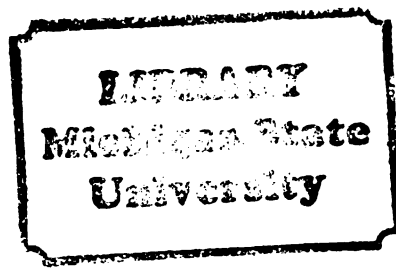
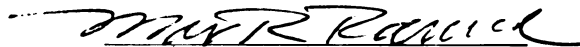


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ORGANIZATIONAL EFFECTIVENESS OF UNIVERSITIES:

A SOCIOTECHNICAL ANALYSIS

by

Carmen Catarina Silva Handel

A DISSERTATION

Submitted to
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1983

ABSTRACT

ORGANIZATIONAL EFFECTIVENESS OF UNIVERSITIES:

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Carmen Catarina Silva Handel

Based on sociotechnical system theory, the present study aims at developing a set of instruments to study universities from an organizational perspective. Relevant variables of this model include perceptions of actual and ideal primary tasks and roles, sentience (trust and loyalty), participant-satisfaction, as well as tangible and intangible technology. The principle objectives of the research were to (a) describe the characteristics of different programs within a major Brazilian university in terms of sociotechnical theory; (b) test a model derived from sociotechnical theory for the analysis of university aspects, predicting differences in program effectiveness; and (c) develop instruments and conduct a pilot study in a single university to evaluate the reliability and validity of items and scales included in the questionnaires.

Carmen C. S. Handel

At the Federal Univeristy of Rio Grande do Sul sixteen programs offer both undergraduate and graduate degrees. Of these, ten were randomly selected: Faculty and administrators (deans, department heads, program coordinators), as well as graduates of these programs were interviewed.

The findings of the study indicate that (a) the various scales to measure the relevant variables present a high degree of reliability; (b) administrators differ significantly from faculty members with respect to factors related to their respective roles; (c) individuals wit greater investment in the university (time, qualifications, rank) perceive the same more positively; (d) there is no direct relation between the level of satisfaction and productivity; (e) loyalty to one's profession may be more important that loyalty to university in terms of achievement; (f) the sociotechnical model used in the present research appears to be a valid approach to study universities.

From the present study, it is possible to conclude that

1. Effectiveness of universities is a complex construct, constituting three different domains: productivity (academic), participant-satisfaction (morale), and impact (external adaptation).
2. Different kinds of results and their respective influences should be studied separately, i.e., proportion of students completing their programs, research, service, etc.
3. Different kinds of result may be expected for different kinds of organizations, participant characteristics, etc.
4. Results of appraisals of program productivity and impact on other organizations constitute an adequate basis for curriculum organizational change.
5. More research related to each component or domain of effectiveness of universities is needed.
6. Research of faculty and administrator characteristics is needed to better understand universities as organizations, and their products.
7. Research regarding the respective loyalty of faculty and administrators to their professional group and to the university, and the influence of such loyalty to the products of the university is needed.
8. Research of the control and reward system, and its relation to the products of the university is needed.

This Dissertation is dedicated
to very special people.

I did the work.

They gave me the conditions.

EGON HANDEL

My husband and colleague.

His understanding, support,
encouragement and love
were immeasurable.

CRISTINE LUISE

LUCIA VERONICA

ANA CAROLINA

My daughters.

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support and the time they
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Chapter I

INTRODUCTION

Institutions of Higher Education play a central role in contemporary society. Decisions and actions by faculty and administrators affect not only their students and employees at all levels, but other organizations, such as state legislatures, contracting organizations, high schools, and ultimately the whole society. Therefore, it is essential that such institutions have their mission or primary task defined with great care and their various programs structured to achieve their objectives as efficiently as possible. Specifically, the staff and technology available to an institution of higher education must be consistent with the objectives of the various programs within which they are located and must be organized in ways that will enable them to most efficiently realize the programs' objectives. In addition to an established and coherent task system, organizations must have credible measures of effectiveness (i.e., measures of results attained and of their relevance to internal and external constituencies in terms of quantity and quality). The present study is an effort toward this end. Unfortunately, the methodology and instruments needed to study, understand, and

evaluate institutions of higher education from a sociotechnical perspective do not exist. Accordingly, the primary purpose of this study is to begin the development of the needed methods and instruments to meet the larger goal described above. There is a second sense in which this is a developmental study: it is a pilot study of only a single university. The long range goal is to improve the methods and instruments so that a large sample of universities may be studied.

Statement of the Problem

The focus of the present study is on the development of methods and instruments for measuring the relationship of program characteristics to effectiveness, and more specifically, the level of compatibility among organizational components and effectiveness in organizations of higher education. The term *compatibility* refers in this context to (a) the extent to which various components of a program, such as its technical and social systems and its defined primary tasks are congruent with one another, and (b) the extent to which perceptions of actual roles and tasks agree with ideal roles and tasks as measured by difference or discrepancy scores.

Obviously, many variables influence program effectiveness (i.e., the relevance of the results to internal and external constituencies - organizational member and other organizations). To

try to identify the contributions of free resources, faculty/student ratios, quality of students entering the programs, and a multiplicity of other factors, would clearly require a multi-institutional study and is beyond the scope of this research. The aims of this study are more modest, i.e., to look at a single university and some of its programs, and to attempt to determine whether or not there is some relationship between compatibility as defined above and effectiveness. If, for example, a department were to define basic research in the physical sciences as one of its primary tasks, but lacked the technology to perform this task, a major incompatibility would exist, presumably reducing effectiveness. Secondly, this study aims to test a model and a set of scales to be used in other studies of organizational effectiveness of universities.

If a relationship could be established between compatibility and effectiveness, the implications for higher education are substantial. According to sociotechnical theory, tasks and objectives, social system and technology must be aligned if an organization is to achieve its potential. While the availability of free resources, competent faculty, and high-caliber students certainly increase the chances for a successful program, the organization may still be ineffective, if the major factors of task, role and technology are incompatible. The problem under study in this research can be stated in terms of the following

questions: (a) What is the relation between the various organizational aspects, such as primary tasks, social and technological systems, structure, and the compatibility among them to organizational effectiveness of universities? (b) Is sociotechnical theory an adequate frame of reference to analyze universities in terms of investigation of its organizational effectiveness? (c) Are the scales constructed to measure the variables presented in the theoretical model of this study an adequate instrument to collect data to be used in studies of organizational effectiveness of universities?

Significance of the Research

From a practical perspective, this study was constructed (a) as an attempt to develop methods and instruments to study organizational effectiveness of universities, and (b) with a view to identifying alternatives for the improvement of organizational effectiveness of universities, in terms of changes needed to align tasks, technology, social system and structure.

From the perspective of sociotechnical theory, which provides the basic premises for the model used in this study, many questions remain unanswered, which require further research. Certain questions refer to the relation of technology to effectiveness. Several authors (Burns & Stalker, 1961; Perrow, 1967; Woodward, 1978) suggest that organizations will perform effectively only to

the extent that their structures are compatible with the requirements of their technological systems. Although some studies have confirmed this hypothesis, a study by Mohr (1971) fails to support this premise. To this author's knowledge, no effort has been made to validate this proposition in higher education organizations. Thus, one of the objectives of this study is to test a model based on the premises of sociotechnical theory emphasizing compatibility or congruence among structure, technology and other organizational aspects and its relationships to effectiveness.

Cultural Context of the Study

In Brazil, a general reform took place in the universities in the 1970's, which resulted in a complete restructuring of institutions of higher education. The reform required the establishment of a departmental system modeled along North American lines, having as its smallest unit the academic department, which is directly responsible for teaching, research and extension.

The general goals of Brazilian universities, as stated in the General Law of the Reform are "research, the development of the sciences, letters and arts, and professional education". An essential structural requirement stated in the Law is that "teaching and research should be integrated", and that "the

university will have scientific, disciplinary, administrative and financial autonomy" (Law Number 5540, 1968).

Departments

All faculty members and courses are related to a specific academic department, which is primarily an administrative unit. Each department is administered by a chairperson and a committee with a maximum of eleven members, elected by the members of the department for a two-year term. Committee members and the department head (who are always faculty members of the department) may be reelected for one additional term.

Faculty

Faculty members are heterogeneous in such characteristics as rank, nature of their contract and qualifications. The qualifications, i.e., holding an advanced degree or not, determine whether they will teach only undergraduate courses, or will be permitted to teach graduate courses as well. Faculty are selected by the department, but are hired as federal employees by the university.

Administrators

At the central administrative level, UFRGS is administered by (a) the *rector*, or university president, who is a faculty member, chosen by the national president from a list of six candidates submitted by the university council; (b) a *vice-rector*, chosen in the same manner; (c) six *pro-rectors*, indicated by the rector, and responsible for the areas of undergraduate education, graduate education and research, administration and finances, extension and continuing education, student affairs and planning. (d) council for teaching and research, composed of representatives of each program and representatives of the students, (e) university council, composed of the 23 deans of colleges and institutes, plus representatives of each faculty rank cohort, i.e., full, associate, assistant professors and teacher assistants, as well as of the students.

Graduate Programs

Graduate programs are directed by a coordinator and a committee of three to five faculty members who are responsible for the administration of the program. For the purpose of this study, the following groups were classified as administrators: deans of colleges and institutes, chairpersons, coordinators of undergraduate and graduate programs and members of the committees for the coordination of graduate programs.

Objectives and Hypotheses

Objectives of the Study

As a consequence of the problem stated in the present chapter and the review of the literature presented in the following one, the current study was designed to achieve the following objectives:

1. Describe the characteristics of different programs within a major Brazilian university in terms of sociotechnical theory.
2. Appraise differences in perception of faculty and administrators within various programs, with regard to the existing state of affairs and the most appropriate state of affairs, related to primary tasks and roles.
3. Appraise the perceptions of faculty and administrators within the various programs with respect to structure, level of trust and loyalty.
4. Test a model derived from sociotechnical theory for the analysis of university characteristics, predicting differences in program effectiveness.
5. To develop instruments for measuring the variables identified in objectives one through four above, and conduct a pilot study in a single university to evaluate the reliability and validity of items and scales included in the questionnaires.

Research Hypotheses

The theoretical model constructed to serve as a basis for this study considers level of compatibility among different organizational aspects as a factor to be stressed in studies of effectiveness. The conceptualization of effectiveness of universities presumes that one indicator of compatibility is the level of agreement between perceptions of actual and ideal tasks and roles. The first five hypotheses were formulated on the basis of this premise as follows:

1. H_0

There are no differences in perception between faculty and administrators with regard to the following:

1. primary tasks, both operative (actual) and expected (ideal);
2. social system, i.e. actual and ideal roles;
3. actual and ideal task and role;
4. trust and loyalty vis-à-vis the organization;
5. technological system and organizational structure.

2. H_0

There are no differences in perception among university staff members with different qualifications in regard to the following:

1. primary tasks, both operative (actual) and expected (ideal);
2. social system, i.e. actual and ideal roles;
3. actual and ideal task and role;
4. trust and loyalty vis-à-vis the organization;

5. technological system and organizational structure.

3. H_0

There are no differences in perception among university staff members with different work contracts in regard to the following:

1. primary tasks, both operative (actual) and expected (ideal);
2. social system, i.e. actual and ideal roles;
3. actual and ideal task and role;
4. trust and loyalty vis-a-vis the organization;
5. technological system and organizational structure.

4. H_0

There are no differences in perception among university staff members of different academic rank with regard to the following:

1. primary tasks, both operative (actual) and expected (ideal);
2. social system, i.e. actual and ideal roles;
3. trust and loyalty vis-a-vis the organization;
4. actual and ideal task and role;
5. technological system and organizational structure.

5. H_0

There are no differences among programs in terms of the perception of their faculty with regard to the following:

1. primary tasks, both operative (actual) and expected (ideal);
2. social system, i.e. actual and ideal roles;

3. trust and loyalty vis-a-vis the organization;
4. actual and ideal task and role;
5. technological system and organizational structure.

The sixth hypothesis refers to the external adaptation domain. Differences in the relevance of the academic programs for professional performance were examined in relation to different organizational objects of this research:

6. H_0

There are no differences among programs with respect to relevance of the program as perceived by graduates.

The seventh hypothesis deals with the primary principle of sociotechnical theory (i.e., the congruence or compatibility among the various organizational subsystems and effectiveness) and the elements of the construct of effectiveness used in this study. This hypothesis refers to the test of the theoretical model:

7. H_0

There is no significant correlation between primary task, social and technological systems on the one hand, and the level of effectiveness (i.e., productivity, satisfaction and impact), given programs as the unit of analysis.

Summary

The present study is primarily concerned with the development of instruments based on sociotechnical systems theory to study universities in aspects related to organizational effectiveness. The general purpose is to mark the characteristics of a single university in sociotechnical terms in an attempt to describe relationships among key organizational dimensions and identify their joint influence on effectiveness. The problem under study may be summarized by the questions: (a) To what extent does compatibility among key dimensions of a university, i.e. its social, technological and task systems and structure, as perceived by faculty and administrators, influence organizational effectiveness of a university? (b) To what extent is a model based on sociotechnical theory and the derived scales adequate instruments to study organizational effectiveness of universities? The long-term objective of the study is to build a model for organizational analysis of universities which might be used as a basis for improving organizational effectiveness of higher education organizations.

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Chapter II

SELECTED REVIEW OF THE LITERATURE

Three quite different but compatible theoretical orientations provide the basis for the present study. *Sociotechnical theory* provides a frame of reference for describing and analyzing events in organizations; *organizational effectiveness theory* provides basic models for the evaluation of programs; and theory and research in *higher education* provide organizational and structural models in the specific domain of interest of this study.

