable may not wish to participate in the activities associated with its achievement. In other words, a faculty member's perceived professional role may significantly differ from his or her perception of the institutional role. Much of the information currently available on faculty perceptions of the institution has been obtained through various goal preference surveys. Examples of these surveys may be found in Gross and Grambsch [10], Uhl [34], Thomas [31], Stead [28], and Hintz [14]. Generally they consist of statements describing various goals and/or objectives of the institution. Faculty members, and often others, are then asked to ascribe levels of actual (current) and ideal (preferred) importance to each of the goal statements. Subsequent analysis of the resultant data provides administrators with information which may be used in establishing priorities for program development and resource allocation [34:4].

A careful review of various goal preference studies (presented in detail in Chapter II) reveals three fundamental weaknesses which tend

to limit their usefulness. First, the process of defining institutional goals or objectives is a difficult one often leading to over-generalization and misconception. Secondly, implied in the design of these studies is the assumption that organizational goals can and should be evaluated independently of one another. Unfortunately, this assumption does not recognize the constraint of finite organizational resources and thus is not consistent with the actual process of determining organizational priorities. Finally, it is difficult to translate perceptions of a goal's "importance," as identified in goal preference studies, into quantitative measures of the resources needed for its achievement.

An extension of activity analysis to include measures of (1) perceived organizational activity, and (2) preferred organizational activity could serve to supplement goal preference studies by responding to many of the concerns cited above. More specifically, such an analysis would add to an understanding of the disposition of faculty toward the organization by evaluating:

1. faculty perceptions of specific goal directed activities (or programs) rather than abstract goal statements,
2. faculty perceptions of organizational activities defined in terms of finite rather than infinite resource availability,
3. faculty perceptions of organizational processes defined in terms of a quantitative measure of activity rather than a qualitative measure of importance.

Theoretical Assumptions

As was mentioned above, most research directed at assessing faculty attitudes toward academic organizations has implicitly followed an approach to organizational analysis which focuses upon the primacy

of goals within the institution. This "goal model" of organizational analysis, as Etzioni [9:16] describes it, assumes that all structured activity existing within an organization is directed at achieving certain predetermined goals. From this perspective, then, organizational evaluation or study becomes little more than a process of identifying and determining the degree to which goals were achieved. In discussing the "goal model" for organizational analysis, Etzioni describes its fundamental weakness:

> ... it tends, though not invariably, to give organizational studies a tone of social criticism rather than scientific analysis. Since most organizations most of the time do not attain their goals in any final sense, organizational monographs are frequently detoured into lengthy discussions about this lack of success to the exclusion of more penetrating types of analysis. Low effectiveness is a general characteristic of organizations. Since goals, as symbolic units, are ideals which are more attractive than the reality which the organization attains, the organization can almost always be reported to be a failure. While this approach is valid, it is only valid from the particular viewpoint chosen by the researcher. [9:16]

Thus, the value of the goal model for organizational analysis is wholly dependent upon the ability of the analyst to precisely describe the goals of the organization. In considering the collegiate organization, this task is confounded by the range of goals attributed to higher education and a lack of concensus on the criteria for evaluating their achievement [32:23].

To overcome this weakness, it is necessary to approach the problem of organizational analysis from the perspective of means (or resources) rather than ends (or goals). Etzioni refers to this alternative approach as the "system model" for organizational analysis. In describing the model he states:

> Rather than comparing existing organizations to ideals of what they might be, (the system model) assesses their performances relative to one another... It constitutes a statement about the

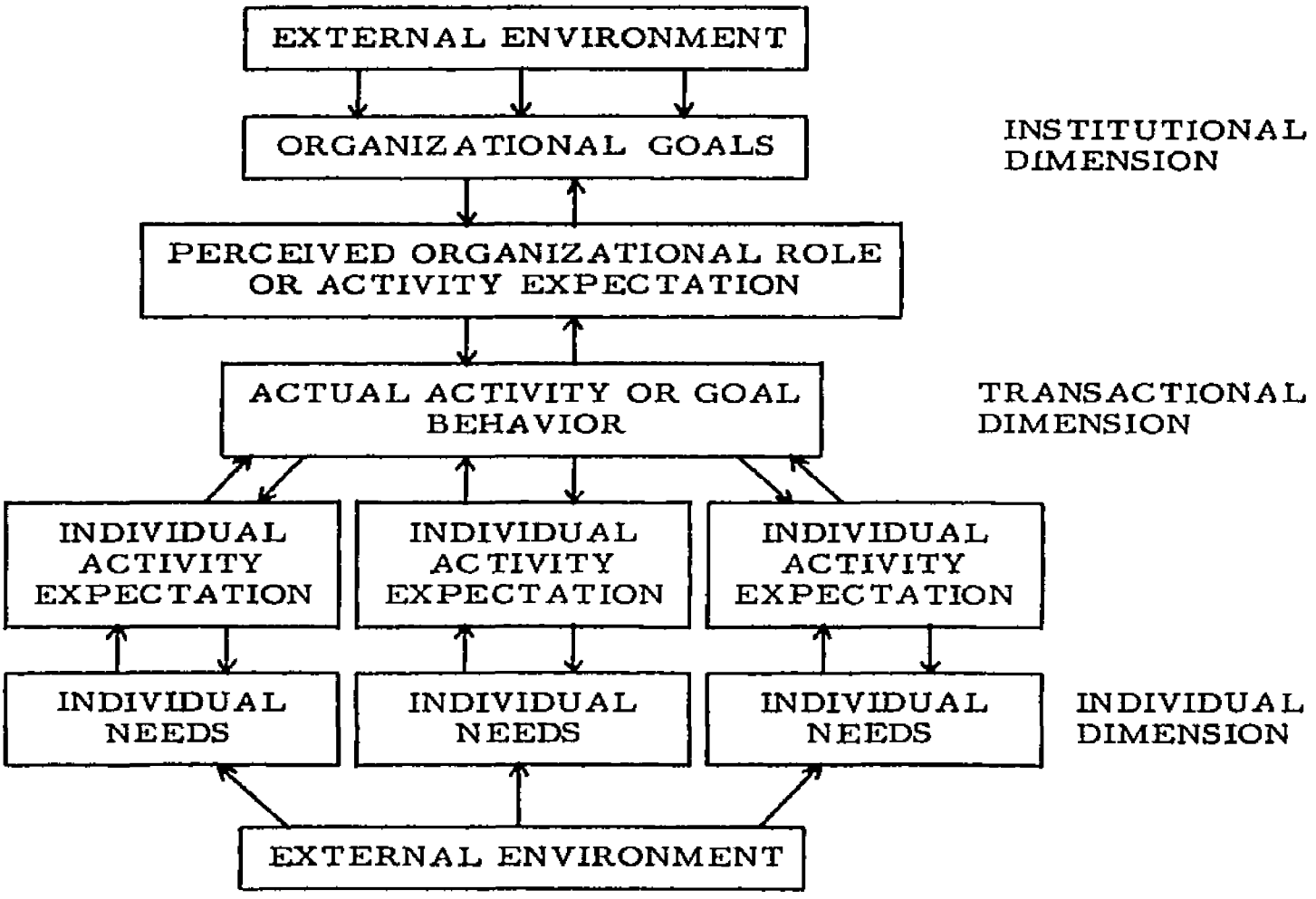
> relationships (or activities) which must exist for an organization to operate. [9:17]

The "system model" is thus concerned with establishing an understanding of the nature of the organization through a careful examination of its various processes or activities. Viewed from this prospective, the problem of identifying faculty perceptions of the institution is one of assessing their perceptions of the organizational activities in which they are engaged.

This study is, then, directed at evaluating priorities within an academic organization through an examination of the activity patterns of faculty. Unlike traditional activity analysis, it is designed to consider perceptions of both actual and preferred activity from an individual and organizational perspective. Implied in this approach is a conceptual framework which describes organizational activity as the result of a complex interaction between individual needs and organizational expectations. This framework is described in part in a theory of organizations advanced by Getzels and Guba [30:167-183]. According to these theorists, all organizations are essentially composed of two dimensions of phenomena. The first dimension consists of the "institution" which is made up of the expectations and roles directed at achieving the goals of the organization. The second dimension is that of "the individuals" or members each having unique personalities and needs. Though conceptually independent, the two dimensions are functionally interactive. It is this interaction (illustrated in Figure 1.1), which creates a third or "transactional" dimension which manifests itself in the activity or goal behavior. In describing the "transactional" dimension Sweitzer concludes:

FIGURE 1.1

A Theoretical Description of Organizational Activity



(Adapted from Sweitzer [30:168])

> This 'transactional' dimension is a blend of the other two dimensions and is composed of the elements of group, climate and intensions. The term was used to communicate the assumption that the process within a social system (or organization) may be seen as a dynamic transaction between roles and personality, and that the phenomenon of behavior includes both the socialization of personality and the personalization of roles. [30:168]

From this perspective, an evaluation of organizational behavior or activity must of necessity address questions of the interaction of institutional and individual needs. In doing so, it becomes essential to consider member perceptions of organizational expectations for behavior or activity in light of individual interests and needs. The present study represents an attempt to consider the "transactional" dimension of an academic organization through an examination of the perceptions faculty members hold toward various organizational activities.

Purpose of the Study

The central purpose of this study is to identify and compare actual and preferred patterns of faculty effort within an academic organization, namely, the College of Engineering at Michigan State University. More specifically, thirty categories of program-related faculty activity are identified and described. Each faculty member is asked estimates of the following:

1. Actual Individual Effort: an estimate of how an individual faculty member divides his or her time between the various categories of activity
2. Preferred Individual Effort: an estimate of how each faculty member would ideally divide his or her time between the various categories
3. Perceived Organizational Effort: an estimate of each faculty member's perception of how the college divides

total faculty time among the various categories

4. Preferred Organizational Effort: an estimate of each faculty member's perception of how the college should divide total faculty time between the various categories of responsibility.

Statistical comparisons of the resultant effort patterns will be made to determine whether differences exist between actual and preferred activity at both individual and organizational levels.

Objectives of the Study

Since the study represents an exploratory attempt to extend the scope of faculty activity analysis, no experimental or directional hypotheses are generated. The study is, however, designed to meet the following six objectives:

1. to determine whether differences exist between actual individual effort and preferred individual effort in the various categories of responsibility,
2. to determine whether differences exist between perceived organizational effort and preferred organizational effort in the various categories of responsibility,
3. to determine whether differences exist between actual individual effort and perceived organizational effort in the various categories of responsibility,
4. to determine whether differences exist between actual individual effort and preferred organizational effort in the various categories of responsibility,
5. to determine whether differences exist between preferred

individual effort and perceived organizational effort in the various categories of responsibility,

6. to determine whether differences exist between preferred individual effort and preferred organizational effort in each of the various categories of responsibility.

Null or non-directional hypotheses constructed to meet the above objectives are presented in Chapter III.

Definitions

Operational descriptions for many of the terms associated with the study are presented below:

Organization: a social unit deliberately constructed and reconstructed to seek specific goals. In the present study the "organization" shall be defined as the College of Engineering at Michigan State University.

Program: an organized set of activities designed to achieve specified goals or objectives.

Faculty: the academic staff (excluding deans, directors, and chairmen) of the College of Engineering at Michigan State University.

Categories of Responsibility: a set of specifically defined areas of faculty activity which are supportive of college programs.

Effort: the workload of a faculty member over a designated period of time.

Pattern of Activity: the amount of effort expended by an individual or group of faculty members over various categories of responsibility.

Scope of the Study

As was earlier mentioned, this study represents an attempt to extend the scope of program-related activity analysis. From an operational standpoint, then, it was deemed important to identify, as a unit of study, a representative academic organization which (1) had systematically defined its programs in terms of their component activities, (2) displayed administrative support for, and experience with, faculty activity analysis, and (3) was interested in exploring the pragmatic application of the proposed analysis. Considering its past experience and acceptance of faculty activity analysis as a viable management tool, the College of Engineering at Michigan State University was selected as the organizational unit of study.

Since the study is limited to an examination of the unique program-related activities associated with the college, caution must be exercised in generalizing the results beyond the unit of study.

Limitations of the Study

In addition to that described in the previous section, other major limitations of the study are presented as follows:

1. The study does not consider variables such as academic rank, departmental affiliation, tenure, age, or sex which may be related to faculty perceptions of activity patterns.
2. Organizational subgroups namely the administrative, student affairs, and/or the profesional-technical staff, are not included in the study.

3. A survey type study, particularly one which employs a newly developed instrument, has certain well documented limitations which must be considered in the interpretation of the data.
4. Since less than 100% return of the questionaire can be anticipated, conclusions cannot be precisely generalized beyond those who complete the questionaire.

Organization of the Study

A review of the relevant literature is presented in the following chapter. The third chapter includes a description of the population, data collection procedures, and statistical design. An analysis of the resultant data is presented in Chapter IV. Finally, the summary and conclusions of the study, as well as recommendations for further research, are discussed in Chapter V.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

As stated in Chapter I, the central purpose of this study is to assess faculty perceptions of organizational priorities through an analysis of professional activity patterns. This chapter is intended to provide additional background for the study by examining various techniques used to identify and measure: (1) faculty perceptions of organizational priorities, and (2) the nature and extent of professional activity within academic organizations.