Sociotechnical Systems Theory

Sociotechnical systems theory is a theoretical frame of reference developed originally at the Tavistock Institute in London (Cherns, 1976; Emery & Trist, 1965; Miller, 1975; Miller & Rice, 1967; Rice, 1958; Trist, 1951). This theory has promoted a shift from looking at enterprises primarily as closed systems to looking at them as open, sociotechnical systems (Trist, 1978).

Sociotechnical systems theorists view organizations as open and living systems much like a biological cell, i.e., engaged in

active transactions with its environment (Pasmore & Sherwood, 1978). The theory describes the complex relationships which occur among people, tasks and technologies within organizations, emphasizing the importance of compatibility among these elements and its relation to organizational effectiveness.

According to sociotechnical theory, all organizations are sociotechnical systems which develop interrelationships between social and technological sub-systems, at any level, be it individual, group, larger internal units or the enterprise as a whole. This relationship is the basis of the central principle of sociotechnical theory, i.e., the principle of *joint optimization* which states that organizational objectives are best met by the joint optimization of the technical and the social systems of any organization (Cherns, 1976). Therefore, a primary objective of the sociotechnical approach is to optimize the relationship between the social or human systems and the technological systems of the organization to produce the expected and relevant outputs. The assumption is that when these systems are arranged optimally, outputs are higher, employee's needs are better satisfied, and the organization remains adaptable to change.

Sociotechnical systems theory also provides a frame of reference for organizational development that typically involves restructuring of work methods, rearrangement of technology and

the redesign of organizational social structures. In the present study, however, the theory serves primarily as a frame of reference for the generation of hypotheses, the collection of data and for the analysis and explanation of results. In this connection, four key variables have been drawn from the theory: (a) primary task, (b) social system, (c) technological system, and (d) level of compatibility.

Primary Task

Primary task is defined as the task that an organization must perform in order to survive. This concept developed by Rice (1958, 1963) is basic to the analysis of organizations in the sense that it determines the dominant import-conversion-export system. It also is the basis to specify the resources required, and thus determines priorities of constituent systems. The concept of primary task is similar to the concept of mission as stated by Selznick (1957). Selznick points out that an appropriately defined organizational mission offers stability and direction to an enterprise, protecting it from adventurism and costly drifting.

The two concepts, mission and primary task, are complementary. Mission is the overall objective. It includes all the tasks that are essential for organizational survival. Primary task is more specific. This more limited concept of primary task is more

useful for organization model building (Rice, 1963), as well as for organizational analysis.

The concept of primary task is related to a theory of organization that treats any organization as an open system, that is, a system in which continuous exchange of materials, with the environment is vital (Rice, 1963). Considering the concept of primary task and its relation to the open system theory, an important criterion emerges. The 'product' of an organization must be adequate, i.e., has to satisfy the needs and expectations of other organizations. Thus, an organization is a system which "produces" an identifiable something which can be utilized in some way by other systems, the output of an organization is an input for some other system (Parsons, 1960). In other words, the primary task performed by an organization has to be relevant.

The primary task is not a normative concept. In reality, every institutions at any given time has one or more tasks which are the primary tasks, in the sense that they are the reasons that it exists. One implication of this is that there may be conflict between the way in which a constituent system defines its primary task and the way in which the subordinate systems define it. Similarly, the environmental definitions of the primary task of an enterprise may differ from and impose constraints on its own definition (Miller & Rice, 1967).

In sociotechnical theory, the role of the primary task is emphasized as necessary to the assignment of roles and responsibilities and to the control process. Rice (1970) states that the most appropriate organization is one that best fits the primary task performance. In summary, sociotechnical theorists emphasize the essentiality of primary task clarification, organizational design and effectiveness.

Multiple Task Organization. Many institutions are created to carry out several different tasks at the same time. Universities and prisons are examples of public institutions with several different primary tasks. Inevitably, problems emerge from this situation, such as (a) diversity and conflict among goals, as in the case of the university (i.e., teaching, research, service); and (b) opposition of expected results, as in the case of a prison (i.e., punishment, rehabilitation, confinement). Different organizational arrangement may be required to perform these alternative tasks. For example, rehabilitation requires an open prison, whereas confinement, by definition, needs a closed prison (Rice, 1963).

Inability to define the primary task either because there is in reality more than one, or because the one that exists is denied, results in confusion within the organization. The import-con-

version-export process is directly affected, the control system is nebulous, and organizational performance is uncertain.

Rice (1970) suggests that if the primary task determines the type of import-conversion-export process and the control system, an organization with multiple tasks requires multiple organizations to be effective. This is true in the case of a university, which is a multiple-task organization, and therefore, needs more than one organizational model to be effective. Each task, though interdependent with other tasks, requires its own characteristic organization. In this manner, graduate and undergraduate teaching require structural differentiation, as do basic and applied research and consulting or extension services. As a consequence, a differentiated management system is required to control, coordinate and service the activities of these systems, as in any enterprise where there is more than one operating system (Rice, 1970). It follows that each part requires a special organization and that the organization of the whole will be constrained by the need to integrate the organization of its parts.

The Primary Task of Universities. Organization is a means to an end, and the most appropriate organization is the one that best fits primary task performance (Rice, 1970). In the case of a university, at least two different primary tasks and two major sub-systems can be identified. One is concerned with research, i.e., the discovery or generation of knowledge and the solution to problems. The other is concerned with teaching, i.e., the dissemination of knowledge. Each of these sub-systems has a characteristic throughput that differentiates it from the other. Furthermore, each has sub-sub-systems with characteristic throughputs that differentiate one sub-sub-system from another (Rice, 1970).

Examining the primary task of a university as viewed above, at least five sub-tasks are apparent: (a) undergraduate teaching, (b) graduate teaching, (c) community teaching, i.e., extension courses, (d) basic research, and (e) applied research. Another subsystem may be considered, namely that of service, i.e., different kinds of projects for other community organizations. Because all these subsystems are part of one complex organization, as Rice (1970) suggests, there must be as many model organizations as there are primary tasks with their differentiated inputs, throughputs, and control systems.

Another point which should be stressed is that a specific task

requires (a) specific skills of the role incumbents, (b) appropriate organization, and (c) a congruent culture, in order to achieve the expected results.

In the present study, the primary task of the university will be considered from two different perspectives: (a) the *expected* or ideal primary task, as perceived by faculty and administrators, and (b) the *operative* or actual primary task, as perceived by faculty and administrators (Cohen & March, 1974; Etzioni, 1964; Katz & Kahn, 1978; Perrow, 1961; Zey-Ferrel, 1979).

Social System

In order to achieve the primary task, any organization requires a technological system, i.e., methods, techniques, machinery, equipment to process the inputs and convert them into "products". Thus, the technological system is essential to the import-conversion-export processes, which are the *raison d'être* of any entity. But, organizations also include a social system which consists primarily of: (a) roles, as defined by the organization and as perceived by its members, (b) the characteristics, expectations, and skills of the role incumbents, and (c) sentience, i.e., commitment, trust and loyalty of individuals to the organization. These components of the social system and their interrelationships will inevitably influence organizational effectiveness.

Activities and Roles. Although there are different theoretical perspectives about the social system (Kast & Rosenzweig, 1970), it is generally agreed that one major element in the social system is *roles* (Katz & Kahn, 1978). Any organization has its roles defined, formally or informally, for its various members. Conversely, individuals as members within organizations have expectations about the roles they and others perform. Complementary to role definition and expectations, one must consider the personal characteristics and sentience of role incumbents (i.e., the skills, qualifications, motivation, needs, and level of commitment to the organization on the part of those filling a given role).

Social roles are commonly defined as a set of expectations oriented toward people who occupy a certain position in a social system or group (Gouldner, 1957; 1958). There are, therefore, two dimensions to be considered in relation to roles, (a) the definition of the expectations for a certain position, and (b) the perception of these expectations by the organizational members.

Individuals acquire membership in one or more formal and informal groups within the organization and perhaps outside the organization by virtue of their role performance. Miller & Rice (1967)

have used the term *role* to refer to the activities that the individual contributes to a particular activity system and to the interrelations involved in carrying out those activities. Merton (1957) uses the term *role-set* to refer to the complement of role relationships which persons have by virtue of occupying a particular social status.

The organization assigns activities to roles and roles to individuals and groups, but the organization cannot always predetermine the consequential role-sets. These are, nevertheless, highly relevant to the effectiveness of the organization (Miller & Rice, 1967).

Two other organizational aspects emerge as a result of role expectations, and assignments to roles: (a) the necessity to establish boundaries, and (b) boundary control. Miller & Rice (1967, p. 41) state that management of an enterprise requires four kinds of boundary control:

1. regulation of task-system boundaries (i.e., regulation of the enterprise as a whole, as an import-conversion-export system, and regulation of constituent system of activity;
2. regulation of sentient-group boundaries, i.e., the boundaries of the grouping to which people belong either directly through their roles in systems of activity, or indirectly through their role-sets;
3. regulation of organizational boundaries where these do not coincide with task-system boundaries;

4. regulation of the relation between task, sentient, and organizational boundaries.

The importance of boundary definition is stressed by Miller & Rice in the following terms:

unless a boundary is adequately located, different people will draw it in different places and, hence, there will be confusion between inside and outside interpretation. In the individual, this confusion leads to breakdown; in the enterprise, to inefficiency and failure (1976, p. 42).

Another crucial aspect to be considered in relation to role expectations and role performance refers to characteristics, skills and expectations of the role incumbent.

Role Incumbents. If roles are defined as expectations oriented toward people, it is essential to consider the general conditions in which these people are to play the roles or to satisfy the expectations of the roles in question and to consider the attributes of the role incumbents. Any study which includes roles as elements of observation has to consider the following elements:

1. the necessary skills required by the role performance;
2. the specific characteristics of the role incumbents;
3. the actual skill of the role incumbents to perform their roles;
4. the expectations of the role incumbents toward the roles to be performed.

Interpersonal factors are an essential aspect to be considered as well in the performance of roles in organizations. In

particular, the adequacy of performance will depend upon the level of sentience in relation to the organization.

Sentience. By performing roles, individuals commit themselves either to the role and task to which they have been assigned or to the other members of their task systems. Individuals may indeed give greater loyalty to groups outside the enterprise than to the enterprise itself: to their union, their friends, to colleagues doing the same kind of work in other task systems, or to groups outside of the enterprise, such as their family, their religion, or political party. These memberships are relevant to the effectiveness of task performance, serving either to support or oppose it (Rice, 1970).

Rice also notes that a successful project team invariably develops sentience, i.e., the members become committed to working together. Such commitment can be a powerful reinforcer of task performance. Rice concludes that "sentient systems, differentiated from operating systems, are essential to provide alternative identification and to maintain institutional rather than project commitment (1978, p. 31)".

From the analysis of the concept of sentience, two constituent elements emerge. The first one is *trust*, which is expressed as an attitude of confidence and a feeling of competence toward the

administrators. The second one is *loyalty* (Rice, 1970), or *organizational identification* (Baldrige, 1980). Either of these two concepts refer to the attitude of the individual in the process of socialization into the organization.

In summary, *sensitiveness* refers to the perception of the relevance of the activity of the group in relation to the needs and/or objectives of the individual. In other words, it relates to the attitude of the individual toward the activity, the group, and the organization.

Trust. Trust in institutions of higher education is defined by Baldrige *et al.* (1980) as a generalized attitude of confidence, or lack thereof, which faculty members hold toward their administration. As used by Gamson (1968), this concept refers to feelings which are expressed in terms of two key elements: bias and efficiency. Bias is expressed by faculty members essentially as a feeling that administrators may or may not "be on their side". The second element of trust is expressed by the faculty's feeling that administrators are efficient, capable of making intelligent decisions, and act accordingly (Baldrige *et al.*, 1980).

Considering the process of trust formation on groups, Gibb (1964) presents a model which specifies dimensions of personal and group

growth. These dimensions are expressed in terms of basic concerns that arise inevitably from all social interaction. The formation of trust refers to a concern with acceptance. It has to do with acceptance of self and others, and consequent growth of confidence. This concern becomes differentiated into concerns about degrees of membership in the various groups of which the person is a part (Gibb, 1964, p. 280).

Loyalty. The second dimension of sentience, loyalty, can be viewed and studied from different perspectives. There is loyalty to the group, to the organization, to the leader, to the task, to the profession. Gouldner (1957; 1958) discusses the professional's dilemma of split loyalties, i.e., loyalty to the profession or to the organization, to the activity system or to the group. In this study, loyalty is measured in reference to the group and to the organization.

The concept of sentience can be viewed by sociotechnical theorists, therefore, as having theoretical similarity to the concept of morale, as used in other fields of study, especially in terms of their component dimensions.

This study, referring to social systems, is concerned with perceptions of faculty and administrators about which are the required roles by the administrators, and which are the expected

roles by faulty. Difference scores were used as a measure of discrepancy and dissatisfaction with the present situation. Also, as elements of social systems, the research considers trust in the administration and loyalty to the organization. Two Lickert-type scales were designed to measure these aspects.

Technological System

All kinds of enterprise or organization use certain procedures, with the aid of mechanical devices or not, to produce their desired results. Although this conversion process is common to any kind of organization, it is still quite difficult to isolate for the purposes of empirical research an organizations's technology and measure it.

Sociotechnical systems theory emphasizes the importance of the technological sub-system and its compatibility with the social sub-system. The primary principle of this theory, as mentioned before, refers to the influence of the level of compatibility which exists between these two sub-systems on the effectiveness of the organization. Although the importance of technology is inherent in any kind of organization, many problems still exist concerning this construct and consequently with its measurement, especially for higher education organizations.

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Technological Construct. Technology can be defined in very broad or in narrow terms. Studies reporting difficulty in defining the construct of technology emphasize the multidimensionality of the concept (Hrebiniak, 1974; Lynch, 1974; Mohr, 1971). The narrowest definition encompasses machine technology, i.e., "the mechanical means for replacing human effort and for producing goals and services" (Kast & Rosenzweig, 1976, p. 181-2). Broader definitions of technology are based on the idea that technology represents knowledge about how work is accomplished (Cuddy, 1978), or represents the totality of methods and systems for improving efficiency (Ellul, 1964). Essentially, technology can be conceptualized as the means by which inputs are transformed into outputs on a predictable basis (Slocum & Sims, 1980).

Perrow (1967) suggests a perspective to study organizations which assumes that (a) technology is an independent variable and that structure and goals are dependent variables (this perspective deals with the enterprise as a whole rather than in terms of specific processes of parts); (b) technology is the best basis for the comparison of organizations; and (c) the work done is a defining characteristic of the organization.

Perrow's concept of technology is sufficiently broad to permit the study and comparison of technologies of many different types of organizations (Lynch, 1974). Perrow defined organizational

technology as

the actions that an individual performs upon an object, with or without the aid of tools or mechanical devices, in order to make some change in that object. The object or 'raw material' may be a living being, human or otherwise, a symbol or an inanimate object (1967, p. 195).

Studies in technology have remained exploratory since the boundaries of the construct itself are still unclear (Hage & Aiken, 1969) and since there are so many organizational variables necessary for its measurement that discrimination of the most important ones is still not evident (Lynch, 1974).

In summary, from the examination of definitions of technology, the following elements emerge: *operations*, which are found mostly in industrial organizations (Woodward, 1965); *tools*, instruments, machines and technical formulas (Dubin, 1968); *transformation processes* in which action, with or without tools, is performed upon an object (Perrow, 1967); and *machines* to transform inputs into outputs (Hunt, 1970). Different concepts of technology and, consequently, how it is studied or measured, make it extremely difficult to compare different studies.

Technology in Education Organizations. In human educational service organizations, a distinction should be made between hardware definitions of technology, and more generic definitions, such as "a derivative or application of an underlying science" (Lumsdaine, 1964, p. 372). This definition is similar to those proposed by Hunt (1970), Ellul (1964), and Cuddy (1978). In this broader sense, technology refers to the systematic application of scientific principles, and possibly hardware, to some work or process. This concept of technology is the one used in this study in considering the areas of teaching and research.

Compatibility. Sociotechnical theories affirm that organizational objectives are best met not by the optimization of the technical system and the adaptation of a social system to it, but by the joint optimization of technical and social aspects (Cherns, 1976, p. 63). The same author defines the principle of compatibility as the first principle of sociotechnical systems, that "the process of design must be compatible with its objectives" (p. 63). Compatibility, congruence and joint optimizations are emphases given by sociotechnical theorists which reflect the importance of the interrelationships among the different elements of the system. In this study, the level of compatibility is measured in terms of (a) the level of correlation or congruence within and between the different components, i.e., primary task, social system, technological system, and structure; (b) the level

of agreement in perceptions of these aspects as measured by difference scores. Organizational effectiveness is defined by the following indicators: (a) productivity (i.e., the quantity of outputs as measured by the percentage of graduates and index of publications); (b) participant-satisfaction (i.e., the extent to which faculty and administrators are satisfied with working conditions and student characteristics); (c) social impact (i.e., the reaction of graduates to the results of the organization, or the relevance of the program to their professional performance).

Organizational Effectiveness

Organizational effectiveness has been a growing concern of researchers, administrators, and government officials in the recent decades. Studies show that different concepts of organization lead to a variety of definitions and approaches to organizational effectiveness and different criteria for its evaluation (Cameron, 1978). As a consequence of this variability, the assessment of organizational effectiveness is a very complex task. There are various decisions to be made in relation to diverse aspects of the study, such as (a) the approaches or models of effectiveness to be used; (b) types and levels of measurement to be taken; (c) criteria to be used for empirical assessment; and (d) strategies for the research selected.

Organizational Perspectives for the Study of Effectiveness

An organization can be viewed essentially from three points of view. The first is the position that the only purpose of an organization is to ensure efficient task performance for the attainment of desired results. From this viewpoint, effectiveness is defined as the ability of an organization to achieve certain objectives. Compatible to this position, the following models to study effectiveness are identified: (a) the goal model which focuses on goals as a central theme in the concept of organizations and their effectiveness (Campbell, 1977; Etzioni, 1964; Georgopoulos & Tannenbaum, 1957; Price, 1972; Steers, 1975); and (b) the process model, with a focal point in the managerial process. In this model, effectiveness is viewed as synonymous with internal organizational health, efficiency and adequate internal processes and procedures (Argyris, 1964; Bennis, 1966; Likert, 1967).

A second perspective, according to Miller & Rice (1967) considers that the primary task of any enterprise is to satisfy the needs of those who work in it. Related to this perspective is the participant-satisfaction model. Based on work by theorists such as Barnard (1938), Cyert & March (1963) and Friedlander & Pickel (1967), the participant-satisfaction model is suggested by Keeley (1978). The central idea of this approach is that organizational

success or effectiveness is relative to the interests of various participants. The basic assumption is that organizations exist ultimately for human benefit.

The third perspective from which organizations may be defined and studied views the benefit of society and needs of client groups as the focus for conceptualization and study of effectiveness. Three models are consistent with this perspective: (a) the functional model in which an organization's effectiveness is determined by the social consequences of its activities (Fremont, 1975; Merton, 1956; Parsons, 1960); (b) the ecological model suggested by Miles (1980), which assumes that effectiveness of organizations may be assessed in terms of their ability to minimally satisfy goals imposed upon them by their various constituencies and (c) the social justice model suggested by Keeley (1978), which emphasizes the satisfaction of interests of various participants as the indicators of organizational effectiveness.

The approaches presented above represent only one classification scheme describing the various perspectives and models used in the past to study organizational effectiveness. A particular conceptualization of organizational effectiveness is a function of either the values, interests and special interests of the researcher or of the nature, characteristics and processes of the

organization being studied. The particulars of this construct influence the approach, the methods and the data to be used in the study (Campbell, 1977).

A broader definition of organizational effectiveness can be stated as the capacity for being effective or of producing effects. From this concept emerges the relationship of effectiveness to goals and obtained results and to the general characteristics and processes of an organization as well as to other organizations which are influenced by these effects.

As a consequence of the present state of research and knowledge related to effectiveness, a study must have certain minimal attributes to be adequate. Goodman & Pennings (1977) include among the desired characteristics of studies of organizational effectiveness:

1. an explicit view of the organization;
2. a precise definition of effectiveness;
3. a domain in which the concept of effectiveness, i.e., the construct space, may be said to function;
4. the perspective of different groups, i.e., constituencies, that determine the type of criteria and the level of effectiveness desired;
5. a framework which defines determinants of organizational effectiveness. This problem is complex since the determinants are found at the individual, role, group, organizational and environmental levels. The framework must also separate the determinants of organizational effectiveness from the criteria of effectiveness;

6. adequate research strategies.

The approach or model to be used will depend upon these variables.

Assessment of Organizational Effectiveness. Many problems arise in the assessment of organizational effectiveness. The first, as mentioned, is the concept of effectiveness itself, or the construct used in the study. Cameron summarizes observations about the concept of effectiveness as

In short, organizational effectiveness may be typified as being mutable (composed of different criteria in different life stages), comprehensive (including a multiplicity of dimensions), divergent (relating to different constituencies), transpositive (altering relevant criteria when different levels of analysis are used), and complex (having non-parsimonious relationships among dimensions) (1978, p. 604).

Level of Measurement. The choice of criteria of organizational effectiveness can be viewed as being on a suborganizational, organizational, and super- or extraorganizational level (Kahn, 1977). Effectiveness related to the attainment of goals can be examined at the individual, organizational and societal level. Effectiveness would be facilitated with the discovery of better means of integrating personal and societal goals with organizational objectives. This does not mean that organizational and individual goal must be synonymous. In fact, individuals and organizations often exchange resources in order to meet their

respectives goals (Zey-Ferrel, 1979). The level of measurement is dependent upon the definition of effectiveness. If, e.g., a researcher defines effectiveness of an organization as the degree to which it is instrumental to its members in the achievement of their goals, the measurement will be at the individual and/or group level, rather than at the organizational level.

Problems of Indicators. A decisive aspect in the study of effectiveness is the identification of indicators. Cameron (1978) defined four types of problems related to indicators:

1. the organizational aspects being considered;
2. the universality or specificity of the indicators;
3. the normative or descriptive characteristics of the indicators;
4. the static and dynamic qualities of the indicators.

Several authors (Friedlander & Pickle, 1968; Georgopoulos & Tannenbaum, 1957) suggest that effective organizations have the same characteristics and can be studied by the same indicators. The characteristics or indicators of effectiveness are adaptability, sense of identity, absence of strain, and the capacity for reality testing. Others point out that organizations have different characteristics, goals and constituencies, and that each organization (or type of organization) requires a unique set of effectiveness indicators (Hall, 1972; Scott, 1977). The researcher, in other words, must choose a level of specificity

for indicators, i.e., universal or specific (Cameron, 1978).

A related problem refers to the use of derived or prescribed indicators. The study of effectiveness can be approached deductively by stating the standards which the organization must meet to be effective, as suggested by Argyris (1962), Bennis (1966), Likert (1967) and McGregor (1960). An alternative approach in which organizational characteristics are described and inductively derived has been suggested by Price (1972), Steers (1977), and Webb (1974). Finally, the problem associated with the dynamic versus static nature of the variables studied should be mentioned.

Alternative Strategies for Research. Identifying research strategies which can be carried out in the real world to investigate what independent variables actually distinguish between effective and ineffective organizations is an important issue. Campbell (1977) suggests that only two choices are available, (a) carefully done simulation studies, and (b) very intensive and very thorough case studies. In this context, a case study refers to a very intensive, longitudinal monitoring of each relevant variable in a specific organization, using a variety of observational and data collection techniques. Case studies can offer considerable potential for learning something fundamental about the interrelated facets of organizational

effectiveness.

Measurement. Measurement and evaluation of organizational effectiveness is related to decision-making (Campbell, 1977). Results of effectiveness studies can influence different kinds of decisions made within organizations. They can be the bases for diagnosis, planning, comparisons, evaluation, organizational innovation, creation of knowledge about organizational phenomena, and about effectiveness and its determinants. The purpose of this study is to describe the characteristics of a Brazilian university, to appraise the perceptions of faculty members and administrators regarding some indicators of effectiveness and their possible determinants, and, finally, to test a model derived from sociotechnical theory for analyzing university organizations. The results may be used to help in the making of various kinds of decisions and for the generation of knowledge about organizational effectiveness and especially the effectiveness of universities.

This study attempts to integrate the three organizational perspectives presented above and considers the characteristics of studies of organizational effectiveness suggested by Goodman & Pennings (1977). Related to these perspectives, this study considers that (a) to achieve certain results is a primary reason for an organization to exist; (b) not only the organization as

conceived and designed by its members is an instrument for the performance of various tasks to attain the expected results, but it also is an instrument by means of which diverse constituencies satisfy specific needs and achieve personal and professional objectives; and (c) the results of the efforts of an organization are an important input for other organizations in the social context. Relevance, in this case, is related to the benefits to society and needs of the client groups.

Effectiveness of higher education organizations, as defined before, consists in the present study of (a) productivity, (b) participant-satisfaction, and (c) social impact. In terms of domains, these indicators refer to (a) the academic domain (i.e., specific results, according to the nature of the organization that is an educational one); (b) the morale domain, especially as it relates to satisfaction; (c) the external adaptation domain, or the influence of the results on other organizations.

Trying to initiate a study of organizational effectiveness of universities, faculty, administrators and graduates are the groups considered as informants. The author is aware that other groups should be considered in a more comprehensive study, such as students and other members of the university organization. The theoretical framework which gives support to this investigation is sociotechnical systems theory which defines some deter-

minants of organizational effectiveness.

Effectiveness of Universities

The purpose of universities can be stated as being (a) the promotion of human development through teaching (i.e., the dissemination of knowledge, development of personal and professional skills, and of attitudes and values); (b) the creation of knowledge through research; (c) the discovery of solutions to social problems through projects and research. In other words, the basic responsibility of academic institutions are educational and scholarly research (Blau, 1973). This specification of functions and responsibilities of the university is essential in providing bases for the examination of the issue of effectiveness in relation to universities.

Few studies exist on the effectiveness of educational institutions, especially higher education institutions. In the last decade, some researchers have been concerned with effectiveness in higher education institutions from an organizational effectiveness standpoint (Cameron, 1978; 1981; Hartnett & Centra, 1977; Jauch & Glueck, 1975; Sadlask, 1978).

The Concept of Effectiveness Applied to Academic Organizations

The concept of effectiveness has been studied and discussed over the past 50 years (Cameron, 1978), but this concept has been used in relation to educational organizations only for the last 10 years. Most of the existing literature about effects of organizations of higher education is concentrated on learning. Nehari & Bender (1978), e.g., conducted a study measuring the concept of effectiveness related to outcomes of higher education. In this study, a conceptual model is presented based on the humanistic theory of education, using the learner's perception of meaningfulness of the learning experience as a measure. They used inventories to measure content learning, personal learning and behavioral learning.

Analyzing the results of studies such as these illustrate the way in which studies frequently concentrate on only one of the functions of organizations of higher education and/or academic departments, i.e., learning. Research, services and administration as support systems are not examined. Jauch & Glueck (1976) conducted a study related to research using multiple measures both objectively and subjectively. The results showed that a simple count of publications (i.e., total number of publications) was the best objective measure of research performance of faculty and indirectly of effectiveness of academic departments in terms of research production. These authors suggest that new studies

be conducted that serve to better refine criteria as well as to establish a more adequate model of evaluating research and publication performance.