Organizational Priority Assessment

The evaluation of faculty attitudes toward institutional priorities is a problem which has attracted considerable attention in recent years. In attempting to address this problem, most research has employed an approach to organizational analysis which focuses upon institutional goals as the central variable of study. This "goal model" for organizational analysis, as Etzioni terms it, assumes that all structured activity existing within an organization is directed at achieving certain predetermined outcomes or goals [9:16]. From this perspective then, the process of establishing priorities for organizational activity must, of necessity, begin with a careful evaluation of institutional goals.

Goal Studies

Perhaps the most widely acclaimed and comprehensive examination

of university goals was conducted by Gross and Grambsch [10]. In this study, administrators and faculty from sixty-eight universities were asked to respond to a listing of forty-seven goal statements developed by the researchers. Each statement was categorized as either an output or support goal of the organization. Output goals were defined as those ends "which immediately, or in the future, are reflected in some product, service, skill, or orientation which will effect society." [10:13] Support goals, on the other hand, were identified as those activities intended to keep the organization functioning effectively [10:9].

Faculty and administrators included in the sample were asked to indicate their perceptions of the actual and preferred importance of each goal within their institution. Comparisons of these perceptions were made to determine the degree of goal congruence existing within the organization. The significance of goal congruence is summarized by Gross and Grambsch in the following:

> In general, we would assume that where there is a high degree of congruence between perceived and preferred goals, a state of harmony and content will exist. Conversely, where what is differs markedly from what the staff feels should be, a state of dissatisfaction, tension, and even conflict will exist. [10:36]

In comparing rankings of the mean scores obtained from the perceived and preferred measures of importance, the authors noted considerable congruence in response and, "by inference, a high degree of satisfaction among faculty and administrators that goals were receiving proper attention." [10:110] Dissonance between perceived and preferred importance was, however, found to exist in the output goals relating to student production and in certain support goals concerned with maintaining the financial base of the institution [10:111].

Though not tested statistically, it is interesting to note that the mean responses for "preferred importance" exceeded those of "perceived

importance" in forty of the forty-seven goal statements [10:28-29]. This could lead one to conclude that faculty and administrators generally feel that institutions should place more emphasis on nearly all goals considered.

In addition to providing insight into faculty and administrative perceptions of institutional goals, the work of Gross and Grambsch served to stimulate further inquiry into goals assessment in higher education. In 1969, the Danforth Foundation [22] reported the results of a study which used a shortened and revised form of the Gross and Grambsch inventory. The study was designed to assist fourteen small liberal arts colleges in identifying their goals. Included in the sample were groups of administrators, faculty, and students from each of the subject institutions. While there were significant differences between the three groups regarding perceived and preferred importance of various goals, all tended to agree on the direction of desired change [22:5].

In 1970, Thomas [31] conducted a study at Michigan State University involving a sample of student personnel workers and graduate students. Using the Gross and Grambsch study instrument, he sought to compare the goal perceptions of this group with the responses of faculty and administrators obtained by Gross and Grambsch in 1968. Thomas found that the student personnel workers placed a higher emphasis on student-oriented goals than did the faculty-administrator group of the national survey [31:111-115]. Since Thomas sought to compare groups which were distant in both size and time, the results of his study must be interpreted with caution.

One year after Thomas' study was published, Stead [28] reported the results of a second goals study conducted at Michigan State University.

Like Thomas, Stead used a slightly modified version of the Gross and Grambsch instrument. The purpose of his study, however, was to determine whether differences existed between the goal perceptions and preferences of various groups associated with the university. Included in the sample were undergraduate and graduate students, faculty, administrators, and trustees. Stead found the greatest goal congruence occurring within the faculty, administrator, and graduate student groups. The responses of undergraduates and trustees reflected the greatest differences between perceived and preferred rankings. In addition, Stead noted that all groups felt that nearly every goal should be given greater emphasis than was the case in practice [28:145-146].

Though congruence of opinion regarding the perceived and preferred importance of various institutional goals was a consistent finding of most of the studies outlined above, certain qualifications must be made in interpreting this result. In each of the studies, goal congruence was statistically identified through a process of mean-score rankings of goal statements. Rankings of perceived importance were correlated with those of preferred importance to establish the existence of congruence between the two measures. Unfortunately, the rank order correlations employed fail to evaluate actual mean score differences between the two measures for each goal.

Though not evaluated statistically, an inspection of the mean scores and variances obtained in the studies suggest the existence of divergent opinion both between, and within, groups regarding the importance of various goals. Further, though not empirical, evidence of differing goal perceptions is manifest in frequent conflicts between constituent groups. Students, faculty, taxpayers, and legislators demand that higher education respond to their respective concerns. In far too

many cases however, the concerns of one group greatly differ from those of another. Since each group is involved in the support of higher education, each has a right to participate in determining institutional goals. The problem, then, as Lawrence puts it:

> Though recognizing the validity of the statement, 'he who pays the piper calls the tune,' the university is caught on the horns of a dilemma. What do you do when two people who pay the piper call different tunes? [17:3]

Divergence of opinion regarding the mission of higher education occurs not only between constituent groups, but within them. In their study of academic departments, Dressel, Johnson, and Marcus [8] conclude that faculty opinion regarding institutional goals is often diverse, obscure, and generally confusing:

> Not only do departments vary in their missions, but individuals within departments also have specific objectives which do not necessarily coincide with those of the department, or of the university. Faculty objectives may, in fact, be highly personal and even unrelated to the discipline. Confusion is added to this picture by the fact that there is little agreement as to what the missions should be for the different units. ... Some professors even argue that departmental or university objectives exist only as vague composites of individual faculty objectives. In the extreme, this means that in the name of academic freedom, each faculty member must be permitted to do his own thing. [8:71]

The problem of identifying organizational goals within academic institutions is thus confounded by diverse and often conflicting opinion. In attempting to resolve this problem, Cyphert and Gant [6] employed the Delphi method of concensus formation in identifying goals for the School of Education at the University of Virginia. The Delphi technique is described by Cyphert and Gant as follows:

> Traditionally the method for achieving consensus is a round table discussion among individuals who arrive at a group position. There are a number of objections to this procedure. 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 opinion, and the bandwagon effect of majority opinion. In contrast, with the Delphi Technique an attempt is made to overcome these factors by not bringing participants together in one place and by not reporting individual opinions. This eliminates committee activity and replaces it with a carefully designed program of sequential interrogations (with questionaires) interspersed with information and opinion feedback. [6:272]

In their study of the School of Education, the researchers employed a Delphi method involving four successive questionaires. The first involved asking a sample consisting of faculty, administrators, political leaders, and school teachers to suggest "prime targets on which the School of Education should concentrate its resources during the next decade." [6:273] From the suggestions received, sixty-one goal statements were formulated. The second questionaire contained a random listing of the sixty-one items and asked the sample to rate each item on a five point scale. The third questionaire differed from the second in that it reported both the group concensus and the respondents prior rating for each item. The respondent was then asked to re-rate the items in light of additional information concerning the opinion of the total sample. Participants who wished to remain outside of the concensus were asked to state primary reasons for doing so. The fourth and final questionaire was constructed to report the concensus achieved on the previous instrument, the participant's previous responses, and a list of the major "dissenting opinions" for each item. The ratings obtained on the final questionaire were thus based "upon the respondents' own values and a knowledge of majority and minority views." [6:273]

In comparing response patterns of both groups and individuals over the successive questionaires, Cyphert and Gant observed a movement toward greater concensus both between and within groups. They

concluded that the Delphi technique could serve as an important tool in identifying and formulating consensus on institutional goals [6:273].

A more comprehensive examination of the potential of the Delphi technique was undertaken by the National Laboratory for Higher Education [34]. In this study, three successive questionaires (along with response feedback) were forwarded to samples of students, faculty, administrators, trustees, alumni, parents, and community leaders associated with five subject institutions. The questionaires were structured similar to that used in Gross and Grambsch [10] in that respondents were asked to rate the current and preferred importance of each goal appearing on the instrument. An analysis of the results revealed that a convergence of opinion occurred between groups at each subject institution. These findings led the researchers to conclude:

> The instrumentation and technique used in this study to assess the present and preferred goals of five colleges...were successful... Not only was the importance of goals assessed, but in most goal areas where some difference of opinion existed, agreement was achieved. This is not to imply that attitudes were changed; they may or may not have been. Possible changes in opinion occurred because participants were given an opportunity, through feedback, to consider dimensions of problems which they have not previously considered. For whatever reason, the different groups came to a much greater agreement as to what the present goals of the institution are and what they should be. [34:49]

Problems of Interpretation

Each of the studies described above sought to identify organizational priorities through an evaluation of institutional goals. According to Uhl [34], the ability to identify goals is the fundamental prerequisite to the development of efficient methods for resource allocation.

> Once...goals have been established, measurable objectives can be set and strategies for obtaining them devised. By evaluating each strategy in terms of resources needed and possible outcomes, a plan of action can be determined. Since a chosen

> strategy is linked to a measurable objective, it will be possible to evaluate how well the plan of action attains the objective. [34:3]

Unfortunately, most of the techniques employed to assess goals typically display three fundamental weaknesses which tend to limit their usefulness in the above process.

First, the task of defining institutional goals is an extremely difficult one, often resulting in over-generalization. The frequently used Gross and Grambsch [10] instrument, for example, employs statements such as:

1. to prepare students specifically for useful careers
2. to assist students to develop objectivity about themselves and their beliefs and hence examine those beliefs critically
3. to produce a student who is able to perform his citizenship responsibilities effectively [10:141].

Though carefully constructed, these and similar statements, in and of themselves, are operationally meaningless. Consider for example, item two in the list presented above. What is critical thinking? How can it be achieved by the institution and how does the institution know when it is achieved? These are difficult questions which tend to stimulate disagreement and controversy particularly among faculty. Yet, if a goal is to be meaningful to the organization, an operational understanding of the means by which it is achieved and evaluated must be attained.

A second weakness commonly observed in goal-assessment techniques is the implied assumption that a goal can and should be evaluated independently of all other goals associated with the organization. This assumption is clearly illustrated in the design of each of the goal studies

earlier described. Respondents were asked to ascribe a level of importance to a number of goal statements. Each item, or statement, was rated independently of all other items. Using this technique, it was theoretically possible to achieve equally high ratings for all possible goal statements presented. Unfortunately, organizations having finite resources are limited in their ability to effectively engage in all possible goal-directed activities. Administrators and thus faced with the task of determining priorities for various institutional goals. Normally, this process requires a careful evaluation of each goal in terms of all others available. Information which does not consider the relative importance of goals, such as that provided through goal preference studies, may be of limited value in supporting this process.

The third major weakness apparent in each of the goal preference studies cited above is the difficulty in translating perceptions of "importance" into administratively significant terms. The process of establishing program priorities requires a careful examinagion of available resources in terms of dollars, facilities, time, and/or other quantitative measures. Regretably, there is little evidence to suggest the existence of a direct correlation between perceptions of importance and any of these measures. Some important goals may, in fact, be effectively achieved through relatively low-cost programs. An instrument which could define levels of importance as quantitative measures of professional resources would be extremely useful to the administrative process.

An extension of professional resource or activity analysis to include measures of actual and preferred program-related activity could serve to supplement goal preference studies by responding to many of

the concerns cited above. More specifically, such an analysis would provide the following information:

1. perceptions of specific goal-directed activities or programs rather than abstract goal statements
2. perceptions defined as quantitative measures of activity rather than quantitative measures of importance
3. perceptions of organizational priorities defined in terms of finite rather than infinite resource availability.

Faculty Activity Analysis

Traditionally, activity analysis in higher education has been concerned with the problem of identifying how faculty members spend their time. As early as 1929, Reeves and Russell described the problem as follows:

> The evaluation of faculty load is an extremely difficult problem. Teaching...and other professional duties vary tremendously from institution to institution and from individual to individual within a given institution. In fact, the factors involved in determining total faculty load are so numerous and so varied as to almost preclude precise determination by any mechanical method. No thoroughly scientific method of measuring faculty load is now available. Existing measures are unsatisfactory and incomplete. The answers are not yet in. Yet, as a practical necessity, some method of measuring and adjusting faculty load even though only approximate must be employed. [24]

Three decades later the American Council on Education, in summarizing a national conference on "faculty workload," echoed the concerns of Reeves and Russell by claiming that the development of an effective means to identify and accurately measure faculty activity "is both impossible and imperative." [2:92]

The need to resolve the problems associated with the evaluation of faculty resources was accentuated during the 1960's. According to Romney [24]:

> The urgent planning problems facing the leadership of higher education at that time involved obtaining an indication of the quality and amount of resources needed to cope with the anticipated expansion and changing mix of enrollments. International competition to explore space as well as federal emphasis on basic scientific research...further accelerated these concerns... Commensurate with increasing public investments in higher education during this period were increasing demands for accountability... Accordingly, administrators developed various devices to capture the information necessary to answer questions of faculty utilization. [24:13]

The most predominant technique employed during this period was the faculty time survey. Generally, these surveys consisted of identifying how the time of an individual or group of faculty was allocated over specified lists of activities. According to Romney, the justification for such inquiries rested on two basic assumptions:

1. That certain kinds of activities somehow are related to the quality of the learning environment created by the institution
2. That mixes of faculty workloads influence the costs of producing the learning environment. [24:13]

Faculty time studies, therefore, have been generally viewed as tools to investigate the impact of faculty activity on both the quality and cost of education. Perceived in this light, the data obtained from such studies may be used, in conjunction with evaluations of other institutional resources, to support various administrative decisions.