Cameron (1978) conducted an empirical study that attempted to deal with several of the important problems related to organizational effectiveness. In this study, nine dimensions of effectiveness were defined, as presented in Table 1. These dimensions were formulated through a primary study using interviews with individuals associated with a variety of institutions of higher education to insure that the indicators could be measured. The interviews were supplemented by questionnaires and the results of both were analyzed in terms of reliability and validity of the effectiveness indicators. A second study was designed to refine and improve the instruments in terms of their psychometric properties. Defining nine dimensions, the development of a network for the measurement of university effectiveness was initiated. It is suggested by Cameron that, by inductively deriving criteria, by focusing on organizational attributes rather than operationalized goals, and by carefully selecting sources and types of criteria to indicate effectiveness, important dimensions of effectiveness can be identified. Using the same instrument, Cameron (1981) studied some 41 institutions of higher education in the United States. The analyses showed that four major domains of effectiveness exist for colleges and

Table 1

Dimensions and Criteria of Academic Effectiveness

<i>Dimension</i>	<i>Criterion</i>
1. Student education satisfaction	Degree of satisfaction of students with their educational experience.
2. Student academic development	Extent of academic attainment, growth and progress.
3. Student career development	Extent of occupational development, emphasis, and opportunities provided.
4. Student personal development	Level of development in non-academic, noncareer oriented areas.
5. Faculty and administrator employment satisfaction	Degree of satisfaction of faculty and administrators with job and employment at the institution.
6. Professional development and quality of faculty	Extent of professional attainment and development of the faculty.
7. System openness and community interaction	Degree of interaction with, adaptation to the external environment and services.
8. Ability to acquire resources	Extent of acquisition of resources from the external environment.
9. Organizational health	Level of benevolence, vitality, viability in internal processes and practices.

(adapted from Cameron, 1978, p. 614)

universities from the standpoint of the internal dominant coalition - an academic domain, a morale domain, an extracurricular domain, and an external adaptation domain. The conclusion is that an institution can be effective in one or more domains

and not in others.

There is no doubt that results are being produced by educational and other types of organizations. The critical problems are to identify what kinds of results and what organizational characteristics or variables are producing these results. It is probable that a more comprehensive framework is needed which contemplates a variety of organizational dimensions or variables that can affect organizational outcomes. This framework would serve to describe the situation and to provide the basis for inferences about effectiveness and some of its determinants.

Framework for Studying Effectiveness of Universities

To study effectiveness, a model is needed that will first specify multiple dimensions and their specific measures of effectiveness, and, second, be useful as a conceptual framework for comparative purposes. This model can be derived from systems theory requirements which are related to the organization's internal and external environment. Cameron (1980) argues that none of the four models used to study effectiveness, i.e., the goal model, the systems resource model the process model, nor the strategic constituencies model, are appropriate for organizations such as colleges and universities, because of their anarchistic nature. Goodman (1979, *apud* Cameron, 1981) argues that different models of effectiveness are needed for different types of organizations

and that appropriate models may differ even among organizational subunits.

Rice (1970) views the university as an open system and states that the university, like any other kind of organization, has a primary task, i.e., the task it must perform in order to survive, an import-conversion-export process, i.e., the process by which the primary task is performed, and a boundary which separates the system from its environment. Two models are presented below which demonstrate potential for use in studies about organizational effectiveness of universities.

The Normative Model. The present stage of development of knowledge and use of strategies to analyze effectiveness of organizations of higher education present many questions and uncertainties. As mentioned before, the use of a rational model of organizations that assumes a coherent and explicit set of collective goals toward which every action is directed and results are measured, is not the most realistic one or appropriate one for the study of higher education organizations.

One alternative is to use a normative model (Mandelbaum, 1979), better suited to the characteristics of a contemporary university. According to this author, the model is appropriate for what he calls *intelligent coalitions*, defined by three

conditions: (a) a lack of the need to decide on a particular set of goals, but a willingness and ability to measure the outcomes of its actions along the dimensions considered relevant; (b) intelligent inquiry that goes beyond the assessment of the dynamics of 'production', i.e., a necessity to move toward the understanding of influences in all process that occur in organizations of higher education. and (c) the willingness and ability of the organization to alter the production process in order to achieve preferred results.

In sum, by exercising these three conditions, a university can constitute an *intelligent coalition* and improve its level of effectiveness, by measuring results, evaluating the conditions for its achievement and providing for improvement of effectiveness in organizations of higher education.

The Sociotechnical Systems Model. Social scientists at the Tavistock Institute conceptualized the organization as a sociotechnical system, emphasizing the integration of social and technological environment as the core aspect to be considered in a study of effectiveness. The use of this frame of reference in the study of the organization or to promote change and improvement requires: (a) understanding of the social processes that occur in organizations; (b) understanding of the technological processes used by the organization; (c) use of the open systems theory, as

no two organizations are exactly alike or are faced with the same environmental demands; and (d) understanding and use of mechanics of change for design and provision for continual adaptation of the organization to new environmental demands (Pasmore & Sherwood, 1978).

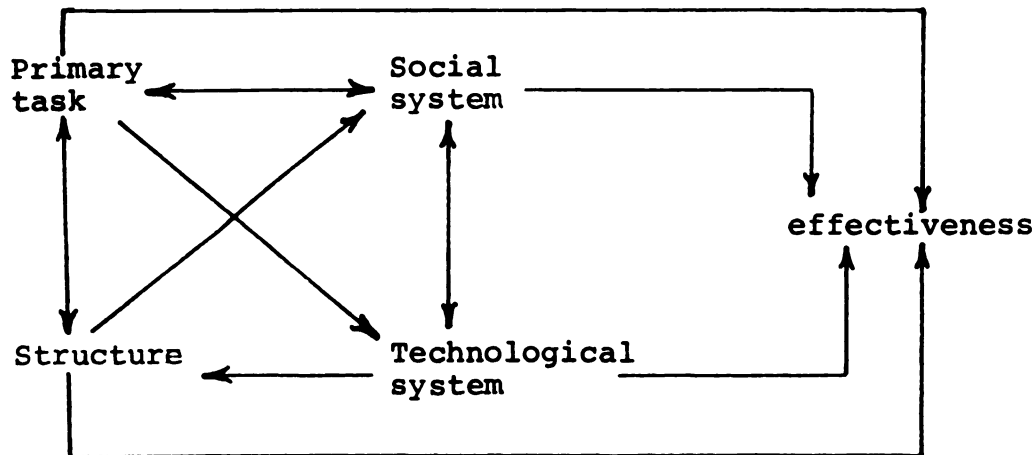
Sociotechnical theory is a frame of reference which can be used for organizational diagnosis as well as to promote change. It views the organization as an open system and emphasizes the interrelationships, especially between the social and the technological sub-systems as essential to effectiveness. Sociotechnical systems theory also provides a frame of reference for organizational development that typically involves restructuring of work methods, rearrangements of technology, and the redesign of organizational social structures.

This frame of reference integrates the open systems model and the so called normative model. The present study will attempt to use sociotechnical systems theory as the theoretical frame of reference to examine organizational aspects of a Brazilian university. Based on this theory, a model was structured and scales to measure the various variables were constructed. The model and the instruments were tested in this study.

A Model to Study Effectiveness. Organizational effectiveness, as was indicated earlier, may be studied from different points of reference. The model shown in Figure 1, which is based in sociotechnical theory, was employed to study organizational effectiveness of a Brazilian university.

Figure 1

A Sociotechnical Framework for the Study of Organizational Effectiveness of Universities



In this model, *effectiveness* is viewed as a function of different organizational components, and of the level of compatibility among them. Effectiveness is conceptualized as the production of effects or results, expected or not, relevant to internal and

external constituencies and is measured by means of three indicators: (a) production, i.e., percentage of graduates and number of publications related to number of FTE (full time equivalent) engaged in research; (b) participant-satisfaction, i.e., the extent to which faculty and administrators perceive that individual professional needs are satisfied in the job situation; and (c) impact, i.e., the extent to which graduates perceive the results of education provided by the university as being adequate to professional performance. The overall effectiveness may be represented by a combined score on these three measures.

Contributions to the Construct of Effectiveness

As was mentioned earlier, there is no consensus on the concept of effectiveness or agreement concerning the definition of organizational effectiveness. Campbell approaches this problem as follows:

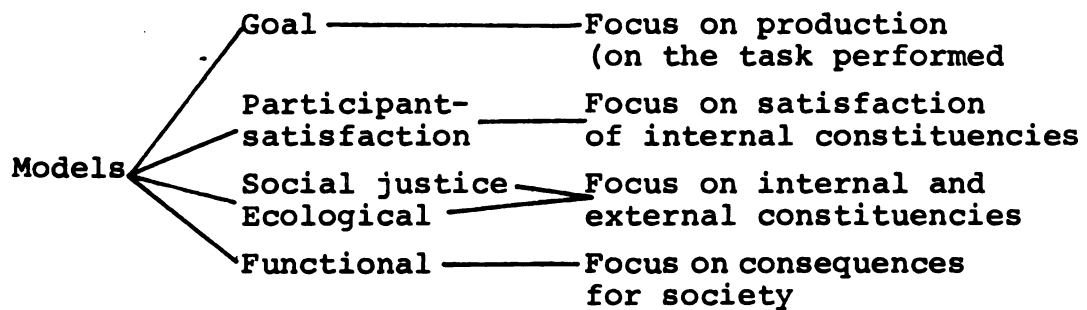
The meaning of organizational effectiveness is not a truth that is buried somewhere waiting to be discovered if only our concepts and data collection methods were good enough. As with theorists in general, a particular conceptualization of organizational effectiveness may be useful only for certain purposes. The usefulness of a particular formulation is a function of both the values of the user and the facts of organizational life (1977, p. 15).

The conceptualization of organizational effectiveness used in the model presented in Figure 1 is based on the integration of various contributions (i.e., goal, participant-satisfaction, functional, social-justice and ecological models). Figure 2

illustrates the specific contribution of each of the models to the study.

Figure 2

*Contributions to the Construct of Organizational
Effectiveness of Universities*



The Goal Model. As discussed above, the goal model or goal approach focuses on the organization's ability to achieve its goals (Etzioni, 1964; Parsons, 1960; Perrow, 1970; Simon, 1964).

This approach uses the idea of official goals, i.e.,

general purposes of the organization as put forth in the charter, annual reports, public statements by key executives and other authoritative pronouncements

as well as the concept of operative goals:

designate[d as] the ends sought through the actual operating policies of the organization; they tell us what the organization is actually trying to do, regardless of what the official goals say are the aims (Perrow, 1961, p. 855).

Despite criticism of the goal model, the concept of operative goal can be a useful one in the analysis of organizations, and contributes to a better understanding of them (Etzioni, 1960; Hall, 1972; Price, 1968; Steers, 1975).

The present study uses a sociotechnical goal concept which stresses primary task, i.e., the task an institution or sub-institution must perform if it is to survive (Miller, 1963; Miller & Rice, 1967; Rice, 1970). This concept makes the construction and comparison of different organizational models possible, based on different definitions of the primary task (Miller & Rice, 1967). The present study proposes, in relation to primary task, (a) to describe perceptions of faculty and administrators about what the operative (i.e., required, actual)

and the expected (i.e., ideal) primary tasks are for different programs in the university, and (b) to identify the level of compatibility (i.e., relation) among primary task(s), social system(s) (i.e., roles and sentience), and technological system(s).

The Participant-Satisfaction Model. The participant-satisfaction model is based on ideas presented by Barnard (1938), Cyert & March (1963) and Friedlander & Pickle (1967), and represents a relativistic notion of the organizational effectiveness. The focus of this approach as was already noted is that organizational effectiveness is relative to the interests of various organizational participants. Its basic assumption is that organizations exist for the benefit of human participants. The model constructed to support this study considers only certain organizational members as participants. The underlying assumption is that there is conflict between the expectations and needs of the organizational members and the expectations and needs of external constituencies. Each group views the organization from diverse perspectives and each expects different results. This fact is recognized as one limitation of the research. The present study deals with (a) satisfaction of internal members, i.e., faculty and administrators, in terms of their working conditions and goal attainments, and (b) perceptions of graduates in terms of the relevance of the program

for professional performance. It does not include students and members of other organizations.

Other Models. The other three models, i.e., functional, social-justice and ecological, which serve as references for the study of organizational effectiveness, emphasize the importance of social consequences of organizational activities. These approaches are derived originally from Parsons, who stressed an orientation toward the attainment of social benefits as the primary defining characteristic of an organization, stating:

An organization is a system which, in the attainment of its goals, "produces" an identifiable something that can be utilized in some way by another system; that is, the output of the organization is, for some other system, an input (1960, p. 77).

The ecological model (Miles, 1980) explicitly recognizes the roles of both external and internal constituencies in shaping goals, operations, and in the ultimate survival of the organization. From the ecological perspective, an organization must pursue the most adequate mix of goals to be effective. The appropriateness (i.e., the ability to satisfy external constituencies) of a set of goals is considered an essential element of organizational effectiveness. In this same manner, the social-justice model (Keeley, 1978) stresses the satisfaction of needs and expectations of strategic constituencies.

The Construct of Effectiveness of Universities

As a consequence of the various models presented above, three indicators are considered in this study as part of the effectiveness construct. These indicators are (a) production, (b) participant-satisfaction, and (c) social impact. This multiplicity of indicators is due to logical reasons related to the multidimensionality of the concept of effectiveness.

Production. Various lines of inquiry have been developed in different studies of educational productivity. In technical terms, productivity is defined as the value of outputs relative to the value of inputs. The definition of productivity in the field of higher education depends on perceptions of the value of products and services. This definition is interpreted in a variety of ways as it relates to different decisions, policy issues and persons involved in higher education (Walhaus, 1975). Considering the wide range of products, such as student growth and development, community services, generation of knowledge and art forms, differences in perceptions of productivity are understandable (Gross & Grambsch, 1968; Micek & Walhaus, 1973).

Walhaus identified three productivity constructs which can be used in studies of higher education organizations:

1. resource use (efficient use of resources) which refers to the production of the maximum output, given the inputs; focus is on *products*.

2. allocative efficiency, which relates to the possibility of output increasing by changing the input mix or by allocating resources differently; focus is on *policy*.
3. preference efficiency, which is concerned with the values of output for society; focus is on the *mission* of the organization.

To summarize, the conceptualization of productivity in higher education may be related to the quality of products, (given a set of inputs) to policy issues, and to missions and goals (related to their relevance to society).

Like other service-oriented institutions, colleges and universities have had difficulty in developing measures of effectiveness that could be used to justify the use of public and private resources and to make comparisons among organizations (Cameron, 1975). Besides the problem of conceptualization, and perhaps because of it, measurement of productivity in institutions of higher education is problematic in terms of availability of data and computational technique. The most widely used measures are the student/faculty ratio and cost per student or cost per student credit hour. Quality is generally ignored. Factors influencing these various ratios generally are not identified or measured.

Another problem or deficiency to be pointed out is that the ratios mentioned relate only to teaching. Other activities, which play a significant role in universities, cannot be measured

and evaluated in terms of a single type of ratio. In addition to multiple outcomes, universities utilize a large number of resources (faculty, administrators, non-professional staff, classrooms, laboratories, supplies, etc.) These multiple resources also require multidimensional approaches, i.e., measures in order to more accurately reflect organizational productivity (Carlson, 1975).

This study recognizes that outputs are not only related to inputs, but are a function of organizational processes and numerous other factors such as characteristics of the entire educational environment. Given all these difficulties, the present research will not attempt to deal with the productivity in the broad sense discussed above, but will concentrate instead on a more limited aspect of productivity, i.e., production or quantity of outputs, related to some input.

Satisfaction. Quality of life or life satisfaction is an understandable, reasonable and legitimate goal for every human being (Sutermester, 1976). Job satisfaction is part of this broad goal to achieve life satisfaction and some researchers have considered satisfaction as an indicator of organizational effectiveness (Cameron, 1978, 1981; Campbell, 1977; Friedlander & Pickle, 1968; Negandhi & Reimann, 1973).

The participant satisfaction model presented by Keeley (1978) stresses that organizational success or effectiveness is relative to the interests of various participants. The author contrasts the goal model with this model which holds that organizations are entities that exist not to pursue their own ends, but exist ultimately for human benefit. Consequently, organizational goals are important only insofar as their pursuit results in benefit to the participants. As participants the Keeley model includes both internal and external constituencies.

The present study distinguishes between the term *participant-satisfaction*, which refers exclusively to internal members of an organization (in the present case, faculty and administrators), and the term *impact* which refers to the consequences of organizational actions or to the satisfaction (perception of results) by external constituencies, i.e., graduates of the university. This differentiation is needed because different constituencies may disagree over organizational effects.

Impact. Different frames of reference, such as the social-justice model, the ecological model, the functional model, have emphasized the relevance of organizational consequences or impact upon other organizations as a critical element in the study of organizational effectiveness. The concept of impact used in the present study uses these three models as references. The satisfaction of members of other organizations (i.e., graduates of the university) is the indicator of this dimension of effectiveness.

Chapter III

METHOD

This study describes some of the academic programs at a Brazilian university and attempts to explain differences among them in sociotechnical terms. The design is exploratory and develops methods and instruments to be employed in other studies about organizational effectiveness of universities.

Population and Sample

The Federal University of Rio Grande do Sul (UFRGS) in Porto Alegre, RS is the organization participating in this study. At UFRGS the academic fields are grouped in four fundamental areas, comprising 82 academic departments responsible for 45 undergraduate and 37 graduate programs (cf. Table 2). Of the latter, 32 are at the MA level, five at the PhD level. Faculty are principally connected with a department, yet participate in the course offerings of several programs. Programs are built around courses from different departments and are academically coordinated by a committee responsible for curriculum, quality control of teaching and learning, evaluation, and criteria for admission to the program.

Table 2
Number of Departments and Programs at UFRGS

	A R E A S				TOTAL
	(1)	(2)	(3)	(4)	
*Departments & Programs					
Departments	34	29	13	6	82
Undergraduate Programs	20	7	8	10	45
MA Programs	13	15	3	1	32
PhD Programs	2	2	1	-	5

*The areas are: (1) Basic Sciences and Technology
 (2) Biological Sciences
 (3) Philosophy and Social Sciences
 (4) Letters and Arts

Source: UFRGS, PROPLAN, 1981.

Several additional points need to be stressed regarding the situation presented in Table 2. First, while the basic, i.e., Natural Sciences and Technology constitute a single area at UFRGS, departments and programs were divided between two areas for the purpose of the present study. Second, some the the graduate programs do not have corresponding undergraduate programs. This is especially true in the biological sciences, where there is one undergraduate program in human medicine, but five MA level programs in various medical specialties. Third, for a variety of reasons that have no direct bearing on this study, at

the time of the reform, certain programs were classified as belonging to the area of Technology, while they might better fit in the Social Sciences. One example of such a program is economics.

Table 3

Number of Graduate Programs by Area

*Programs	A R E A S					TOTAL
	(1)	(2)	(3)	(4)	(5)	
MA Level	3	6	15	7	1	32
PhD Level	2	-	2	1	-	5

*The areas are: (1) Basic Sciences
 (2) Technology
 (3) Biological Sciences
 (4) Philosophy and Social Sciences
 (5) Letters and Arts

Source: UFRGS, PROPLAN, 1981.

Choice of Programs for the Study

The first criterion in choosing a program for inclusion in the present study was that it offer both an undergraduate and graduate level program. Applying this criterion, sixteen "multilevel" programs may be found at UFRGS, as indicated in Table 3. Of these, ten were randomly selected and included in

the present study (cf. Table 4 below).

Table 4

*Distribution of Programs at UFRGS Offering
Graduate and Undergraduate Programs*

Basic Sciences

MA *Mathematics

PhD Geology

*Physics

Applied Sciences

MA Administration

*Agronomy

*Architecture

*Engineering

Biological Sciences

MA Biology

Dentistry

*Medicine

*Pharmacy

PhD Cardiology

Genetics

Letters and Arts

MA *Economics

*Letters

*Philosophy

Sociology & Political Science

PhD Education

*Included in the present study

Respondents

As indicated below, there are two levels of analysis, first by programs, and then by individual respondents.

Program Level Subjects

Tables 2 and 3 above presented the distribution of the departments and of the graduate programs at the Federal University of Rio Grande do Sul (UFRGS). Table 4 presents the distribution of the programs that offer *both* undergraduate and graduate degrees, and furthermore indicates the distribution of the ten randomly selected programs included in the present research.

Individual Respondents

Two groups of respondents were studied, (a) faculty and administrators associated with the programs indicated above, and (b) graduates of the programs.

Faculty and Administrators. All administrators of the selected programs were considered in the survey, including deans of colleges, directors of institutes, coordinators of academic committees, graduate and undergraduate programs, as well as department heads. An equal number of faculty members were randomly selected from a sampling frame list of faculty members of each undergraduate and graduate program covered by the list of

programs indicated in Table 4. A total of 105 faculty and administrator responded, representing 50% of the sample selected. Characteristics of these respondents are presented in Table 5.

Graduates of Programs. In order to study the effectiveness of the selected programs, graduates of these programs were interviewed regarding their perceptions of their programs. A simple random sample of individuals was selected from a list of organizations in the Greater Porto Alegre area employing graduates from UFRGS. The 71 respondents represent 70% of the sample selected. Characteristics of these respondents are presented in Table 6.

Instruments

The Research Model

Sociotechnical theory and the effectiveness models presented in the previous chapter provide the foundation for a research model used in this study to analyze a university in terms of its effectiveness. A more complete version of the preliminary model presented in Figure 1 is shown in Figure 3. Each of the five basic elements of the model, i.e., primary task, social system, technological system, structure, and effectiveness, as discussed above, will be addressed in the instruments utilized in the present research. Two questionnaires, one for faculty and administrators, and one for graduates of the university, were specially developed to collect the data for this study.

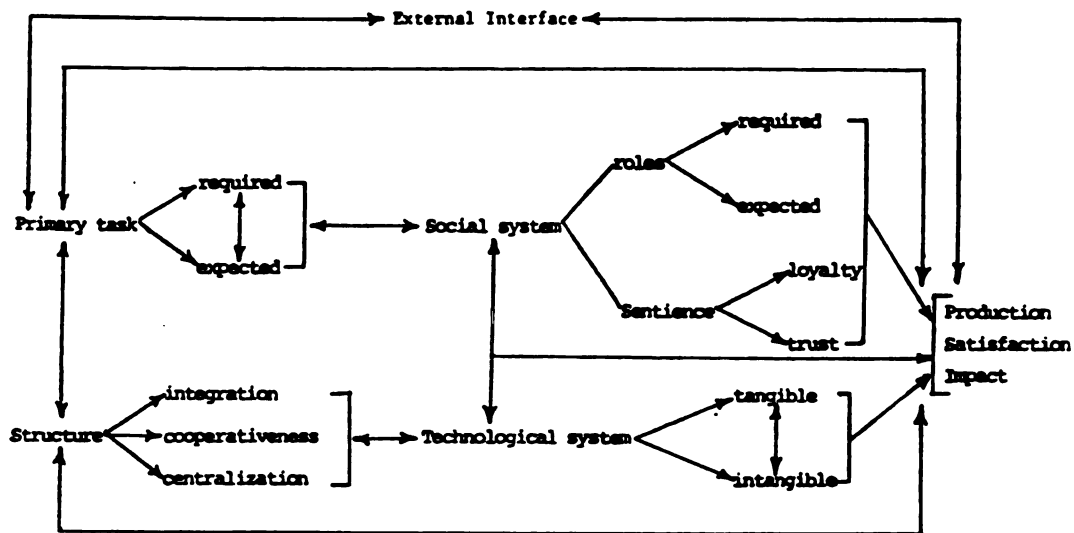
Questionnaires for Faculty and Administrators

A copy of the original questionnaire in Portuguese is presented in Appendix A (page 141), a translation in Appendix B (page 165).

Part I of the questionnaire gathers background information about the respondent (cf. page 166 [1]), covering such information as position in the university, program affiliation, rank, type of contract, and qualification.

Figure 3

*A Research Model for the Study of
Organizational Effectiveness of Universities*



Part II (cf. page 168) is composed of a series of five level items, forming Likert type scales, regarding the *actual* and the *ideal* task or goal of a university program, according to the

[1] All references are made to the *translation* of the questionnaire, rather than the original.

variables of the model. This questionnaire was constructed according to the theoretical framework used in this study, i.e., sociotechnical systems theory. Consequently, the scales relate to each of the major variables of the general model, as follows:

Primary Task. Items 12.1 to 12.10 ask the respondent to indicate the importance that each of the 10 possible goals currently or *actually* has in their program. These items are based on the experience of the researcher as a faculty member, as well as on the academic bylaws of the institution. Items 13.1 to 13.10 repeat these questions, asking for the importance that each goal should have, i.e., the *ideal* task or goal. Item 14 finally asks for a rank order of the three most and three least important actual and ideal goals.

Part III (cf. page 171) presents a series of questions regarding the *social* and the *technological* system of the university.

Roles. Items 15.1 to 15.10 ask the respondent to indicate the emphasis that each of the 10 possible roles currently or *actually* receive, while items 16.1 to 16.10 repeat these questions with respect to the *ideal* role. Item 17 finally asks for a rank order to the three most and three least emphasized roles, both actual and ideal.

Technological System. The technological characteristics of the university were determined through items 18 to 36. As defined earlier, technology refers to the work done in organization ,x s, and specifically to the "actions that an individual performs upon a living being, human or other-wise, a symbol or an inanimate object" (Perrow, 1967). In this study, two dimensions of technology were considered: the tangible and the intangible dimensions referring, respectively, to material conditions, procedures and resources (items 18 to 32), and the normative aspects, i.e., policies and norms (items 33 to 36). Items dealing with technology were generated on the basis of the previously identified primary task and roles, according to the theory and the experience of the researcher as a faculty member.

Structure. Aspects of structure considered in the present research are integration of teaching (graduate and undergraduate) and research (item 37); cooperation in terms of interdepartmental activities (item 38); and degree of centralization, i.e., the level of participation by faculty in decisions about their program (items 40 and 58). These items were generated directly from the conceptualization of this dimension.

Trust. This scale was developed on the basis of research by Baldrige *et al.* (1980) and Gibbs (1964). Trust is considered as one component of sentience, according to the theoretical model used in the current study. Aspects of trust were measured by items 43 to 49.

Satisfaction. Considered as a relevant result to be achieved by organizations, satisfaction is examined with respect to working conditions, salary, and the characteristics of students (items 50 to 57, and 59).

Loyalty. The other component of sentience is loyalty. It was determined through items 60 to 64, which were generated on the basis of research by Gouldner (1958) and Baldrige *et al.* (1980). This dimension deals specifically with group and organizational identification.

These various scales relate to each other in terms of consistency by one dimension deriving from another (e.g., roles and technology are derived from primary task), or by generating items related directly to the theory as in the case of structure, sentience (trust and loyalty) and satisfaction.

Questionnaire for Graduates

A copy of the original questionnaire for graduates in Portuguese is presented in Appendix C (page 187) and a translation of the questionnaire is presented in Appendix D (page 191).

Part I of this questionnaire gathers background information about the respondents (cf. page 192), covering such information as field of study and current occupation. Questions six through fourteen constitute the body of the questionnaire. The scale *Impact* was derived from questions six, eight to eleven, determining the relevance of the academic program to the professional performance of the respondent. Items seven, *Satisfaction*, twelve, *Competence*, and thirteen, *Influence* of other people to attain the present position, were analyzed individually. Finally, two open questions were asked about modifications that should be introduced in the program to improve it, and about the most important objectives of a university in this connection. Sociotechnical theory, as well as the experience of the researcher constituted the basis for the formulation of the items of this questionnaire.