Romney [24], for example, suggests that activity analysis is a necessary ingredient to the management functions of long-range planning, program review and evaluation, budgeting, and resource utilization analysis. Cannell [3], Stecklein [29], and Hauck [11] agree that activities data may be effectively used to evaluate the appropriateness of faculty assignments. Hill [13], however, perceives activity analysis as a means to identify problems of individual and/or organizational morale.

Doi [7] even suggests that data obtained from such analyses can serve to stimulate the development of more efficient instructional techniques.

Perhaps the most significant result of the analysis of activity patterns has been the development of a more comprehensive understanding of the various components of faculty workload. Traditional measures, such as credit-hours, contact-hours, and student credit-hours have been proven unreliable as single indicators of instructional load. The evaluation of activities data has suggested the need to consider other variables which significantly effect the workload of a faculty member. Sheets [27], for example, identifies nine components of instructional load including: (1) type of class, (2) number of students in class, (3) number of classes per day, (4) arrangement of hours within the day, (5) experience of the faculty member, (6) number of different preparations, (7) amount of clerical assistance available, (8) professional improvement required, and (9) number of non-teaching assignments. More comprehensive listings, including non-instructional load components, may be found in Miller [19] and Isaacs [15].

In addition to identifying the components of load, analyses of activities data has also suggested the existence of quantitative relationships between these various components. Further analysis of these relationships has resulted in the development of mathematical models describing faculty workload. Examples of these models (or workload formulae) may be found in Hauck [11], Hill [13], Sheets [27], and Ratzmann [21].

Recent emphasis on developing systems of program planning and budgeting in higher education has encouraged researchers to explore the relationship of faculty activity to institutional program objectives.

The University of California at Berkeley [35], for example, surveyed its faculty to determine the amount of effort being allocated to support various institutional objectives. In addition to providing information on the amount of time being spent in different types of activities, faculty were asked to indicate the degree to which their effort contributed to the general program areas of the institution. As a result of the survey, the researchers concluded that a single activity may contribute to, or simultaneously effect, several institutional objectives.

The complex relationship between activity and output has more recently been addressed by the National Center for Higher Education Management Systems (NCHEMS). According to Romney [24], the central objectives of the faculty activity project at NCHEMS are to describe "the relationship of faculty to the outcomes of higher education and the faculty role as it relates to the mix of resources that are combined to produce these outputs, i.e., the production function of higher education." [24:62] To describe this "production function," NCHEMS has, to date, developed instrumentation and standardized analytical procedures to assist institutions in defining the effect of faculty resources upon the achievement of institutional objectives [18].

The scope of activity analysis has thus evolved from a singular examination of the nature of faculty responsibility into a set of analytical procedures which may be used to describe the production process of an institution. Increasing administrative acceptance and application of these techniques has, however, generated a considerable amount of controversy among academicians. Veblen [36], for example, summarizes the views of many faculty by suggesting that activities analysis and other management techniques are inconsistent with achieving academic excellence.

> Men debate on the high necessity of a businesslike organization and control of the university, its equipment, personnel, and routine... In this view, the university is conceived as a business house dealing with merchantable knowledge, placed under the governing hand of a captain of erudation, whose office is to turn the means in hand to account for the largest feasible output... (Such a university) puts a premium on mediocrity and profunctory work, and brings academic life to revolve about the office of the Keeper of the Tape and Sealing Wax. [36:76-77]

Even those who support the use of activity analysis caution against its excessive or unwise use [26]. Lawrence [17] suggests, for example, that important outputs and related activities are generally difficult to identify and near impossible to accurately measure. Activity and output analysis, therefore, may tend to denigrate the most important activities in favor of those which are easily measured. Concurring with this observation, Rourke and Brooks conclude that "excessive reliance upon quantitative criteria in any institution with purposes as intangible as education is the most foolhardy kind of administrative delusion." [25:10]

Quantification of activity may also tend to obscure questions relating to the quality of endeavor. Within a professional organization, such as a university, where personnel are the most significant resource effecting output, such questions are critical to evaluations of productivity. The importance of qualitative evaluation within a professional or "labor intensive" organization is summarized by Toombs [33]:

> (The university) is not only labor intensive but also 'quality intensive.' That is to say, the way in which education is carried out has qualities that must be preserved. How it is done, what happens between input and output, is at the heart of the matter. Earl Cheit and others have used the analogy of the symphony orchestra, also a labor intensive and quality intensive organization. The orchestra is limited in how many engagements it can play per week before its repertoire deteriorates and performance declines. It cannot play faster or louder. The number of members cannot be increased...to yield more output. In short the quality of the process itself, not just the outcome, is a part of 'production.' [33:29]

Implied in Toombs' analogy is the need to extend professional resource analyses to consider questions of quality as intrinsic to educational productivity. When, for example, does the quantity of activity begin to intrude upon the quality of the educational process? Emphasizing only those quantitative aspects of the process, activity analysis, as it is presently construed, leaves such critical questions unanswered.

The interpretation of activities data is further complicated by questions relating to the relative value of various professional activities [24]. Are, for example, teaching activities more "valuable" to the institution than those activities associated with research or public service? Or, is a faculty member who reports fifty hours of professional activity each week more valuable to the organization than one reporting forty hours? To answer these and other evaluative questions, it is essential to relate specific activity measures to the valued goals and objectives of the institution (i.e., the priority structure) [17]. Without this relationship, activity measurement may become no more than a meaningless exercise.

Summary

As was stated earlier, the central purpose of this study is to extend the scope of activity analysis as a means to identify priorities within academic organizations. This chapter was intended to provide background for the study by examining: (1) various analytical techniques used to identify and measure perceptions of organizational priorities, and (2) the current "state of the art" of faculty activity analysis in higher education. As a result of this review, a number of observations relating to the need for this study were made:

1. Most empirical attempts to identify and measure perceptions of organizational priorities have focused primarily on institutional goals. Assuming that all organizational activity is goal directed, these studies have approached the problem of priority assessment through evaluating various perceptions of institutional goals.
2. A careful review of these goal studies reveals three significant limitations which tend to limit their usefulness. First, the process of defining goals often results in overgeneralization and misconception. Secondly, the designs of most goal studies fail to recognize the constraint of finite organizational resources and thus is not consistent with realistic processes of determining institutional priorities. Finally, it is difficult to translate perceptions of a goal's "importance" into a quantitative measure of the resources needed for its achievement.
3. Recognizing these limitations, it was concluded that a realistic assessment of institutional priorities must, of necessity, include an evaluation of perceptions and attitudes toward the distribution of professional resources.
4. Evaluations of professional resources in higher education have, however, been limited to the identification and measurement of actual activity patterns. The application of these techniques to priority assessment requires that the traditional scope of their inquiry be expanded to include a qualitative consideration of valued or preferred activity patterns.

CHAPTER III

DESIGN OF THE STUDY

Introduction

The central objective of this study, as presented in Chapter I, is to compare actual and preferred patterns of faculty activity at both an individual and organizational level. This chapter provides more detailed descriptions of the population to be studied, the instrumentation, procedures employed in collecting data, and the statistical techniques used in the analysis.

Population

The sample for the study consists of all faculty associated with the College of Engineering at Michigan State University. Members of the administrative staff, including the dean, assistant deans, director of research, department chairmen, and academic advisors are not represented in the sample. In order to employ the parametric statistical design, described later in this chapter, it is assumed that the sample has been perfectly drawn from a theoretical population which displays all of the characteristics of the sample.

The rationale for this assumption is provided by Cornfield and Tukey [5] who suggest that selection techniques, no matter how precise, never produce samples which exactly reflect the characteristics of an actual population. The Cornfield-Tukey argument concludes that a true population may only be defined in terms of the unique characteristics

of the sample. Thus, the user of research is obligated to determine the extent to which results may be generalized.

Instrumentation

As was mentioned in Chapter I, the College of Engineering has, for a number of years, collected data on faculty activity to support various management functions. Much of this information has been obtained through the use of a questionaire (see Appendix A) which is routinely administered to the faculty each year. Though constructed to meet the unique needs of the College, the questionaire, or Annual Report, has been widely used as a model for data collection in the area of faculty resource analysis [8:194-206]. In order to meet the objectives of the study, an addendum to the Annual Report, namely the Faculty Effort Form (see Appendix A), was revised in consultation with the college administration and representatives of the faculty.

Description of the Annual Report

Essentially, the Annual Report is designed to obtain detailed descriptions of individual activity performed in support of the five major program areas of the College. Each of the program areas is defined in terms of component activities within the form as follows:

Instruction: includes all effort dedicated to the teaching of students, whether the teaching effort is formal or informal. It is distributed into the following categories: (a) regular on campus classroom teaching, (b) off-campus programs administered by the university involving instruction for credit, (c) off-campus programs administered by the university, but not for credit, (d) advising, (e) thesis direction, and (f) related developmental activities.

Research and Scholarly Activity: consists of all effort dedicated primarily to the discovery and application of new knowledge. Excluded are any activities for which the major purpose is the training of students or the improvement of instruction, both of which should be accounted for under "Instruction." Consulting or other activity for which individuals receive more than token payment from an outside source is also excluded.

Public Service: is comprised of the following activities: preparation of information bulletins; contacts with professional organizations (offices held, committee assignments, etc.); editor of a professional publication; directorship or planning chairmanship of conferences; participation in conferences; seminars, colloquia; radio and TV presentations; talks or papers before service clubs and high schools; community service and activities; public relations work with outside agencies or institutions for courtesy and good will; campus visitor programs; student society or fraternal organization advising.

Committee and Administrative Services: consists of all effort devoted to managerial and supervisory tasks (except course supervision) performed for the department, college, or university as a whole but supported by the department.

Professional Development: includes any personal accomplishments designed to maintain and improve one's general professional competence. Such activities include scholarships, fellowships, grants, leaves, travel, special summer programs and activities, added degrees, honoring awards or memberships granted.

After reviewing the definitions above, faculty members are asked to respond to a series of questions concerning individual activities

performed in each of the five program areas. With few exceptions, the questions are structured to elicit responses which describe performance in terms of selected measures which approximate the productivity or output achieved in a given activity area. In describing an instructional program activity such as teaching, for example, the faculty member is asked to list the number of student credit hours resulting from his or her teaching rather than simply indicating courses or subjects taught. Other examples of output approximations employed in the Annual Report are illustrated in Table 3.1.

It should be noted that each output approximation is either directly expressed or may be converted to a quantitative representation of productivity. Results obtained from an individual faculty member's report may, therefore, be equated and combined with the reports of other faculty to obtain an approximation of group or organizational productivity. Such information, combined with other data may also serve as a fundamental component in analyses of productivity within the organization.

Description of the Faculty Effort Form

As indicated above, the Annual Report is designed to provide information regarding the character and amount of productivity achieved in college program areas. Attached to the Annual Report (see Appendix A, Annual Report pp. 12-13) is a Faculty Effort Form. This form is structured to obtain estimates of the amount of time an individual faculty member devotes to various activities associated with the five program areas.

Essentially, the Faculty Effort Form consists of a listing of eighteen key words or statements which represent specific activities

TABLE 3.1 -- Examples of Program Output Approximations Used in the College of Engineering Annual Report of Individual Faculty Activities

Program	Output Approximations
Instruction	Undergraduate Student Credit Hours Graduate Student Credit Hours Off-Campus Undergraduate Student Credit Hours Non-Credit Course Enrollment Number of Undergraduate Advisees Number of Graduate Advisees Number of Graduate Committees Number of Theses Completed Number of New Courses Developed Number of Instructional Techniques Employed
Research and Scholarship	Research Projects Directed Amount of Outside Research Funding Received Proposals Completed Gifts and Grants Received Publications Completed
Public Service	Contacts with Professional Societies Contacts with Service or Community Organizations Contacts with Governmental Agencies Contacts with Student Organizations
Committees and Administrative Service	Programs Organized or Administered Committee Assignments
Professional Development	Scholarships and/or Fellowships Received Conferences or Workshops Attended Advanced Degrees Completed Travel

associated with a faculty appointment in the College of Engineering. Each of the activity statements appears on the form under the program category to which it corresponds. After completing and carefully reviewing responses to the Annual Report, faculty members are instructed to complete the Faculty Effort Form by providing estimates of the percentage of time devoted to each of the listed activities. The resultant percentage distribution describes a pattern which illustrates the relative amount of individual activity performed in each program over a calendar year. Since faculty members may be viewed as organizational resources, the patterns of individual activity obtained from the form may be combined to represent an estimate of how faculty resources are allocated in support of college programs.

Description of the Revised Effort Form

Viewed as a single instrument, the Annual Report and the Faculty Effort Form provide useful information regarding both the distribution of faculty activity over college programs and the results or effects of this activity defined in terms of quantitative approximations of productivity. The scope of the information derived from the instrument, however, is limited to descriptions of actual individual activity. In order to meet the objectives of this study, it was necessary to either design a new instrument or extend the scope of the Annual Report and Faculty Effort Form to include additional measures of activity. To maintain consistency with data collection procedures already existing in the college and at the suggestion of the college administration, the latter course was chosen.

After a thorough examination of the structure of both the Annual Report and the Faculty Effort Form, it was concluded that the data

essential to the study could be obtained through a careful revision of the Faculty Effort Form. A copy of the revised Effort Form used in the study is presented in Appendix B.

The revised Effort Form is designed to estimate actual, perceived, and preferred activity patterns of individual and groups of faculty within the College of Engineering. More specifically, it provides subject faculty members with a listing of thirty statements representing categories of faculty activity. Each of the categories is constructed to relate specifically to the various programs associated with the central goals of the college (e.g., instruction, research and scholarship, public service, committee and administrative service, and professional development). A listing of the activity categories and program areas is presented in Table 3.2. Following the suggestion of Richardson [23:108-114], the instructional program area, which normally receives the largest proportion of faculty resources within an academic organization, is divided into six sub-program areas to achieve greater clarity in results.

In reviewing Table 3.2, it is obvious that other groupings of activities with programs are possible. Indeed, other activity and program categories may logically be defined. The functional activity and program relationships, as defined in the revised Effort Form, are those which are commonly used in the College of Engineering. They also appear in the Annual Report. Since the revised Effort Form was designed to be included as an addendum to the Annual Report, it was decided to specify program and activity relationships as they appear in that document.

After reviewing the categories of activity, subjects are asked to provide estimates of the following:

TABLE 3.2 -- Program Areas and Activity Categories as Defined in the Revised Effort Form

Program/Sub-Program		Activity Category Item
Instruction		
On-Campus Teaching	1.	Teaching undergraduate courses designed for college majors
	2.	Teaching undergraduate courses designed for non-college majors
	3.	Teaching 800-900 level courses designed for college majors
	4.	Teaching 800-900 level courses designed for non-college majors
Off-Campus Teaching	5.	Teaching off-campus undergraduate courses
	6.	Teaching off-campus graduate courses
Other Off-Campus or Evening College Programs	7.	Teaching non-credit courses
Academic Advising	8.	Formal and informal undergraduate advising
	9.	Formal and informal graduate advising (including Ph. D. committee activity)
Thesis Direction	10.	Directing M. S. Theses
	11.	Directing Ph. D. Theses
Associated Instructional Activities	12.	Developing new courses for majors
	13.	Developing new courses for non-majors
	14.	Implementing new teaching-learning techniques
	15.	Evaluating existing courses within the curriculum
	16.	Other related activity

Table 3.2 (Continued)

Program/Sub-Program		Activity Category Item
Research and Scholarship	17.	Conducting research supported by Department
	18.	Conducting research supported by Division of Engineering Research
	19.	Conducting research supported by Off-Campus Agency
	20.	Developing research proposals supported by Department
	21.	Developing research proposals supported by Division of Engineering Research
	22.	Attraction of other gifts and grants
	23.	Preparation or editing of manuscripts, papers and/or articles
Public Service	24.	Professional participation in community and/or professional organizations
Committee and Administrative Service	25.	Participation in Departmental committees
	26.	Participation in College committees
	27.	Participation in University committees
	28.	Management and/or supervisory activities
Professional Development	29.	Improvement of general professional competence including scholarships, fellowships, grants, leaves, travel, special summer programs, personal study, etc.

1. Actual Individual Activity: how an individual faculty member divides his or her effort between the various categories of responsibility
2. Preferred Individual Activity: how the faculty member would ideally divide his or her effort between listed categories of activity
3. Perceived Organizational (College) Activity: the faculty member's perception of how the college divides total faculty effort among the various activities
4. Preferred Organizational (College) Activity: the faculty member's opinion as to how the college should divide total faculty effort between the categories

Estimates are expressed in percentage of effort devoted to each of the thirty categories of activity (with the total effort in a single activity pattern to equal 100%). The use of percentage effort as an expression of activity is consistent with the assumption that all organizational resources, including faculty resources, are finite in nature. This assumption is particularly important to any realistic assessment of priorities as it forces the assessor to consider the value of an organizational activity in terms of all other activities. The instrument, therefore, is designed to simulate the process of priority assessment by requiring the faculty respondent to consider the trade-offs between the stated categories of activity.

As was mentioned earlier, the revised Effort Form is designed to be used with the Annual Report of faculty activities. Before responding to the Effort Form, the faculty member is asked to review his or her responses to the Annual Report. Since the report provides relatively

complete descriptions of each college activity category, the review process is suggested to provide more precise definitions of the activity statements appearing on the revised Effort Form.

Pretesting the Revised Effort Form

Since the Faculty Effort Form used in this study represented a significant departure from previously used activity analysis instruments, it was considered necessary to conduct a pretest to strengthen the construct validity of the instrument. The pretesting consisted of two distinct phases.

First, a draft of the instrument along with a general description of the purposes of the study were presented in meetings of both the Administrative (Department Chairmen's) Group and Advisory (Elected Faculty) Council of the College. In addition to obtaining approval to conduct the study, suggestions regarding the construction of items on the form were received. Following these meetings, the dean and department chairmen were contacted on an individual basis. As a result of these meetings and later interviews, a number of changes were incorporated in the draft instrument.

The second phase of the pretest involved administering the draft instrument to a sample of five faculty members consisting of one full professor, two associate professors, one assistant professor, and one specialist. The faculty members were asked to complete the Effort Form noting any questions or difficulties they encountered on a separate sheet. After completing the form, four of the five faculty members were interviewed regarding their reactions to the form. The fifth, who was unable to schedule a personal interview, was contacted by phone to discuss his reaction.

The interviews were structured to concentrate on the construct validity of the instrument. A system of random probing was used to assist in revising the activity statements. Each individual was asked to relate his perception of the activity represented in a given item to determine whether the item was conveying the precise definition intended. Individuals were also asked to explain differences in their responses to the four activity patterns (actual, preferred, perceived organizational, and preferred organizational activity) for selected activity categories. This was done to determine whether the activity pattern descriptions were initiating intended response patterns. From the information obtained, minor changes were made in several activity pattern descriptions, and the general directions for the form. The size of the pre-test sample (which was dictated by the small size of the population) and the nature of the instrument precluded any a priori test for statistical reliability.

Data Collection Procedures

Approval to conduct the study was obtained from the Dean of the College, the Administrative or Department Chairman's Group, and the College Advisory Council (an advisory group consisting of elected faculty representatives from each department). In approving the study, the latter group expressed concern regarding the confidentiality of certain information obtained through the revised Effort Form (namely data on preferred activity patterns). Their concerns were magnified by the fact that the revised Effort Form was proposed as an addendum to the Annual Report which is used in management and personnel decisions within the College. In light of this concern, the following procedures were used in collecting the data:

1. The revised Effort Form was attached to the Annual Report Form and copies were distributed to the faculty on December 27, 1973. Following standard procedures used in the College, all faculty were required to complete an Annual Report Form and Column A (see Appendix C) of the Effort Form. The remaining columns on the form were noted as optional.
2. Faculty members were asked to return completed Annual Reports and Effort Forms to their respective departmental secretaries on or before January 15, 1974.
3. The departmental secretaries were instructed to forward a reproduction of the entire Effort Form, without names directly to the author. A reproduction of Column A in the Effort Form was attached to the Annual Report and forwarded to the department chairman and dean for normal processing. Original copies of the Effort Form were returned to the faculty.
4. The follow-up of non-respondents was made through the departmental secretaries.

The response rates resulting from this procedure are presented in Table 3.3. As indicated in the table, the total number of Effort Forms received was extremely high (97.7%). This was expected, however, since completion of the actual activity pattern (Column A on the Effort Form) was required as part of the Annual Report. A total of 16 faculty members, representing 17.7% of the sample, chose not to complete the Effort Form beyond Column A. It should be noted, however, that 8 of the 16 non-participating respondents did complete Column B

(Preferred Individual Activity) but did not wish to respond to the organizational activity scales. Two forms or 2.2% of the sample were judged to be unusable. A total of 70 responses, or 77.7% of the sample, were included in the analysis.

TABLE 3.3 -- Summary of Faculty Response

	Number	Percentage of Sample
Total Sample	90	100.0
Total Responses Received	88	97.7
Total Non-Respondents	2	2.2
Non-Participating Respondents	16	17.7
Unusable Responses	2	2.2
Usable Responses (Total N in the Analysis)	70	77.7

Treatment of the Data

Objectives and Hypotheses

As was indicated in Chapter I, the study is designed to meet the following six central objectives:

1. to determine whether differences exist between actual individual and preferred individual effort in each activity category
2. to determine whether differences exist between perceived organizational and preferred organizational effort in each activity category
3. to determine whether differences exist between actual individual and perceived organizational effort in each activity category

4. to determine whether differences exist between actual individual and preferred organizational effort in each activity category
5. to determine whether differences exist between preferred individual and perceived organizational effort in each of the activity categories
6. to determine whether differences exist between preferred individual and preferred organizational effort in each of the activity categories.

In the subsequent analysis of the data, each of the above objectives is redefined as a series of hypotheses representing the various activity categories used in the study. Thus, objective one, which is directed at determining differences between actual individual and preferred individual effort, is achieved by testing the following symbolic hypotheses:

Objective 1

$$H_{O_1} : M_{E_1} : A_1 = M_{E_2} : A_1$$
$$H_{O_2} : M_{E_1} : A_2 = M_{E_2} : A_2$$
$$H_{O_3} : M_{E_1} : A_3 = M_{E_2} : A_3$$
$$\vdots$$
$$H_{O_N} : M_{E_1} : A_N = M_{E_2} : A_N$$

where: M = mean

E_1 = actual individual activity

E_2 = preferred individual activity

A_1 = first activity category

N = number of activity categories considered in the study.

Since the study is exploratory in nature, the hypotheses generated in support of the objectives are stated in the null form.

Analysis of the Data

A univariate analysis of repeated measures design is used to test the hypotheses. Originally developed to compare individual scores on a single test over time, the ANOVA of repeated measures or split-plot design is commonly used in comparisons of individual or group results on similar, though independent, measures [16:245]. Since this study seeks to compare four related though independent measures (actual individual, preferred individual, perceived organizational, and preferred organizational effort), the design provides an appropriate means to describe significant differences between the variables in question.

Three major assumptions, however, must be met in justifying the use of the analysis: (1) there is a normal distribution of errors or scores within the population, (2) there is an equal error variance for all treatment groups, and (3) there is a statistical independence between the error components [12:440].

The ANOVA of repeated measures technique is generally considered robust to violations of normality and error variance equality. Recognizing, however, that an activity analysis is likely to generate raw error components which drastically violate these assumptions, responses were transformed to standard scores prior to the analysis. Justification for the systematic transformation of scores in univariate designs is provided by Kirk [16:63-67].

The third assumption of the analysis, that of statistical independence, is also likely to cause inferential error if drastically violated. Obviously, tests which employ repeated measures on the same subject

are immediately suspect with respect to this assumption. The suspicion is compounded if the study requires dependency in response (i.e., where responses to one item determine responses to all others). Recognizing that this weakness is inherent in all split-plot designs and particularly apparent in this study, two counter measures were employed. First, the Geisser-Greenhouse conservative F test was used in the analysis. This test increases the resistance of the design to violations of the third assumption [16:142-143, 262]. Secondly, to reduce response dependence, the following six items appearing on the Effort Form were deleted prior to the analysis:

5. Teaching off-campus undergraduate courses
7. Teaching non-credit courses
8. Formal and informal undergraduate advising
16. Other related activity
22. Attraction of other gifts and grants
30. Other assignments (Computer Laboratory, department outside College).

The selection of items to be deleted was based on a lack of specificity in content and/or lack of actual faculty activity in the described area. The latter was determined through a review of Annual Reports completed during the previous year.

After meeting the above assumptions, the analysis was completed in three steps. The first step consisted of generating an over-all F test to determine whether significant interaction existed between the various activity areas and the four response patterns (actual individual, preferred individual, perceived organizational, and preferred organizational effort). An alpha level of .05 was established. Given the

existence of significant interaction, a second step, consisting of an examination of simple main effects, was planned. This test, described by Kirk [16:263-266], was employed to determine whether differences exist between the four response patterns in each of the activity areas. Since the experimental alpha is additive over the twenty-six activity area tests, a level of significance of .05/26 or .002 was established. The third and final step of the analysis involved a post hoc examination to determine the source of any differences discovered between the four response patterns. The Tukey method for post hoc comparisons discussed by Hayes [12:484] was employed. Results of the comparisons are organized in Chapter IV around the six objectives of the study.