Pilot Study

A pilot study was conducted with the colaboration of five respondents, three faculty members and two administrators. A number of items were rewritten on the basis of suggestions made from the respondents, improving the understandability of the instrument.

Reliability

The relilability or internal consistency of the scales in the faculty questionnaire was determined through Cronbach's *alpha*. Results for the scales are presented in Chapter IV.

Validity

The validity of the faculty questionnaire was examined on the basis of Pearson correlation coefficients among the different variables, and were inferred by comparing the results with the theory. This procedure is supported by the definition of construct validity, i.e., a demonstrated relationship between hypothetical constructs and a set of measures related to those constructs (APA, 1980). In other words, construct validity is characterized as a validation of the theory underlying the instrument used for measurement.

It is recognized, of course, that construct validity may not be established in a single study. However, this research is

developed as the *beginning* of a series of studies about organizational effectiveness of universities. Results of the validity of the instruments are reported in Chapter IV.

Procedure

Faculty and Administrators

Questionnaires were distributed to faculty and administrators by the secretaries of the academic departments and graduate programs. A cover letter, individually addressed and signed, presented the general purpose of the research and stressed the importance of the collaboration of the respondents. After answering the questionnaires, the respondents were asked to return the questionnaires to the secretaries.

Graduates

Graduate questionnaires were delivered personally to each of the respondents in the organizations selected, one or two weeks later they were collected at the place of work. Again, a cover letter accompanied the questionnaire, explaining the objectives of the study and the importance of responding.

Analysis of the Data

The organizational unit of analysis is an *academic program*, i.e., sets of courses/credits leading to degrees. The analysis of the data was done in two steps. Initially, individual responses were analyzed; next, aggregated data were computed for each of the academic programs. In a second phase of the data analysis, these aggregated data were considered. Using the Statistical Package for the Social Sciences (Nie, et al., 1975; Hull & Nie, 1981), statistical analyses used include an analysis of reliability (Cronbach's *alpha*), as well as analysis of variance and Pearson correlations.

Analysis of Individual Responses

As mentioned before, individual responses were collected from two groups, (a) university faculty and administrators, and (b) graduates of university programs. Major independent variables, such as perception of primary task, roles, trust, loyalty (i.e, components of the social system), as well as components of the technological system, and information regarding structure, were obtained from the first group of respondents (a above). Major dependent variables, such as level of satisfaction, were derived as well from the first group of respondents; while information about impact was obtained from the graduates of the programs. Another dependent variable, productivity of the programs, was determined on the basis of university records..

Aggregate Data Analysis

To test the model presented in Figure 1 (cf. page 48), individual data analyzed in the first phase were aggregated by program (cf. Table 4). The indices derived from this aggregation were used to test the hypotheses related to the model.

Chapter IV

FINDINGS AND INTERPRETATION

The analysis of the data obtained in this study is made from a methodological perspective. The principal concern, consistent with the objective of the study, is to examine the characteristics of the instruments developed to collect the data, and to discuss the procedures used, focusing on the usefulness of the instruments for future studies.

Different, complementary approaches are used to present the findings: (a) the characteristics of the subjects are specified; (b) reliability of internal consistency and validity of the instruments and scales developed to measure the major variables of the model under study are discussed; (c) differences among groups are considered; (d) the use of the proposed theoretical model to study organizational effectiveness of universities are discussed and recommendations for future research are presented.

Characteristics of the Individual Subjects

Two groups of subjects participated in the present study, 105 faculty and administrators, and 71 graduates of programs of the Federal University of Rio Grande do Sul.

Faculty and Administrators

Major demographic characteristics, such as position, sex, academic rank, contract status, and qualification, of the faculty and administrators are presented in Table 5.

Graduates of the University

Demographic characteristics, such as position, sex, age, of the graduates of UFRGS are presented in Table 6.

Instrument Characteristics

A detailed description of the instruments was presented in Chapter III, and copies of them can be found in Appendices A, B, C, and D. As noted above, several different indices were computed from the questions responded to by faculty and administrators.

Table 5
Demographic Characteristics of University Staff

<i>Variable</i>	<i>Category</i>	<i>Frequency</i>	<i>Percent*</i>
Position	Faculty	50	42.9
	Administrator	45	47.6
Sex	Male	79	75.2
	Female	18	17.1
Academic Rank	Full Professor	8	7.6
	Associate Prof	55	52.4
	Assistant Prof	34	32.4
	Auxiliar	1	6.7
Contract Status	Full Time	48	45.7
	40 Hours	29	27.6
	20 Hours	19	18.1
Qualification	Undergraduate	6	5.7
	Specialization	20	19.0
	MA	27	25.7
	PhD	38	36.2
	Livre Docencia	9	8.6

*Does not add to 100% due to missing answers.

Table 6
Demographic Characteristics of Graduates

<i>Variable</i>	<i>Category</i>	<i>Frequency</i>	<i>Percent*</i>
Position	Professional	47	66.2
	Administrator	17	23.9
	Other	6	8.5
Age	Less than 35	46	64.8
	35 to 45	13	18.3
	More than 45	9	12.7
Sex	Male	38	53.5
	Female	33	46.5

*Does not add to 100% due to missing answers.

Reliability

Reliability tests were conducted for the different scales within the faculty/administrator questionnaire. A summary of the results of these reliability tests is presented in Table 7.

Table 7

*Reliability Coefficients (Alpha) of the Scales:
Primary Task, Social and Technological System, and
Attitudes toward the Organization*

<i>Scale</i>	<i>Items</i>	<i>Mean</i>	<i>Std Dev</i>	<i>Alpha</i>
Actual Task	10	3.07	.86	.91
Ideal Task	10	4.39	.40	.77
Task Difference	10	-1.32	.86	.89
Actual Role	10	3.01	.68	.84
Ideal Role	10	4.02	.49	.79
Role Difference	10	-1.01	.68	.81
Tech Tangible	13	3.53	.72	.79
Tech Intangible	4	3.14	.96	.84
Satisfaction	14	3.44	.42	.77
Trust	12	3.57	.60	.83
Loyalty	4	3.55	.72	.58

Primary Task. As described in Chapter III, ten items dealt with perceptions of the *actual* and the *ideal* primary task of the university. Respondents indicated on a scale from 1 (low emphasis) to 5 (high emphasis) the importance given to each of the ten tasks. On the basis of the list of tasks presented, three scales were developed: (a) the actual task, constituting a mean of responses to the ten items of the 'actual task scale'; (b) the ideal task, consisting of the mean of responses to the (same) ten items of the 'ideal task scale'; and (c) the difference score between the rating of the actual and the ideal tasks. The ideal score was subtracted from the actual score, such that a greater negative score indicated greater discrepancy between the actual and the ideal, while a positive score would signify reality being 'better' than the ideal. The reliability indexes *alpha* for the scales actual task, ideal task, and the difference score, as presented in Table 7, are .91, .77 and .89 respectively. These results show that the internal consistency of the instrument, i.e., of the scales to measure the perception of the primary task of university is very high.

Social System. Ten questions dealt with the perceived *actual* role of university faculty, as well as with the expected or *ideal* role. Respondents indicated on a scale from 1 (low) to 5 (high) the degree of emphasis given to the various elements of the scale. On the basis of the list of possible roles, three scales were developed: (a) the actual role, constituting the mean of responses to the ten items of the 'actual role scale'; (b) the ideal role, constituting the mean of responses to the (same) ten items of the 'ideal role scale'; and (c) the difference score between the ratings of the actual and the ideal roles. Again, a more negative score indicated a greater discrepancy between the actual and the ideal. The Cronbach reliability coefficient alpha for the actual role, ideal role, and difference score, as presented in Table 7, are .84, .79 and .81 respectively. As in the case of primary task, the reliability of the scales dealing with roles is high, indicating that the instrument is adequate for measuring the variable in focus.

Technological System. Two sets of items dealt with (a) tangible and (b) intangible aspects related to procedures and university environment. The two scales represent the mean of the responses for the two sets of questions. The Cronbach reliability coefficient alpha for the tangible and the intangible technological system, as presented in Table 7, are .79 and .84 respectively, representing high levels of internal consistency of

the instrument.

Attitudes toward to Organization. Three sets of items dealt with attitudes toward the university, resulting in three scales: (a) satisfaction with the job; (b) trust in the administrators and the organization; and (c) loyalty toward the university. In each case, the score represents the mean of the responses. The Cronbach reliability coefficient alpha for satisfaction, trust and loyalty, as presented in Table 7, are .77, .83 and .58 respectively. Even the scale *loyalty*, with alpha = .58 has an acceptable level of reliability, considering it is higher than .50 (Nunnally, 1967).

Considering the fact that the reliability coefficient for the scale *loyalty* was comparatively lower than the coefficients for the other scales, some improvements may be necessary in this scale to make it more compatible with the others. As all the scales were administered together, this scale might be improved by (a) rewriting some of the items that are ambiguous; (b) increasing the number of items above the current number of four questions.

Components of the Sociotechnical Model

The first five hypotheses presented in Chapter I deal with the eleven university indices used to characterize the primary task, the social system, the attitude toward the university and the technological system. The previous section presented the derivation of the various scales to be used in the following analyses. In this section, the results of the analyses relative to these first five hypotheses will be presented.

Before describing these results, it is important to understand precisely what these measures indicate, particularly the measures of task and role. Recall that faculty and administrators were asked to indicate the emphasis their programs actually placed or should place on a variety of goals and activities. With respect to goals, for example, faculty and administrators were asked about the emphasis on research, publication, professional development, etc. With respect to roles, they were asked about their emphasis on teaching, advising, consulting, etc.

A high score on either of these factors tends to indicate that a program does or should (depending on the scale) emphasize the wide range of goals or roles listed. Thus, a high score means a broad level of commitment to many things. Indeed, the commitment may be so broad as to be unrealistic, for it may not make much sense for faculty and administrators to try to be 'all things to

all people'.

The difference score on these variables, however, is a more interesting and potentially sensitive indicators of effectiveness, because it says there is a discrepancy between what is and what should be. Thus, a negative difference score may signal real dissatisfactions and problems in the alignment of tasks and roles. In the following, data related to each hypothesis are presented, as well as the interpretation of the results.

Comparison of Faculty and Administrator Perceptions

The first null hypothesis states: *There are no differences in perception between faculty and administrators with regard to the following:*

1. *primary tasks, both operative (actual) and expected (ideal);*
2. *social system, i.e. actual and ideal roles;*
3. *differences between actual and ideal task and role;*
4. *trust and loyalty vis-à-vis the organization;*
5. *technological system (tangible and intangible).*

Generally, administrators scored higher on the various dimensions of the university environment (Table 8). However, highly significant differences were found for only two dimensions: Administrators tend to express greater loyalty to the organization (the means were 3.39 and 3.70 for faculty and administrators

respectively), and a more positive perception of intangible technical conditions, i.e., policies and norms. Administrators may also have had higher (and perhaps even unrealistic) expectations about the range of tasks, roles, and tangible technology that are currently being emphasized. However, the level of significance for the differences on these scales is only $p = .08$, $p = .11$ and $p = .10$ respectively. Considering the exploratory nature of the present research, a $p = .10$ level of significance is acceptable, as it points in the direction of future research.

Table 8

*Mean Scores of Perceptions of Faculty and Administrators of
Tasks, Roles, Satisfaction and Technology
Summary of Analysis of Variance Results*

<i>Component</i>	<i>Faculty</i>	<i>Administrators</i>	<i>F</i>	<i>p*</i>
Actual Task	2.94	3.27	3.20	.08
Ideal Task	4.39	4.43	< 1	
Task Difference	-1.45	-1.16	2.51	.17
Actual Role	2.93	3.16	2.60	.11
Ideal Role	4.02	4.05	< 1	
Role Difference	-1.09	-0.89	1.97	.16
Satisfaction	3.40	3.50	1.41	.24
Trust	3.53	3.68	1.37	.24
Loyalty	3.39	3.70	4.61	.03
Tech Tangible	3.43	3.68	2.77	.10
Tech Intangible	2.95	3.40	5.46	.02

*p expresses the exact level of significance of the results.
In this study, a $p \leq .10$ level will be accepted.

Comparison of University Staff with Varying Qualification

The second null hypothesis states: *There are no differences in perception among university staff members with different qualifications in regard to the following:*

1. *primary tasks, both operative (actual) and expected (ideal);*
2. *social system, i.e. actual and ideal roles;*
3. *differences between actual and ideal task and role;*
4. *trust and loyalty vis-a-vis the organization;*
5. *technological system (tangible and intangible).*

On the basis of the criteria used (i.e., accepting a $p = .10$ level of significance), only *ideal task* does not present significant differences between university staff of differing qualifications (Table 9). Generally, university staff (faculty and administrators) with a PhD score higher than those with an MA, who, in turn, score higher than those with but an undergraduate degree. University staff members holding a BA, MA and PhD differed significantly with respect to their perceptions (emphasis) on the actual tasks, task difference, and both tangible and intangible technology. Those with more advanced degrees tended to emphasize a wider range of goals and are generally more positive about the available technology. Furthermore, significant differences were found with respect to the actual and ideal roles of faculty, suggesting that in this area as well those with more advanced degrees emphasize a more

Table 9

*Mean Scores of Perceptions of University Staff with
Different Levels of Qualifications of
Tasks, Roles, Satisfaction and Technology
Summary of Analysis of Variance Results*

<i>Component</i>	<i>BA</i>	<i>MA</i>	<i>PhD</i>	<i>F</i>	<i>p*</i>
Actual Task	2.48	3.25	3.29	9.15	.001
Ideal Task	4.28	4.46	4.42	1.55	.22
Task Difference	-1.80	-1.20	-1.12	5.75	.001
Actual Role	2.74	3.12	3.19	2.88	.06
Ideal Role	3.84	4.03	4.11	2.46	.09
Role Difference	-1.11	-0.92	-1.001	< 1	
Satisfaction	3.28	3.45	3.53	3.01	.05
Trust	3.38	3.61	3.70	2.39	.10
Loyalty	3.52	3.27	3.72	3.49	.03
Tech Tangible	3.05	3.51	3.79	9.82	.001
Tech Intangible	2.62	3.27	3.39	5.85	.001

*p expresses the exact level of significance of the results.
In this study, a $p \leq .10$ level will be accepted.

diverse set of roles.