Summary

A brief description of the sample used in the study was presented in this chapter. Also included were discussions of the development of the instrument and the procedures employed in collecting the data. Finally, the statistical design selected for the study was identified and described.

CHAPTER IV

ANALYSIS OF DATA

Introduction

This chapter is devoted to the presentation and analysis of the data which were collected to achieve the objectives of the study. The format of the chapter consists of: (1) a re-statement of the objectives and study hypotheses, (2) a brief review of the procedural and statistical design, and (3) a report and analysis of the data.

Statement of Objectives

Four variables were identified in Chapter I as being central to the purpose of this study. These include: (1) actual individual effort, (2) preferred individual effort, (3) perceived organizational effort, and (4) preferred organizational effort. An instrument was developed and administered to the faculty of the College of Engineering at Michigan State University to obtain estimates of these variables for thirty program-related activities. The subsequent analysis of this data was directed at achieving the following six objectives:

1. to determine whether differences exist between actual individual and preferred individual effort in each activity category
2. to determine whether differences exist between perceived organizational and preferred organizational effort in each activity category

3. to determine whether differences exist between actual individual and perceived organizational effort in each activity category
4. to determine whether differences exist between actual individual and preferred organizational effort in each activity category
5. to determine whether differences exist between preferred individual and perceived organizational effort in each of the activity categories
6. to determine whether differences exist between preferred individual and preferred organizational effort in each of the activity categories.

A series of null hypotheses representing the various activity categories was established for each of the objectives stated above.

Review of Design and General Findings

An analysis of variance of repeated measures or split-plot design was employed to test the hypotheses generated in support of the objectives of the study. In order to meet the theoretical assumptions of the design, three precautions were taken in preparation for the analysis. First, to insure independence of response, six of the thirty activity category items appearing on the instrument were excluded from the analysis. Secondly, since unequal error variance was expected, individual raw scores were transformed into standard scores. Finally, a conservative decision model (Geisser-Greenhouse F statistic) was chosen to overcome possible violations of statistical independence of response.

The analysis was accomplished in three distinct phases. The first phase consisted of testing for main and interaction effects. Table 4.1 summarizes the results of this procedure. Using a conservative F statistic, significant differences at the .05 level were found between the four effort measures.

TABLE 4.1 -- Summary of Analysis of Variance on Subjects, Activity Areas, and Effort Measures

Source	SS	df	MS	F
Subjects	150.655	69	2.183	
Effort Measures	226.937	3	75.465	163.028*
Activity Categories	569.359	23	24.754	10.383*
Subjects x Measure	96.060	207	.464	
Subjects x Categories	3783.565	1587	2.384	3.989*
Measures x Categories	151.677	69	2.198	
Subjects x Measures x Categories	2624.345	4761	.551	

*Significant at the .05 level using the Geisser-Greenhouse Conservative F statistic

Significant differences were also found to exist between the twenty-four activity categories. The third main effect, "subjects," could not be tested as no error terms were available to generate an appropriate F statistic.

Obviously, the differences existing between levels of a main effect are confounded by any significant interaction which may exist between it and other main effects. Since a significant interaction effect was

discovered between effort measures within activity categories, no conclusions could be drawn from this phase of the analysis.

Phase two of the design consisted of examining significant interaction through an analysis of simple interaction effects. As was indicated above, significance at the .05 level was found for the interaction effect of measures within activity categories. In other words, the differences between the four effort measures did not consistently appear in every activity category. The analysis of simple interaction effects was employed to compare the four measures within each of the activity categories. Since the simple effects ANOVA examined the sources of significant interaction found at the .05 level, an alpha equivalent to .05 divided by the number of activity categories (24) or .002 was established for the analysis.

The results of the ANOVA of simple interaction effects are presented in Table 4.2. Significant differences between effort measures were found in seventeen of the twenty-four activity categories. No differences were discovered between effort measures in seven of the categories including (1) M.S. thesis advising, (2) service course development, (3) departmental research, (4) sponsored research, (5) publications, (6) public service, and (7) professional development.

The third and final phase of the analysis was directed at examining the source of the differences between effort measures which were found to exist in seventeen of the activity categories. This was accomplished through an a posteriori comparison of effort measure means appearing in the seventeen categories. A Tukey post hoc procedure was employed in making the pairwise comparisons. The results of this phase of the analysis are presented in the following section.

TABLE 4.2 -- Summary of Analysis of Variance of Simple Main Effects of Effort Measures by Activity Area

Source	SS	df	MS	F
Subjects	150.655	69	2.183	
Effort Measures	226.937	3	75.465	163.028*
Activity Areas	569.359	23	24.754	10.383*
Subjects x Measures	96.060	207	.464	
Subjects x Area	3783.565	1587	2.384	
Measures x Area:				
Undergrad Inst. Major	58.152	3	19.384	35.372**
Undergrad Inst. Service	8.421	3	2.806	5.120**
Grad Inst. Majors	38.345	3	12.781	23.322**
Grad Inst. Service	20.027	3	6.675	12.180**
Off-Campus Grad Inst.	37.160	3	12.386	22.602**
Grad Advising	16.749	3	5.583	10.187**
M.S. Thesis	4.981	3	1.660	3.029
Ph.D. Thesis	19.353	3	6.451	11.771**
Course Dev. Majors	19.645	3	6.548	11.948**
Course Dev. Service	2.598	3	.866	1.580
New Teaching Tech.	14.017	3	4.672	8.525**
Course Evaluation	8.793	3	2.931	5.348**
Dept. Research	1.134	3	.337	.687
College Research	25.532	3	8.510	15.529**
Sponsored Research	7.770	3	2.590	4.726
Dept. Res. Proposal Dev.	9.305	3	3.101	5.658**
College Res. Propo. Dev.	12.906	3	4.301	7.848**
Publications	1.439	3	.479	.874
Public Service	.473	3	.157	.286
Dept. Committees	12.232	3	4.077	7.439**
College Committees	15.453	3	5.151	9.399**
Univ. Committees	25.507	3	8.502	15.514**
Management	14.025	3	4.674	8.529**
Professional Dev.	4.597	3	1.532	2.795
Subjects x Areas x Measures	2624.345	4761	.551	

*Significant at the .05 level using conservative F test.

**Significant at the .002 level.

The data analysis was performed on the CDC 6500 computer system at Michigan State University. Three programs were employed in accomplishing various phases of the design: (1) the BASTAT routine to obtain raw data statistics; (2) a transformation program, written especially for this study, to convert responses into standard scores; and (3) the Jennrich program to accomplish the ANOVA and the analysis of simple interaction effects. The post hoc calculations were performed by hand.

Hypotheses Testing

As was earlier stated, twenty-four null hypotheses, representing the activity category items remaining in the design, were established for each of the six objectives of the study. The results of the testing of these hypotheses are presented below.

Objective I

To determine whether differences exist between actual individual effort and preferred individual effort in each activity category.

Symbolic statements of, and test results for, the twenty-four hypotheses generated in support of Objective I are presented in Table 4.3. Seven of the twenty-four null hypotheses were not rejected as a result of the ANOVA of simple interaction effects (described in Table 4.2) where no significant differences were found between effort measures. The Tukey post hoc analysis of the remaining seventeen activity categories also failed to describe significant differences between the combined actual individual and preferred individual effort of the engineering faculty.

TABLE 4.3 -- Tukey *Post Hoc* Comparisons of Actual Individual Effort and Preferred Individual Effort

Activity	Me_1	Me_2	$\hat{\psi}$	Ho:Me_1=Me_2
Undergrad Inst. Majors	1.198	1.207	-.009	not rejected
Undergrad Inst. Service	.459	.533	-.074	not rejected
Grad Inst. Majors	.951	1.172	-.221	not rejected
Grad Inst. Service	.220	.293	-.073	not rejected
Off-Campus Grad Inst.	.238	.221	.017	not rejected
Grad Advising	1.111	1.058	.053	not rejected
M.S. Theses	.356	.455	---	not rejected
Ph. D. Theses	.609	.840	-.231	not rejected
Course Dev. Majors	.340	.795	-.445	not rejected
Course Dev. Service	.529	.575	---	not rejected
New Teaching Tech.	.342	.329	.013	not rejected
Course Evaluation	.431	.284	.147	not rejected
Dept. Research	.559	.492	---	not rejected
College Research	.417	.468	-.051	not rejected
Sponsored Research	.585	.871	---	not rejected
Dept. Proposal Dev.	.379	.393	-.014	not rejected
College Proposal Dev.	.387	.439	-.052	not rejected
Publications	.765	.848	---	not rejected
Public Service	.463	.551	---	not rejected
Dept. Committees	1.101	.874	.227	not rejected
College Committees	.709	.745	-.036	not rejected
Univ. Committees	.511	.504	.007	not rejected
Management	.341	.219	.122	not rejected
Prof. Development	.859	.720	---	not rejected

*Significant at .002 level.

Me_1 = mean standard scores for Actual Individual Effort

Me_2 = mean standard scores for Preferred Individual Effort

$$\hat{\psi} = Me_1 - Me_2$$

Tukey test statistic for ψ at .002 *Alpha* = ±.460

Objective II

To determine whether differences exist between perceived organizational and preferred organizational activity.

This objective was established to assess faculty perceptions of actual and ideal patterns of professional resource allocation within the organization. The tests of the hypotheses generated in support of the objective are summarized in Table 4.4. The analysis of simple interaction effects and the post hoc comparisons again failed to produce significant differences between perceived and preferred organizational effort in any of the twenty-four activity categories.

Objective III

To determine whether differences exist between actual individual and perceived organizational effort in each activity category.

This third objective was directed at determining the accuracy of faculty perceptions of organizational patterns of resource allocation. As such, it compares the combined activities of individual faculty members (as a measure of actual organizational effort) with an estimate of the faculty's perception of the current pattern of professional resource allocation within the college. The results of this comparison are described in Table 4.5.

Significant differences between actual individual effort and perceived organizational effort were discovered in nine of the twenty-four activity categories. In each of these cases, the faculty perceived that more resources were being allocated than was actually the case. The largest difference occurred in the instructional program area where standard score differences of -1.018 and -.880 were found in undergraduate and graduate instruction for majors. Other instructional

TABLE 4.4 -- Tukey Post Hoc Comparisons of Perceived Organizational Effort and Preferred Organizational Effort

Activity	Me_3	Me_4	$\hat{\psi}$	Ho:Me_3=Me_4
Undergrad Inst. Majors	2.216	1.982	.234	not rejected
Undergrad Inst. Service	.806	.866	-.060	not rejected
Grad Inst. Majors	1.831	1.732	.099	not rejected
Grad Inst. Service	.687	.861	-.174	not rejected
Off-Campus Grad Inst.	.915	.997	-.082	not rejected
Grad Advising	.796	.495	.301	not rejected
M.S. Theses	.639	.683	---	not rejected
Ph.D. Theses	1.286	1.142	.144	not rejected
Course Dev. Majors	1.024	.945	.259	not rejected
Course Dev. Service	.783	.605	---	not rejected
New Teaching Tech.	.831	.721	.110	not rejected
Course Evaluation	.561	.767	-.206	not rejected
Dept. Research	.647	.640	---	not rejected
College Research	1.138	.908	.230	not rejected
Sponsored Research	1.021	.955	---	not rejected
Dept. Proposal Dev.	.792	.696	.016	not rejected
College Proposal Dev.	.864	.813	.051	not rejected
Publications	.934	.940	---	not rejected
Public Service	.441	.483	---	not rejected
Dept. Committees	1.441	1.266	.175	not rejected
College Committees	1.164	1.225	-.061	not rejected
Univ. Committees	1.130	1.091	.039	not rejected
Management	.745	.689	.056	not rejected
Prof. Development	1.017	1.035	---	not rejected

*Significant at the .002 level

Me_3 = mean standard scores for Perceived Organizational Effort

Me_4 = mean standard scores for Preferred Organizational Effort

$$\hat{\psi} = Me_3 - Me_4$$

Tukey test statistics for ψ at .002 Alpha = ±.460

TABLE 4.5 -- Tukey Post Hoc Comparisons of Actual Individual Effort and Perceived Organizational Effort

Activity	Me_1	Me_3	$\hat{\psi}$	Ho:$Me_1 = Me_3$
Undergrad Inst. Majors	1.198	2.216	-1.018*	rejected
Undergrad Inst. Service	.459	.806	-.347	not rejected
Grad Inst. Majors	.951	1.831	-.880*	rejected
Grad Inst. Service	.220	.687	-.467*	not rejected
Off-Campus Grad Inst.	.238	.915	-.667*	rejected
Grad Advising	1.111	.796	.315	not rejected
M.S. Theses	.356	.639	---	not rejected
Ph.D. Theses	.609	1.286	-.575*	rejected
Course Dev. Majors	.340	1.024	-.684*	rejected
Course Dev. Service	.529	.783	---	not rejected
New Teaching Tech.	.342	.831	-.489*	rejected
Course Evaluation	.431	.561	-.130	not rejected
Dept. Research	.559	.647	---	not rejected
College Research	.417	1.138	-.721*	rejected
Sponsored Research	.585	1.021	---	not rejected
Dept. Proposal Dev.	.379	.792	-.413	not rejected
College Proposal Dev.	.387	.864	-.477*	rejected
Publications	.765	.934	---	not rejected
Public Service	.463	.441	---	not rejected
Dept. Committees	1.101	1.441	-.340	not rejected
College Committees	.709	1.164	-.455	not rejected
Univ. Committees	.511	1.130	-.619*	rejected
Management	.341	.745	-.404	not rejected
Prof. Development	.859	1.017	---	not rejected

*Significant at the .002 level

Me_1 = mean standard scores for Actual Individual Effort

Me_3 = mean standard scores for Perceived Organizational Effort

$$\hat{\psi} = Me_1 - Me_3$$

Tukey test statistic for ψ at .002 Alpha = ±.460

program activity areas displaying significant differences were off-campus graduate instruction, Ph. D. thesis advising, course development for majors, and the development of new teaching-learning techniques. In the research program area, the faculty perceived that more resources were being expended in college sponsored research and proposal development than combined individual activity in these categories indicated. A similar difference also appeared in the administrative and committee services program area where perceptions of university committee activity were higher than the mean faculty effort reported.