The difference scores follow the same pattern, i.e., the higher the degree, the lower the difference between perception of the actual and the ideal task. These results may be attributable to

(a) a more realistic perception of the organization, given the difference in educational experience; (b) a higher level of satisfaction with the working conditions; and/or (c) a higher level of commitment, trust and loyalty to the organization.

Comparison of University Staff with Various Contracts

The third null hypothesis states: *There are no differences in perception among university staff members with different contract levels regard to the following:*

1. *primary tasks, both operative (actual) and expected (ideal);*
2. *social system, i.e. actual and ideal roles;*
3. *difference between actual and ideal task and role;*
4. *trust and loyalty vis-a-vis the organization;*
5. *technological system (tangible and intangible).*

It may be observed that faculty with more dedication to the university in terms of the conditions of their contract (hours/week) had, in general, a more positive perception of different organizational aspects. Faculty with a full time contract (i.e., one that excludes outside work) score higher than those with a 40 hour contract, who in turn score higher than those with a 20 hr part-time contract. As may be noted from Table 10, significant differences were found for most of the variables under study. Only ideal task, ideal role and role difference show lower levels of significance ($p = .12$, $p = .11$,

Table 10
*Mean Scores of Perception of University Staff
 with Different Contracts of
 Tasks, Roles, Satisfaction and Technology
 Summary of Analysis of Variance Results*

<i>Component</i>	<i>Full Time</i>	<i>40 Hour</i>	<i>20 Hour</i>	<i>F</i>	<i>p*</i>
Actual Task	3.34	3.02	2.44	7.80	.001
Ideal Task	4.48	4.35	4.27	2.13	.12
Task Difference	-1.13	-1.32	-1.82	4.31	.02
Actual Role	3.21	2.99	2.60	5.64	.01
Ideal Role	4.13	3.91	3.90	2.28	.11
Role Difference	-0.92	-0.93	-1.31	2.33	.10
Satisfaction	3.55	3.38	3.24	4.05	.02
Trust	3.74	3.55	3.26	4.72	.01
Loyalty	3.71	3.57	3.08	5.65	.01
Tech Tangible	3.73	3.48	3.13	4.87	.01
Tech Intangible	3.51	3.01	2.52	8.49	.001

*p expresses the exact level of significance of the results.
 In this study, a $p \leq .10$ level will be accepted.

and $p = .10$ respectively).

Again, the difference scores indicate the same direction in terms of variation of perceptions: The higher the dedication to the university, the lower the difference between the 'real' and the

'ideal'. Findings related to satisfaction, trust and loyalty, also follow the same direction, i.e., the greater the involvement with the university (in terms of contract), the higher the level of satisfaction, trust and loyalty.

Comparison of University Staff of Various Academic Rank

The fourth null hypothesis states: *There are no differences in perception among university staff members with different academic rank in regard to the following:*

1. *primary tasks, both operative (actual) and expected (ideal);*
2. *social system, i.e. actual and ideal roles;*
3. *difference between actual and ideal task and role;*
4. *trust and loyalty vis-à-vis the organization;*
5. *technological system (tangible and intangible).*

Generally, the higher the academic rank, the higher the score on the various dimensions of the organization, and the lower the difference score for task and role. As may be noted from Table 11, the most significant differences were observed with respect to trust, loyalty, the technological system, as well as the difference score between actual and ideal task. With respect to the latter finding, it may be asked whether the younger professors are more idealistic, or are the full professors more accommodated to the situation?

Table 11

*Mean Scores of Perceptions of University Staff
with Different Academic Rank of
Tasks, Roles, Satisfaction and Technology
Summary of Analysis of Variance Results*

Component	P R O F E S S O R			F	p*
	Assistant	Associate	Full		
Actual Task	2.76	3.19	3.43	3.47	.04
Ideal Task	4.46	4.37	4.38	< 1	
Task Difference	-1.71	-1.18	-0.95	5.21	.01
Actual Role	2.85	3.06	3.37	2.24	.11
Ideal Role	4.02	4.01	4.11	< 1	
Role Difference	-1.18	-0.95	-.075	1.80	.17
Satisfaction	3.32	3.48	3.69	3.12	.05
Trust	3.33	3.66	3.98	5.74	.001
Loyalty	3.11	3.72	4.19	13.10	.001
Tech Tangible	3.21	3.65	3.88	5.31	.01
Tech Intangible	2.70	3.31	3.78	6.60	.001

*p expresses the exact level of significance of the results.
In this study, a $p \leq .10$ level will be accepted.

Comparison of Programs

The fifth null hypothesis states: *There is no difference between programs in terms of the perception of their faculty with regard to the following:*

1. *primary tasks, both operative (actual) and expected (ideal);*
2. *social system, i.e. actual and ideal roles;*
3. *difference between actual and ideal task and role;*
4. *trust and loyalty vis-a-vis the organization;*
5. *technological system (tangible and intangible).*

The analysis of the data reveals that there are differences between programs relative to the majority of the organizational aspects considered in this study. As may be noted from Table 12, only with respect to the ideal role, role difference, and loyalty, no significant differences were found between departments. As may be noted from this table, Agronomy, Engineering and Physics are the three departments that in general present the highest mean scores, i.e., the most positive responses with respect to the various aspects of the university environment, as well as the lowest difference scores for task and role. On the other hand, medicine, architecture and economics are the programs which generally present the lowest mean scores, i.e., the most negative responses to the university environment, as well as the highest difference scores, i.e., see the largest

Table 12
*Mean Scores of Perceptions of University Staff
 by Department of Tasks, Roles, Satisfaction and Technology
 Summary of Analysis of Variance Results*

<i>Dimension</i>	<i>AGR</i>	<i>ARC</i>	<i>ENG</i>	<i>PHY</i>	<i>MAT</i>	<i>PHA</i>	<i>MED</i>	<i>PHI</i>	<i>ECO</i>	<i>F</i>	<i>p</i>
Actual Task	3.43	2.50	3.63	3.84	3.15	3.07	2.38	3.09	2.80	5.20	.001
Ideal Task	4.69	4.32	4.44	4.38	4.16	4.09	4.34	4.21	4.38	1.91	.069
Task Diff	-1.27	-1.82	-.81	-.53	-1.01	-1.02	-1.96	-1.12	-1.59	4.21	.001
Actual Role	3.28	2.56	3.32	3.36	2.85	3.04	2.63	3.13	2.99	2.51	.017
Ideal Role	4.32	3.86	4.11	3.88	3.88	4.04	3.85	3.97	4.03	1.32	.247
Role Diff	-1.04	-1.30	-.78	-.52	-1.03	-1.01	-1.22	-.84	-1.04	1.20	.312
Tech Tang	3.93	3.12	3.74	4.31	3.37	3.17	3.25	3.07	3.08	4.77	.001
Tech Intang	3.35	2.60	3.70	3.89	3.55	3.00	2.41	3.52	2.94	4.07	.001
Satisfaction	3.72	3.32	3.50	3.53	3.62	3.53	3.20	3.22	3.43	2.34	.026
Trust	3.72	3.55	3.62	3.93	3.90	3.99	3.11	3.54	3.51	2.95	.006
Loyalty	3.60	3.58	3.48	3.92	3.95	3.60	3.20	3.54	3.16	1.41	.206

discrepancy between 'real' and 'ideal' task and role.

On the basis of the results obtained in this study sofar, it is impossible to identify the reasons for the observed differences. More research is clearly needed to investigate the origins of the differences in perception of the faculty of various departments. However, some tentative directions for future research are

possible: One reason for differences in the perception of university may be related to the present status of the profession, as well as to the power of the professional association in setting high standards and requirements. Different standards of professional performance may extend to the university. In the case of physics, for example, the university is practically the only place where graduates of the program have a chance to work in their field. The entire faculty is full-time, all have a PhD. The criteria for judging organizational aspects and conditions of the university is restricted to the organization itself. In the case of medicine and architecture, on the other hand, there are more part-time faculty, and professional organizations are setting high standards. Thus, there exists a greater opportunity for comparisons using criteria external to the university, which may explain the less positive evaluations, as well as the higher difference scores for task and role.

Program Effectiveness

Effectiveness is conceptualized in this study as the production of effects or results, expected or not, which are relevant to internal and external constituencies. This concept was operationalized in terms of three indicators: (a) program productivity (i.e., percentage of students concluding the program, as well as the scholarly production of the faculty); (b)

participant-satisfaction (i.e., the extent to which faculty and administrators perceive their individual professional needs satisfied in their job situation; and (c) impact (i.e., the extent to which graduates of the programs perceive the results of the education provided by the university as being adequate to professional performance.

Program Productivity and Satisfaction

In Table 13 the indices of program productivity are summarized, as well as the indices of satisfaction of the members of the programs. The first column indicates the percentage of students that completed their undergraduate degree during the 1979 through 1981 academic years. The data represent official university information. The second column indicates the percentage of students completing their graduate degrees, based on the number of students terminating the program between 1979 and 1981, as related to the total number of students registered during the past five semesters.

Medicine, Architecture and Pharmacy are the three programs with the highest number of students completing their course of study (cf. Appendix E, page 195). Considering the conditions of the students entering these programs, it should be noted that medicine, architecture, physics and engineering have only students who choose these fields as their first option.

Table 13

*Percentage of Graduates and Mean Scores
of Publication Index and Participant Satisfaction by Program*

PROGRAM	Percent Completing Program		Publish Index	Participant Satisfaction
	UGrad	Grad		
Agronomy	65	16	5.63	3.72
Architecture	79	2	1.82	3.32
Engineering	64	7	4.41	3.50
Physics	22	17	6.06	3.53
Mathematics	30	15	6.60	3.62
Pharmacy	68	22	2.71	3.52
Medicine	85	6	6.11	3.20
Philosophy & Letters	42	4	4.71	3.22
Economics	39	5	2.14	3.42

Furthermore, students in medicine generally have the highest overall mean on the university entrance examination, followed by students in agronomy, physics and engineering. Thus, the prerequisites and general characteristics of the students may explain some of the differences among the programs.

The third column presents publication indices for the nine programs under study. The index is based on a weighted sum of

the total number of publications of the program during the last five semesters divided by the full time equivalent faculty of the program. Weights were distributed as follows:

Points

- 1: abstracts, papers for student use
- 2: papers presented at meetings, working papers
- 3: translations or other creative intellectual productions
- 4: articles
- 5: books, dissertations and theses

Satisfaction. The level of satisfaction was measured by a specific scale in the questionnaire for faculty and administrators (cf. page 180). As reported above, significant differences were found among departments, Agronomy showing the highest level of internal satisfaction, medicine the lowest.

Comparison of Perceptions of Program Graduates (Impact)

The sixth hypothesis states: *There is no difference between programs with respect to relevance of the program as perceived by the graduates.* The perception of graduates of the university regarding the impact their training had on their current job are presented in Table 14. Three indices of impact were considered: the overall impact of the academic training on the current job (cf. items 6, 8 - 11 in Appendix D (page 191), the satisfaction with the university education (item 7), and self-appraisal of acquired technical competence (item 12). These results indicate that students of Medicine, Pharmacy and Agronomy report the

Table 14

*Mean Scores of Perceptions of Graduates by Program
of Program Relevance, Satisfaction, and Professional Competence*

PROGRAM	N	Relevance	Satis- faction	Compe- tence
OVERALL	70	3.70	3.44	2.77
Agronomy	4	3.95	4.25	2.75
Architecture	7	3.66	2.86	2.71
Engineering	12	3.53	3.58	2.83
Physics	5	3.88	4.00	3.20
Mathematics	9	3.38	3.33	2.67
Pharmacy	10	3.92	3.50	2.50
Medicine	10	4.22	3.60	2.60
Philosophy	5	3.32	3.00	3.40
Economics	8	3.42	3.13	2.75
F (8,69)		2.07	2.00	< 1
p		.052	.062	

highest impact of their course on their career, the same respondents also indicated the highest level of satisfaction.

While significant differences were found among graduates of various programs with respect to impact and satisfaction, no differences were found with respect to technical competence

acquired. The general evaluation of the technical competence acquired is low, ranging from poor to good, and only in two cases (Philosophy and Physics) considered as better than good. What is notable is the lack of a correlation (Spearman's rank) between the level of impact and technical competence ($r_s = .36$), and a no significant relation between satisfaction and competence ($r_s = .59$), given the data presented in Table 14. One interpretation of these results may be that the adoption of the higher standards of the profession which increase the expectations, assumptions and level of demand.