It is equally, if not more important, to note that no significant differences were found in fifteen of the activity categories. Thus, the majority of null hypotheses suggesting equality between actual individual and perceived organizational effort were not rejected.

Objective IV

To determine whether differences exist between actual individual and preferred organizational effort in each category of activity.

Objective IV was established to investigate the differences between the combined individual effort of the faculty (as a measure of actual professional resource allocation in the organization) with an estimate of a perceived "ideal" pattern for allocating faculty resources. Table 4.6 summarizes the results of the comparisons made to achieve this objective.

Ten of the twenty-four null hypotheses suggesting equality between actual individual and preferred organizational effort were rejected at the .002 level. Significant differences occurred most frequently in the activity categories associated with the instructional program area.

TABLE 4.6 -- Tukey Post Hoc Comparisons of Actual Individual Effort and Preferred Organizational Effort

Activity	Me_1	Me_4	$\hat{\psi}$	Ho:$Me_1 = Me_4$
Undergrad Inst. Majors	1.198	1.982	-.784*	rejected
Undergrad Inst. Service	.459	.866	-.407	not rejected
Grad Inst. Majors	.951	1.732	-.781*	rejected
Grad Inst. Service	.220	.861	-.641*	rejected
Off-Campus Grad Inst.	.238	.997	-.759*	rejected
Grad Advising	1.111	.495	-.616*	rejected
M.S. Theses	.356	.683	---	not rejected
Ph.D. Theses	.609	1.142	-.533*	rejected
Course Dev. Majors	.340	.945	-.605*	rejected
Course Dev. Service	.529	.605	---	not rejected
New Teaching Tech.	.342	.721	-.379	not rejected
Course Evaluation	.431	.767	-.336	not rejected
Dept. Research	.559	.640	---	not rejected
College Research	.417	.908	-.491*	rejected
Sponsored Research	.585	.955	---	not rejected
Dept. Proposal Dev.	.379	.696	-.317	not rejected
College Proposal Dev.	.387	.813	-.426	not rejected
Publications	.765	.940	---	not rejected
Public Service	.463	.483	---	not rejected
Dept. Committees	1.101	1.266	-.165	not rejected
College Committees	.709	1.225	-.516*	rejected
Univ. Committees	.511	1.091	-.580*	rejected
Management	.341	.689	-.348	not rejected
Prof. Development	.859	1.035	---	not rejected

*Significant at the .002 level

Me_1 = mean standard scores for Actual Individual Effort

Me_4 = mean standard scores for Preferred Organizational Effort

$$\hat{\psi} = Me_1 - Me_4$$

Tukey test statistic for ψ at .002 Alpha = ±.460

Differences were also discovered in the categories of college supported research and committee activities at both the college and university level. In all but one case, the differences of significance suggested that perceptions of preferred organizational effort were greater than the actual effort being expended. The exception occurred in the category of graduate advising where more actual effort was observed.

Within the majority of categories, however, no significant differences were identified. Thus, a total of fourteen null hypotheses stating equality between the measures of actual individual and preferred organizational effort were not rejected.

Objective V

To determine whether differences exist between preferred individual and perceived organizational effort in each of the activity categories.

The intent of this objective was to evaluate whether the combined individual activity preferences of the faculty differed from their perception of the actual allocation of professional resources within the college. The hypotheses testing associated with this objective is presented in Table 4.7.

The null hypotheses stressing equality between preferred individual and perceived organizational effort were rejected in eight of the twenty-four activity categories. The largest significant difference found at the .002 level was in the category of undergraduate instruction for majors. Similar differences, though less pronounced, occurred in the categories of graduate instruction for majors, off-campus graduate instruction, new teaching-learning development, and college sponsored research. In the program area of committee and administrative service,

TABLE 4.7 -- Tukey Post Hoc Comparisons of Preferred Individual Effort and Perceived Organizational Effort

Activity	Me_2	Me_3	$\hat{\psi}$	Ho:Me_2=Me_3
Undergrad Inst. Majors	1.207	2.216	-1.009*	rejected
Undergrad Inst. Service	.533	.806	-.273	not rejected
Grad Inst. Majors	1.172	1.831	-.659*	rejected
Grad Inst. Service	.293	.687	-.394	not rejected
Off-Campus Grad Inst.	.221	.915	-.694*	rejected
Grad Advising	1.058	.796	-.262	not rejected
M.S. Theses	.455	.639	---	not rejected
Ph.D. Theses	.840	1.286	-.446	not rejected
Course Dev. Majors	.795	1.024	-.229	not rejected
Course Dev. Service	.575	.783	---	not rejected
New Teaching Tech.	.329	.831	-.512*	rejected
Course Evaluation	.284	.561	-.277	not rejected
Dept. Research	.492	.647	---	not rejected
College Research	.468	1.138	-.670*	rejected
Sponsored Research	.871	1.021	---	not rejected
Dept. Proposal Dev.	.393	.792	-.399	not rejected
College Proposal Dev.	.439	.864	-.425	not rejected
Publications	.848	.934	---	not rejected
Public Service	.551	.441	---	not rejected
Dept. Committees	.874	1.441	-.567*	rejected
College Committees	.745	1.164	-.419	not rejected
Univ. Committees	.504	1.130	-.626*	rejected
Management	.219	.745	-.526*	rejected
Prof. Development	.720	1.017	---	not rejected

*Significant at the .002 level

Me_2 = mean standard scores for Preferred Individual Effort

Me_3 = mean standard scores for Perceived Organizational Effort

$$\hat{\psi} = Me_2 - Me_3$$

Tukey test statistic for ψ at .002 Alpha = ±.460

three of the four activity categories listed displayed significance between the two measures. The data supporting the rejection of the eight null hypotheses further suggested that the faculty's perception of the amount of organizational effort expended was greater than the combined individual preferences for involvement in each of the eight areas.

No significant differences were found in sixteen of the activity areas. Thus, most of the null hypotheses suggesting equality between measures were not rejected.

Objective VI

To determine whether differences exist between preferred individual and preferred organizational effort in each of the activity categories.

The sixth and final objective was established to compare faculty perceptions of an ideal pattern of allocating organizational effort with an organizational effort pattern constructed from the combined individual activity preferences of the faculty. The hypotheses testing conducted to meet this objective is described in Table 4.8.

The null hypotheses suggesting equality between preferred individual and preferred organizational effort were rejected in nine of the twenty-four activity categories. Differences of significance (at the .002 level) were again observed most frequently in the instructional program area. The activity categories, within this area, displaying significant differences included undergraduate instruction for majors, graduate instruction for majors, graduate instruction for non-majors (service), off-campus graduate instruction, graduate advising, and course evaluation. In each of these cases, organizational preference was greater than the combined preferences of individual faculty members. Similar

TABLE 4.8 -- Tukey Post Hoc Comparisons of Preferred Individual Effort and Preferred Organizational Effort

Activity	Me_2	Me_4	$\hat{\psi}$	Ho:Me_2=Me_4
Undergrad Inst. Majors	1.207	1.982	-.775*	rejected
Undergrad Inst. Service	.533	.866	-.333	not rejected
Grad Inst. Majors	1.172	1.732	-.560*	rejected
Grad Inst. Service	.293	.861	-.568*	rejected
Off-Campus Grad Inst.	.221	.997	-.776*	rejected
Grad Advising	1.058	.495	-.563*	rejected
M.S. Theses	.455	.683	---	not rejected
Ph.D. Theses	.840	1.142	-.302	not rejected
Course Dev. Majors	.795	.945	-.150	not rejected
Course Dev. Service	.575	.605	---	not rejected
New Teaching Tech.	.329	.721	-.332	not rejected
Course Evaluation	.284	.767	-.483*	rejected
Dept. Research	.492	.640	---	not rejected
College Research	.468	.908	-.440	not rejected
Sponsored Research	.871	.955	---	not rejected
Dept. Proposal Dev.	.393	.696	-.303	not rejected
College Proposal Dev.	.439	.813	-.374	not rejected
Publications	.848	.940	---	not rejected
Public Service	.551	.483	---	not rejected
Dept. Committees	.874	1.266	-.392	not rejected
College Committees	.745	1.225	-.480*	rejected
Univ. Committees	.504	1.091	-.587*	rejected
Management	.219	.689	-.470*	rejected
Prof. Development	.720	1.035	---	not rejected

*Significant at the .002 level.

Me_2 = mean standard scores for Preferred Individual Effort

Me_4 = mean standard scores for Preferred Organizational Effort

$$\hat{\psi} = Me_2 - Me_4$$

Tukey test statistic for ψ at .002 Alpha = ±.460

differences of significance and direction were observed in three of the four categories associated with the committee and administrative service program area. These included the categories of college committee management and university committee activity.

Once again, the analysis failed to reject the null hypotheses established for fifteen of the activity categories. Thus, in most categories, the analysis tended to support the assumption of equality between the two measures.

Summary

The central purpose of this study was to compare faculty estimates of actual individual, preferred individual, perceived organizationa, and preferred organizational effort within twenty-four program related activity categories. The estimates were obtained using an instrument which forced respondents to consider the "relative importance" of each of the twenty-four activity categories.

In order to fulfill the purpose of the study, six central objectives, directed at comparing various combinations of the four effort measures, were identified. To facilitate the analysis, each objective was redefined as twenty-four null hypotheses representing the activity categories were identified for the study.

A three-phase ANOVA of repeated measures design was employed to test the hypotheses. To meet the various assumptions of this design, extremely conservative procedures and decision models were used throughout the analysis. Phase one of the analysis, consisting of an overall ANOVA of main and interaction effects, yielded significant differences (.05 level) for the main effects of "activity areas" and "effort measures." More important, however, was the discovery of significant interaction between effort measures within activity categories.

Given the significant interaction effect, phase two of the analysis, consisting of testing simple interaction of measures within single activity categories was initiated. The results of the ANOVA of simple effects yielded significant differences (Alpha = .05/24 or .002) between effort measures within seventeen activity categories.

Phase three of the analysis consisted of testing the sources of difference found within each of the seventeen activity categories. This was accomplished using a series of Tukey post hoc comparisons. The results of these comparisons were organized to test the various hypotheses associated with the objectives of the study. A summary of the hypotheses testing is provided in Table 4.9.

TABLE 4.9 -- Summary of Hypotheses Testing
(X = Reject, O = Do Not Reject)

Activity	Objective I H_o:Me_1=Me_2	Objective II H_o:Me_3=Me_4	Objective III H_o:Me_1=Me_3	Objective IV H_o:Me_1=Me_4	Objective V H_o:Me_2=Me_3	Objective VI H_o:Me_2=Me_4
Undergrad Inst. Majors	O	O	X	X	X	X
Undergrad Inst. Service	O	O	O	O	O	O
Grad Inst. Majors	O	O	X	X	X	X
Grad Inst. Service	O	O	X	X	O	X
Off-Campus Grad Inst.	O	O	X	X	X	X
Grad Advising	O	O	O	X	O	X
M.S. Theses	O	O	O	O	O	O
Ph.D. Theses	O	O	X	X	O	O
Course Dev. Majors	O	O	X	X	O	O
Course Dev. Service	O	O	O	O	O	O
New Teaching Tech.	O	O	X	O	X	O
Course Evaluation	O	O	O	O	O	X
Dept. Research	O	O	O	O	O	O
College Research	O	O	X	X	X	O
Sponsored Research	O	O	O	O	O	O
Dept. Proposal Dev.	O	O	O	O	O	O
College Proposal Dev.	O	O	X	O	O	O
Publications	O	O	O	O	O	O
Public Service	O	O	O	O	O	O
Dept. Committees	O	O	O	O	X	O
College Committees	O	O	O	X	O	X
Univ. Committees	O	O	X	X	X	X
Management	O	O	O	O	X	X
Prof. Development	O	O	O	O	O	O

CHAPTER V

SUMMARY AND CONCLUSIONS

Need and Purpose

Increasing demands for educational and fiscal accountability have, in recent years, emphasized the need to critically evaluate program priorities within higher education. Fundamental to this evaluative process is the problem of developing effective means to assess the disposition of faculty toward various institutional programs. Since a program may be generally defined as an organized set of activities designed to achieve predetermined goals, it appears reasonable to approach this problem from the perspective of institutional goals (through goal preference assessment) or through careful analyses of attitudes toward organizational activities.

Considering the problems associated with the interpretation of goal preference assessment, this study was predicated on the need to further explore activity analysis as a means to identify faculty perceptions of institutional programs. The central purpose of the study was to compare actual and preferred patterns of faculty effort within an academic organization. The population consisted of all faculty members associated with the College of Engineering at Michigan State University. Members of the administrative and student services staff were excluded from the study. An instrument defining thirty categories of program-related activity was developed and distributed to the sample. Respondents were asked to provide estimates of the following:

1. Actual Individual Effort: a percentage distribution describing how the faculty member divides his or her time between the thirty categories of activity
2. Preferred Individual Effort: a percentage distribution describing how the faculty member would ideally divide his or her time between the categories of activity
3. Perceived Organizational Effort: a percentage distribution describing the faculty member's perception of how the college divides total faculty time between the various activities
4. Preferred Organizational Effort: a percentage distribution describing the faculty member's perception of how the college should divide faculty time between the various activities.

Percentage distributions were employed in each of the four measures to achieve an understanding of the "relative value" of each activity. Since percentage distribution forces relative response patterns, by assuming finite resource availability, the procedure roughly simulates the process of priority assessment which naturally occurs within an organization.

Using the data collected, statistical comparisons were made to determine whether differences existed between actual and preferred effort at both individual and organizational levels.

Objectives

Since the study was exploratory in nature, no experimental or directional hypotheses were established. The study was, however, organized to achieve the following six objectives:

1. to determine whether differences exist between actual individual and preferred individual effort in each of the activity categories,
2. to determine whether differences exist between perceived organizational and preferred organizational effort in each activity category,
3. to determine whether differences exist between actual individual and perceived organizational effort in each activity category,
4. to determine whether differences exist between actual individual and preferred organizational effort in each activity category,
5. to determine whether differences exist between preferred individual and perceived organizational effort in each activity category,
6. to determine whether differences exist between preferred individual and preferred organizational effort in each activity category.

Twenty-four null hypotheses, representing the activity categories included in the study, were generated in support of each of the above objectives.

Design

An analysis of variance of repeated measures design was employed to test the hypotheses. To meet the theoretical assumptions associated with this design, the following precautions were taken. First, to insure independence of response, six of the thirty activity category items were deleted from the analysis. Secondly, individual raw scores were

transformed to standard scores to avoid error associated with unequal population variance. Finally, a conservative decision model, the Geisser-Greenhouse F test, was employed to overcome problems of statistical independence among measures.

The analysis was conducted in three distinct phases. First, an overall ANOVA of repeated measures was performed to test main and interaction effects. Significant differences at the .05 level were found to exist between the main effects of activity categories and effort measures. The interaction of effort measures within activity categories was also found to be significant at the .05 level.

Given significant interaction between effort measures within activity categories, phase two of the analysis was initiated. This phase consisted of determining whether differences existed between effort measures within specific activity categories. Tests were performed using an ANOVA of simple interaction effects which generated F statistics for effort measures within each of the twenty-four activity categories. As a result of this procedure, significant differences at the .05/24 or .002 level were found in seventeen of the twenty-four activity categories.

The third and final phase of the analysis consisted of determining the sources of the differences between effort measures within the seventeen significant activity categories. Paired comparisons were made using the conservative Tukey post hoc procedure. The results of this analysis served to test the hypotheses generated in support of the objectives of the study.

Findings

The results of the hypothesis testing are summarized as follows:

Objective I: None of the twenty-four null hypotheses generated in support of this objective was rejected. Thus, as a result of this study, no differences were found to exist between actual individual and preferred individual effort within the program-related activity categories.

Objective II: Similar results were found in the comparison of perceived and preferred organizational effort. Again, the analysis failed to reject the twenty-four null hypotheses associated with this objective.

Objective III: This objective was established to compare estimates of actual individual effort with perceptions of organizational effort in program-related activity categories. As a result of the analysis, significant differences were found in the following activity categories: (1) undergraduate instruction for majors, (2) graduate instruction for majors, (3) graduate instruction for non-majors (service), (4) off-campus graduate instruction, (5) Ph. D. thesis direction, (6) course development for majors, (7) developing new teaching techniques, (8) college supported research, (9) college supported research proposal development, and (10) university committee work. In each case the faculty appeared to perceive the college expending more effort than was indicated by the combined statements of individual effort.

Objective IV: In comparing actual individual with preferred organizational effort, significant differences were found to exist primarily in the activity categories associated with the instructional program area. These included: (1) undergraduate instruction for majors, (2) graduate instruction for majors, (3) graduate instruction for non-majors, (4) off-campus graduate instruction, (5) graduate student advising, (6) Ph. D. thesis direction, and (7) course development for majors. Null hypotheses were also rejected in the categories of college supported research and committee activity at both the college and university levels. With the

exception of the graduate advising category, faculty preferences for the allocation of effort were higher than the current pattern of allocation as measured by the combined estimates of individual effort.

Objective V: Differences between preferred individual and perceived organizational effort were found to be significant in only eight of the twenty-four activity categories. These included: (1) undergraduate instruction for majors, (2) graduate instruction for majors, (3) off-campus graduate instruction, (4) developing new teaching-learning techniques, (5) college supported research, (6) department committee work, (7) university committee work, and (8) management. The data supporting the rejection of these null-hypotheses further suggests that perceptions of the amount of organizational effort expended in these categories is greater than the combined effort preferences of individual faculty.

Objective VI: The sixth and final objective was established to compare faculty perceptions of an ideal or preferred pattern of allocating organizational resources with the combined individual effort preferences of the faculty. Of the twenty-four null hypotheses generated to achieve this objective, only nine were rejected. Significant differences between preferred individual and preferred organizational effort were found in the categories of: (1) undergraduate instruction for majors, (2) graduate instruction for majors, (3) graduate instruction for non-majors, (4) off-campus graduate instruction, (5) graduate student advising, (6) course evaluation, (7) college committee work, (8) university committee work, and (9) management.

Conclusions

The evaluation of faculty attitudes toward institutional programs is a problem which has attracted considerable attention in recent years.

For the most part, researchers have approached this problem indirectly from the perspective of organizational goals assessment. Predicated on the assumption that organizational programs are goal directed, most of these studies have sought to establish goal evaluation as fundamental to the process of identifying program priorities within academic organizations. While the logic of this approach is unquestionable, certain interpretive problems (see Chapter II) generally associated with various goal preference techniques tend to limit their usefulness.

Recognizing these problems, this study attempted to address the question of priority evaluation from the perspective of organizational activity. The study was predicated on four operational assumptions:

1. Since institutional programs may be defined as organized sets of activites, it was assumed that perceptions of these programs could be evaluated in terms of the specific activities from which they are comprised.
2. It was suggested that the value or "importance", whether actual or preferred, of a program-related activity could be defined quantitatively as an amount of professional resources (faculty effort) devoted to the activity.
3. Recognizing that all organizational resources, including faculty, are finite in nature, it was assumed that an evaluation of the "importance" of a single activity must necessarily be weighed against the "importance" of all other activities.
4. Finally, it was assumed that organizational activities and programs are the result of a complex interaction between individual needs and organizational expectations. Thus,

it was deemed essential to consider the evaluation of activities from both an individual and organizational perspective.

With these assumptions in mind, three major conclusions may be drawn from the analysis of faculty effort patterns within the College of Engineering.

1. There was no evidence to suggest that the combined individual effort preferences of faculty members differed from the pattern of faculty effort which actually occurs within the college. It appears, then, that if assignments were made solely on the basis of individual faculty preferdnce, the resultant pattern of professional resource allocation over programs could not be significantly different than that which is currently in effect. It must be emphasized, however, that the results did not suggest that the assignment of individual faculty members, under "preferred" conditions, would remain the same. To the contrary, it was evident through a review of individual response patterns that actual assignments do not necessarily reflect the activity preferences of many faculty.

2. The analysis also failed to reject the null hypotheses generated to compare faculty perceptions of actual and preferred patterns of organizational effort. This finding was particularly significant in that it evaluated faculty attitudes toward the priority structure which exists within the College of Engineering. The evaluation consisted of asking faculty to define the "importance" of various program-related activities in terms of their perception of the amount of professional resources being expended by the college in support of these activities. The resultant pattern of perceived organizational effort was then compared with

a pattern consisting of the faculty preferences for professional resource allocation within the organization. Since the analysis failed to describe significant differences between the two organizational patterns, it would appear that the faculty, as a whole, is content with the current priority structure which exists within the College of Engineering.

Though empirical comparison is not possible, it is appropriate to briefly contrast the findings described above with those studies which have sought to define institutional priorities through the assessment of organizational goals. As noted in Chapter II, most of the goal studies reviewed tended to support two central conclusions. First, faculty, and often others, generally display congruent opinion on the "actual" and preferred "importance" of various goals (i. e., the rank order correlations between the two measures were found to be directly related). Secondly, faculty and other groups queried generally felt that nearly all goals should ideally be given greater amphasis (i. e., preferred importance ratings were almost always higher than ratings of actual importance).

To a large extent, the findings of the present study support the conclusion of congruence of opinion among faculty regarding organizational priorities. Viewed from the perspective of program-related activities rather than goals, the faculty sample tended to describe statistically equivalent ratings of perceived and preferred importance over the various activities in question. Since the "importance" of activities was defined as a finite quantity of resources, the results did not (nor could they) suggest that greater emphasis should be placed upon all organizational programs. Each program-related activity was, in effect, weighed against all others considered. The results, therefore, confirm

congruence of opinion regarding program priorities by suggesting that each program-related activity was receiving an appropriate share of the professional resources available to the organization. Thus, though similar to those found in goal studies, the conclusions of the present inquiry were uniquely based upon a pragmatic evaluation of organizational processes and resources. As such, they may be more easily interpreted to support various administrative functions.

3. Four of the six objectives of the study sought to compare individual effort patterns (actual and preferred) with organizational effort patterns (perceived and preferred). As a result of the analysis, the following four observations were made: (a) the comparison of actual individual with perceived organizational effort suggested that faculty perceptions of the actual pattern of professional resource allocation are generally accurate; (b) in comparing actual individual with preferred organizational effort, it appears that the faculty's perception of an ideal pattern of resource distribution is not significantly different from that which currently exists; (c) the analysis of preferred individual and perceived organizational effort suggested that if faculty were assigned according to their personal interests and needs, the resultant pattern of resource allocation would not be significantly different from that which they feel currently exists; (d) the results of the comparison of preferred individual with preferred organizational effort suggested that the combined individual preferences of the faculty generally agreed with their preferences for organizational activity.

Exceptions to these observations (i.e., significant differences between individual and organizational effort) were noted in certain activities related to the instructional and administrative-committee

services program area (see Chapter V, pp. 70-71). Substantive interpretation of these exceptions must be made with caution since the response rate achieved precluded accuracy in establishing organizational measures composed of the combined actual and preferred effort of individual faculty.

Recommendations for Further Research

This study represents an initial attempt to extend the scope of activity analysis as a means to evaluate program priorities within academic organizations. As such, its results and limitations suggest the need for further inquiry in the following areas:

1. The present study did not consider such variables as sex, age, tenure, educational and personal background. Further research should be directed to determine whether these and other demographic characteristics relate to various perceptions of individual and organizational effort.
2. The study also failed to consider the perceptions of other significant organizational groups such as trustees, administrators, personnel workers, and students. Since each of these groups influences the priority structure of the organization, their perceptions of professional effort patterns should be carefully evaluated.
3. In addition to including various groups, it is also recommended that future research be directed to consider other organizational units having similar programs (such as other engineering colleges and/or academic departments with a college). Cross-comparisons of such units may serve to determine the relationship of climate, structure, and/or other organizational characteristics to resultant patterns of actual and preferred effort.

4. To support the above recommendation, it is suggested that research be undertaken to develop instrumentation capable of measuring actual and preferred effort patterns within a variety of academic environments.
5. The present study sought to compare actual and preferred patterns of professional resource distribution using gross percentage estimates of faculty effort. While no significant differences were found between organizational patterns, there was some slight evidence to suggest the existence of differences between the patterns of individual faculty members. A comparative re-examination of these patterns, considering such variables as cost and hours, could serve to determine whether individual differences substantively effect resultant organizational patterns.
6. Questions concerning the relationship of individual effort patterns to other organizational variables, not addressed in the present study, should also be fully explored. For example, is congruence between actual and preferred individual effort related to such factors as productivity, conflict, efficiency, and/or the leadership style of the organization?
7. The evaluation of actual and preferred patterns of resource allocation should be enlarged to encompass resources other than professional staff. Consideration, therefore, should be given to the allocation of space, equipment, supportive staff, and other resources necessary to the maintenance of academic programs.
8. Faculty reaction to the design of the present study should also be explored. For example, did the evaluation of program-related activities, in terms of finite resources, result in faculty members changing their perceptions of the "importance" of various activities?

9. The relationship between activities and programs, on which the present study is largely based, needs further empirical description. Is, for example, this relationship singular or can a given activity substantially relate to more than one organizational program? The answer to this question would significantly effect the interpretation of future activity analyses.

10. Finally, the present study sought to evaluate faculty attitudes toward institutional programs through an analysis of professional resources and activities. Other studies have approached the same problem through the assessment of institutional goals and objectives. Since the advantages and limitations of these techniques are somewhat complimentary, information obtained from both should be systematically combined to support various management processes.

APPENDICES

APPENDIX A

THE ANNUAL REPORT OF FACULTY ACTIVITIES AND FACULTY EFFORT FORM

Michigan State University - College of Engineering

Annual Report of Individual Faculty Activities

Name _____

Department _____

Rank _____ Basis: _____ 10 Mo. _____ 12 Mo.

Period Covered: January 1, 1973 through December 31, 1973

. INSTRUCTION -- This includes all effort dedicated to the teaching of students, whether the teaching effort is formal or informal. It will be distributed into the following categories: (a) regular on-campus classroom teaching, (b) off-campus programs administered by the University involving instruction for credit, (c) off-campus programs, administered by the University, but not for credit, (d) advising, (e) thesis direction and (f) related developmental activities. Lectures to civic groups or laymen not students or practitioners in the subject field are excluded here and placed under "Public Service." Reading related to a research project or general reading in one's professional field not specifically related to courses taught is subsumed under "Research and Scholarly Activity" or "Professional Development."

A. On-Campus Teaching. To help with data on teaching loads, Institutional Research has supplied the attached printout. Please check this listing for accuracy and enter the appropriate figures below.

	u.g. sch	grad. sch
Winter, 1973		
Spring, 1973		
Summer, 1973		
Fall, 1973	_____	_____
TOTAL		

B. Off-Campus Teaching. Indicate in parenthesis any of the student credit hours taught on an overload basis.

	u.g. sch	grad. sch
Winter, 1973		
Spring, 1973		
Summer, 1973		
Fall, 1973		
TOTAL		

C. Off-Campus (or Evening College) Programs. Describe.

D. Academic Advising.

	W'73	S'73	SS'73	F'73
Number of undergrad. advisees				
Number of M.S. advisees				
Number of Ph.D. advisees				

E. Thesis Direction.

	W'73	S'73	SS'73	F'73
Number of M.S. students requiring thesis direction:				
Number of M.S. degrees awarded:				
Number of Ph.D. degrees awarded:				
Names of Ph.D. recipients:				
_____				
_____				
_____				
_____				
_____				
Number of active guidance committees:				

F. Associated Instructional Activities. If you check any of the activities listed below, explain briefly.

_____ New course development

_____ Class notes in trial or preliminary preparation

_____ Preparation of laboratory exercises or notes; design of laboratory experiments

_____ New experiments in teaching, learning, or examination methods

_____ T.V. instruction programs

_____ Experiments with programmed learning

_____ Audio-visual aids, electrowriter, or any other teacher-learning media

_____ Services performed in support of instruction, i.e., service at registration desk, orientation program

_____ Course supervision

_____ Other

Explain:

G. Teaching Effectiveness. Supply any information you feel is appropriate which summarizes your effectiveness in teaching. SIRR forms, although not necessary, provide one of the better views of effectiveness and student acceptance. Do not include material you wish to have retur

_____

_____

_____

_____

_____

_____

II. RESEARCH AND SCHOLARLY ACTIVITY -- includes all effort dedicated primarily to the discovery and application of new knowledge. Excluded are any activities for which the major purpose is the training of students or the improving of instruction, both of which should be accounted for under "Instruction." Consulting or other activity for which individuals receive more than token payment from an outside source is also excluded.

A. Department Supported Research and/or
B. College Supported Research through DER.

This information will also be used in the Division of Engineering Research's short form of the Annual Report. Additional information for the long form may be requested.

Title _____

Support Source (Department, DER, or other) _____

_____

Co-Investigators _____

Graduate Students _____

Provide a brief summary or abstract of progress for 1973 (approximately 200 words):

C. Research Supported by Off-Campus Agency.

This information will also be used in the Division of Engineering Research's short form of the Annual Report. Additional information for the long form may be requested.

Title _____

Agency _____

Amount _____

Starting and Ending Dates _____

Co-Investigators _____

Graduate Assistants _____

Provide a brief summary or abstract of progress for 1973 (approximately 200 words):

D. Department Supported Proposal Development and/or
E. College Supported Proposal Development through DER.

Title	Date Submitted	Approved	Denied

If pending or under active development, briefly explain.

F. Gifts and Grants from Outside Sources. (Equipment, unspecified gifts and grants, fellowships, etc.)

Item Received	Amount	Source

Explain if necessary:

G. Publications.

This information will also be used in the Division of Engineering Research's short form of the Annual Report.

Please indicate whether these were American or foreign articles, papers presented, books, chapters, monographs, reviews, technical reports, etc. Indicate any works in progress. For papers presented, give the location and date of the conference. Add additional sheets if necessary.

Journal reference:
G. E. Doe and P. S. Roe, "The development of the betatron," Am. J. Phys. 20, 298 (1952).

Book reference:
John G. Doe, The Gammatron (McGraw-Hill Book Company, Inc., New York, 1952), 2nd ed. Vol. I, Chap. 2, p. 69.

Paper presented:
A. C. Doe, "New developments with the betatron," ASEE Annual Meeting, New York, October 1967.

III. PUBLIC SERVICE -- includes the following activities: preparation of information bulletins; contacts with professional organizatio (offices held, committee assignments); editor of professional publication; directorship or planning chairmanship of conferences; participation in conferences, seminars, colloquia; radio and T.V. presentations; talks or papers before service clubs, high schools, community service and activitie public relations work with outside agencies or institutions for courtesy and good will; campus visitor programs; student campus society or fraternal organization advising.

Name of Activity	Nature of the Service

IV. COMMITTEE AND ADMINISTRATIVE SERVICES -- includes all effort devoted to managerial and supervisory tasks (except course supervision) performed for the department, college, or University as a whole but supported by the department.

Names of committees or activities

_____

_____

_____

_____

_____

You may want to detail any contributions of the administrative responsibilities listed above.

V. PROFESSIONAL DEVELOPMENT -- includes any personal accomplishme designed to maintain and improve one's general professional competence rather than one's performance of current instructional, research, or ser responsibilities. Such activities include scholarships, fellowships, grant leaves, travel, special summer programs, and activities, added degrees honoring awards or memberships granted.

Name of accomplishment or activity	Dates

Explain if you so desire:

VI. SELF-ASSESSMENT -- indicate the most significant contribution to your department, the college or the University during the calendar year 1973.

VII. NEED -- in what area could assistance be provided to you that would help you in better achieving your objectives for 1974?

FACULTY EFFORT FORM

COLLEGE OF ENGINEERING

You have recorded your activities during the period from Winter 1972 through Fall 1972. Will you now look through the questionnaire and estimate the percent of time you spent in each of the listed activities for the entire year. Your total effort should be exactly 100%.

A summary will be made from this data and provided to you.

		Lower U.G.	Upper U.G.	Masters	Doctoral	
I Instruction	A. Teaching Load					____
	B. Academic Advising					____
	C. Associated Instructional Activities					____
	D. Thesis Direction	X	X			____
II Research	A. Research supported by academic department					____
	B. Research supported by Division of Engineering Research					____
	C. Research supported by Off-Campus Agency					____
	D. Research proposal development supported by academic department					____
	E. Research proposal development supported by Division of Engineering Research					____
III Public Serv.	Public Service					____
IV Administration	Committee and Administrative Service Department College University					____ ____ ____
V Prof. Develop	Personal accomplishment designed to maintain and improve general professional competence					____
Other Assign-ment	Computer Laboratory, department outside the College of Engineering					____
					Total:	100%

APPENDIX B

REVISED FACULTY EFFORT FORM

FACULTY EFFORT FORM

Directions

You have now recorded your activities during the period Winter 1973 through Fall 1973. Will you now look through the questionaire and estimate the percent of time you spent in each of the listed activities. These estimates should total 100% and appear in Column A on the following page.

We are also asking your assistance in acquiring additional data for a study which may be helpful to you, your Department and the College. This information is requested in the remaining three columns which appear on the following page:

In Column B you are asked to estimate the percentage of time you would prefer spending in each of the listed activities over an academic year. This estimate should reflect personal judgment on how your talents and interests might best be used in the College. Your total "preferred effort" estimates in Column B should be exactly 100%.

In Column C please estimate your perception of the percentage of faculty time which you feel the College currently allocates to each of the listed activities. Your estimates in Column C should again equal 100%.

In Column D you are asked to provide an estimate of the percentage of faculty time which, in your opinion, should be devoted by the College to each of the listed activities. The total of Column D should be 100%.

Suggested Procedure: You will note that the thirty activity items appearing on the form are listed under eleven general headings (i.e., ON CAMPUS TEACHING, OFF-CAMPUS TEACHING, RESEARCH, etc.). To simplify completing the columns, you may first wish to estimate percentages for each of the eleven headings according to the directions above. Each gross estimate may then be divided among the items listed under the heading.

The information collected in each of the four columns will be made available, without names, to Mr. William Abbett for use in a proposed Ph.D. thesis which will examine patterns of resource allocation within the College. When your department secretary prepares the two copies of the form to be made available to your Department and the College, Columns B, C, and D will not be included in order to insure confidentiality of your responses. Your original draft will be returned to you.

FACULTY EFFORT FORM

Please indicate your departmental affiliation: _____

NOTE: Please review directions on preceding page before completing the columns below:

Item	Col. A Actual Personal Activity	Col. B Preferred Personal Activity	Col. C Perceived College Activity	Col. D Preferred College Activity
I. INSTRUCTION				
A. ON-CAMPUS TEACHING				
1. Teaching undergraduate courses designed for college majors	%	%	%	%
2. Teaching undergraduate courses designed for non-college majors	%	%	%	%
3. Teaching 800-900 level courses designed for college majors	%	%	%	%
4. Teaching 800-900 level courses designed for non-college majors	%	%	%	%
B. OFF-CAMPUS TEACHING				
5. Teaching off-campus undergraduate courses	%	%	%	%
6. Teaching off-campus graduate courses	%	%	%	%
C. OTHER OFF-CAMPUS (OR EVENING COLLEGE) PROGRAMS				
7. Teaching non-credit courses	%	%	%	%
D. ACADEMIC ADVISING				
8. Formal and informal undergraduate advising	%	%	%	%
9. Formal and informal graduate advising (including Ph. D. committee activity)	%	%	%	%
E. THESIS DIRECTION				
10. Directing M.S. Theses	%	%	%	%
11. Directing Ph. D. Theses	%	%	%	%
F. ASSOCIATED INSTRUCTIONAL ACTIVITIES				
12. Developing new courses for majors	%	%	%	%
13. Developing new courses for non-majors	%	%	%	%
14. Implementing new teaching-learning techniques	%	%	%	%
15. Evaluating existing courses within the curriculum	%	%	%	%
16. Other related activity	%	%	%	%
II. RESEARCH AND SCHOLARLY ACTIVITY				
17. Conducting research supported by Department	%	%	%	%
18. Conducting research supported by Division of Engineering Research	%	%	%	%
19. Conducting research supported by Off-Campus Agency	%	%	%	%
20. Developing research proposals supported by Department	%	%	%	%
21. Developing research proposals supported by Division of Engineering Research	%	%	%	%
22. Attraction of other gifts and grants	%	%	%	%
23. Preparation or editing of manuscripts, papers and/or articles	%	%	%	%
III. PUBLIC SERVICE				
24. Professional participation in community and/or professional organizations	%	%	%	%
IV. COMMITTEE AND ADMINISTRATIVE SERVICES				
25. Participation in Departmental committees	%	%	%	%
26. Participation in College committees	%	%	%	%
27. Participation in University committees	%	%	%	%
28. Management and/or supervisory activities	%	%	%	%
V. PROFESSIONAL DEVELOPMENT				
29. Improvement of general professional competence including scholarships, fellowships, grants, leaves, travel, special summer programs, personal study, etc.	%	%	%	%
VI. OTHER				
30. Other assignments (Computer Laboratory, department outside College)	%	%	%	%
TOTALS	100%	100%	100%	100%

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