Aggregate Data Analysis

The seventh null hypothesis states: *There is no association between the correlations (or level of compatibility) between the variables: primary task, social and technological systems on the one hand, and the level of effectiveness (i.e., productivity, satisfaction and impact), given programs as the unit of analysis.* Table 15 presents Pearson correlation coefficients between various components of the sociotechnical system. These data constitute the basis for the testing of the general model of organizational effectiveness of the university, as presented in Figure 3 (cf. page 65). Even without statistically determining differences between the various correlations, it is obvious that there are considerable differences among programs. The correlations between the perception of operational and ideal

Table 15

*Correlations between the Variables of the Components of
the Theoretical Model: Primary Task,
Social and Technological System by Program*

*Variables AGR ARC ENG PHY MAT PHA MED PHI ECO**

Primary Task

TASKA-TASKI**	-.18	.45@	.79*	.89*	.58	-.45	-.31@	.33	-.03
TASKA-TECHT	.40@	.53&	.74*	.73&	.39	.84&	.34@	.72&	.92*
TASKA-TECHE	.60&	.74*	.91*	.52@	.48	.95*	.64*	.96*	.85*
TASKA-ROLEA	.84*	.78*	.57&	.77*	.80&	.87&	.72&	.86*	.96&

Social System

ROLEA-ROLEI	-.17	-.55	.71*	.76*	.82&	-.39	.08	-.04	.44
ROLEA-TECHT	.51&	.60&	.53&	.76*	.56	.75@	.40&	.93*	.93*
ROLEA-TECHE	.70*	.84*	.50@	.72&	.75@	.92&	.66*	.86*	.81*
ROLEA-LOYAL	.69*	-.07	.77*	.48@	-.18	.24	.69*	.57@	.65&

Technological System

TECHT-TECHE	.66*	.70*	.69*	.88*	.56	.92&	.39&	.77&	.94*
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Level of Significance: @ = .10, & = .05, * = .01

*AGRonomy, ARChitecture, ENGIneering, PHYsics, MATHeMATics,
PHARmacy, MEDicine, PHIlosophy, ECOnomics.

** For abbreviations, see Glossary on page 138.

tasks are evidence of the differences between these two variables, already indicated by the difference scores.

The correlation coefficients presented in Table 15 may be interpreted as a measure of the degree of compatibility between the different variables of the theoretical model. According to this model, however, the significance of these correlations is based on their association with organizational effectiveness. No such relationship is found if effectiveness is considered to be a construct composed of productivity, satisfaction and impact, as shown in Table 16. Examining the results of the correlations between the different variables of the model used as a frame of reference, it may be observed that there is no pattern relating to all of the components of the construct of effectiveness. The differentiation indicates that it is more appropriate to consider each component of the construct separately, i.e., constituting a separate domain.

Productivity

Productivity may be viewed as an academic domain, as suggested by Cameron (1981). Even within this domain, it is necessary to establish sub-categories such as: proportion of students graduating from the undergraduate program, proportion graduating from the graduate program, amount of publications, as well as other "products" which were not examined in this study, such as consulting, projects, special programs, and other service activities of the university. The results of this study indicate that these different kinds of production have different relations

with the variables under study. For example, the proportion of students completing the undergraduate program is not related to any positive correlation between the variables (Table 15), or, more specifically, the principle of joint optimization referring to the relation between task and role, and between task, role and technology does not apply. Furthermore, there is no strong relationship with the level of sentience (trust and loyalty). In this manner, the data in Tables 15 and 16 do not differentiate consistently among programs in terms of their influence on productivity. Thus, other explanations might be considered (cf. Appendix E, page 195). The quality of the students who enter the programs is an indication of the possible proportion of graduates. The field of medicine would be a case in point: Good correlations were found for this program between the actual task and role, and the actual role and intangible technology. Although these correlations are not the highest, in comparison to some of those of other programs, it is this program that has the highest proportion of students finishing the program. Also, the students who enter this program have the highest score on the entrance examination, and this program is their first option. Another observation to be made refers to the organization of the medical profession and its standard of performance. As most of the faculty members are part-time in the university, a principle influence derives from the faculty's identification with their profession and the standards it exerts.

Satisfaction

Related to the comments presented above, results about the level of satisfaction show that program with a higher proportion of full-time and PhD level faculty have a higher index of participant-satisfaction. Table 9 and 10 present results comparing university staff with different types of contracts and academic preparation, indicating that the higher the degree and the greater the time dedicated to the university, the higher the level of satisfaction. The group of faculty that develops professional activities only within the university, appear more satisfied, but do not produce more, when measured in terms of proportion of students completing the program. The question remains whether this is to be interpreted as an indication that effectiveness has satisfaction as a separate domain, or are there alternative interpretations? No doubt, more research is needed on this subject. However, it should be mentioned that a higher percentage of full-time and PhD level faculty teach at the graduate level, do research, and, in many cases, perform administrative functions, but are not teaching in undergraduate programs. In sum, the degree of satisfaction is not directly related to productivity, rather, if satisfaction is considered an indicator of effectiveness, it should constitute a specific domain.

An analysis of the results presented in Table 15 and 16 indicate that the level of satisfaction is related to high positive correlation between the different components of the model. In other words, the more satisfied faculty members are, the more positive their perception of the organization, or vice-versa. One possible interpretation of this is that faculty members who do not have split loyalties (between the university and their professional group) are more satisfied.

Impact

Impact, as expressed in the perceptions of graduates, is related to the proportion of students completing the undergraduate program. Once more it appears that the level of structuring and defining a profession in terms of mission, status, and demand is a strong element in the level of impact. Again, more research, including among members of the organizations that receive the graduates, would help to understand and improve the influence of the university has on other organizations.

Impact is viewed as the external adaptation domain and may be conceptualized as the quality dimension of the results. It is important in this connection to remember that not only quantity is important, but adequacy to the needs and expectations of society, if an open systems approach is taken.

Table 16

*Indices of Organizational Structure and
Measures of Effectiveness by Program*

<i>Variables</i>	<i>AGR</i>	<i>ARC</i>	<i>ENG</i>	<i>PHY</i>	<i>MAT</i>	<i>PHA</i>	<i>MED</i>	<i>PHI</i>	<i>ECO*</i>
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Sentience (means)

TRUST	3.72	3.55	3.62	3.93	3.90	3.98	3.11	3.54	3.51
LOYALTY	3.60	3.58	3.48	3.92	3.95	3.60	3.20	3.54	3.16

Participant-Satisfaction (mean)

Satisfaction	3.72	3.32	3.50	3.53	3.62	3.53	3.20	3.22	3.43
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Organizational Structure

Participation	3.97	3.58	3.17	3.28	3.90	3.80	2.53	3.82	3.19
Integration	3.73	2.08	3.45	3.33	3.60	2.00	1.76	2.29	3.13
% Course Educ	23	25	10	11	0	20	56	57	38
% Full Prof	7	0	10	0	0	0	5	29	14
% PhD	3	8	50	100	100	20	6	43	50
% Full Time	93	8	18	100	60	40	26	57	13

Productivity of the Program

% Undergraduate	65	79	64	22	30	68	85	42	39
% Graduate	16	2	7	17	15	22	6	4	5
Index Public.	5.63	1.82	4.41	6.06	6.60	2.71	6.11	4.71	2.14

Program Effectiveness (Perceptions of Graduates)

Impact	3.95	3.66	3.53	3.88	3.38	3.92	4.22	3.42	3.32
Satisfaction	4.25	2.86	3.58	4.00	3.33	3.50	3.60	3.13	3.00

*AGRONomy, ARCHitecture, ENGINEERING, PHYsics, MATHeMATICS, PHARMacy, MEDicine, PHIlosophy, ECONomics.

Summary of the Findings

The findings of this study may be summarized as follows:

1. The various scales used to measure perceptions of
 1. primary task: actual, ideal and the difference between the two;
 2. roles: actual, ideal and the difference between the two;
 3. sentience: the level of trust and loyalty to the organization;
 4. technology: tangible and intangiblepresent a high Cronbach reliability coefficient, and hence, a high degree of internal consistency.
2. The scale used to measure loyalty, would benefit from improvement, as its coefficient of reliability was .58.
3. Administrators differ significantly from faculty members only with respect to factors related to their respective roles, and the level of commitment of the organization, i.e., in terms of emphasis on tasks, intangible technology and the level of loyalty.

4. Individuals with greater investment in the university, i.e., with higher qualifications, more dedication to the university (full-time), and higher academic rank, showed more positive reactions to the university, and were more satisfied.
5. Different sub-categories of productivity relate differently to the components of the model and their correlations.
6. There is no direct relation between the level of satisfaction and productivity.
7. The level of satisfaction is related to the degree of correlation between different variables of the model.
8. Loyalty to one's profession (or professional organization) appears to be more important than loyalty to the university in terms of achievement.
9. The relationship between the elements of the construct of effectiveness, and the set of measures used in this study, i.e., differences in perceptions of administrators and faculty, differences among various ranks,

levels of qualification, and types of contract, relationship between satisfaction, and trust and loyalty, and between satisfaction and the agreement between actual and ideal task and role, show that the instrument used to collect the data is valid.

10. The sociotechnical model used in the present research appears to be a valid approach to the study of universities, given the relationship between the constructs and the measures related to these constructs.

Chapter V

DISCUSSION AND RECOMMENDATIONS

The general purpose of the present study was to develop instruments and methods to study organizational effectiveness of universities, testing a theoretical model based on sociotechnical theory. An attempt was made to assess organizational effectiveness, and to identify variables within the university which influence its effectiveness. In the course of this study, an effort was made to better understand organizational processes and conditions which influence outcomes.

Limitations of the Study

As far as the author knows, no similar study using the sociotechnical theory has been conducted to analyze university organization. Thus, the present research should be considered a pilot study, forming a basis from which other investigations may be planned in other universities in Brazil and other countries.

Two specific limitations of this study are the overall response rate (50% of the sample) and the sample size (i.e., number of programs) for the aggregate data analysis. Only ten of the

sixteen programs theoretically eligible for inclusion were considered. Furthermore, since the number of respondents in the letters program was only two, these were analyzed together with the equally low number in the philosophy program. This low number of programs prevented a regression analysis of the aggregated data, allowing only simple correlations. It is hoped that in future studies data from a larger number of academic units can be collected, allowing for a more sophisticated analysis.

Group Comparisons

Sociotechnical theory uses several different constructs to describe various aspects of an organization. In the present case, these constructs were primary task, social and technological system, sentience and university structure. In the first stage of the data analysis, comparisons of various groups within the university with respect to these components were undertaken.

Comparison of Faculty and Administrators

Significant differences between faculty and administrators were observed in relation to their reported level of loyalty (i.e., sentience) and the intangible technological system, i.e., policies and norms of the university. The differences in roles and level of commitment to the university on the part of administrators and faculty may be an important determinant in the more

positive response to these two elements on the part of the former. Administrators influence the choice of tasks to be emphasized, and they are in charge of establishing policies and norms. It would appear logical for them to have a more positive perception of these aspects.

The lack of differences between faculty and administrator perceptions with respect to the other components of the model may be a reflection of the fact that administrators in Brazilian universities are faculty members, elected for a two or four term, depending on the position [2]. In other words, administrators are in their positions only temporarily, most of the time they are faculty.

Other Comparisons

Three other group comparisons were made, namely between university staff with different (a) qualifications, (b) contract, and (c) academic rank. Consistently it was found that individuals with greater investment in the university, i.e. those with higher qualifications, a more stable contract (full-time), and higher academic rank (cf. Tables 9, 10, and 11), demonstrated more positive attitudes to university in terms

[2] In fact, the rector of the university cannot succeed him/herself after the end of a single four year term.

of the actual primary task and role. Moreover, no differences were found with respect to the ideal primary task and role, but significant differences with respect to the discrepancy between ideal and actual, such that those with greater investment showed significantly less discrepancy between the ideal and the real primary task. Consequently, their level of loyalty and satisfaction with the technological system is higher as well.

Components of the Sociotechnical Model

Primary Task

Perceptions of faculty and administrators of the actual primary task show significant differences among programs. Likewise, the perception of difference between operative and ideal primary task is significant. This fact reflects the difference in level of expectations and assumptions that faculty and administrators have regarding their programs. As commented above, consistent differences were observed with respect to faculty of differing rank, contract, and qualification. These findings suggest the need for more research focusing on expectations and assumptions of faculty regarding the primary tasks a program should perform. As the instrument showed a high level of internal consistency (reliability), it may be used to study other organizations, in order to corroborate the findings of the present research.

Social System

Roles are considered to be one of the principal elements of social systems, and, according to sociotechnical theory, they should be consistent with task and technology, if the organization is to be effective (Cherns, 1976; Miller & Rice, 1967; Rice, 1963). The results of the present study show the correlations between actual primary task and actual role to be high in almost all programs (they range from .57 to .96; cf. Table 15).

Considering the sociotechnical principle of compatibility between social and technological systems, these results can be viewed and interpreted from diverse perspectives. First, there is the problem of the identification of the components of the social system in one organization. Does the social system include roles (Katz & Kahn, 1978), the "webb of behavior of the individuals that operate the work or the technical system" (Litterer, 1973); or are the elements of social structure centralization and formalization (Hage & Aiken, 1969)? Second, the compatibility between social and technological subsystems is only part of the influence upon organizational effectiveness. Characteristics of the individuals (in the case of a university: faculty, administrators, students, staff) are a very strong factor influencing results. This research dealt only with faculty and administrators, and their effect on students. Third, the results of this

research demonstrated that sentience relates more strongly to some of the obtained results than role perception. This indicates that in future research, sentience should be studied separately from roles.

Technological System

Differences in perception of the actual and ideal role and of the technology (tangible and intangible) do not relate directly to the indices of effectiveness. Although the tests of the reliability and validity of the instrument indicate that it is adequate for this type of research, it is necessary to do more research in the direction of clarification of the technological system of universities. In reality, adequate technology appears to exist for different kinds of desired outcomes (types of learning, research and services). Thus, what may be needed is the dissemination of this technology, i.e., the specific preparation or training of faculty and administrators to perform the specific functions required in this type of organization.

The results presented above suggest the following comments: First, universities have unclear technologies (Baldridge, 1980), but only from the perspective of faculty and administrators who in many cases are professionals in fields other than education or research. What should be considered with reference to technology of universities, however, is that it is unclear not because it

does not exist, but because it is not disseminated. The question to be stressed is not what is the technology to be used for teaching, research, administration, and services, but why it is not required of faculty and administrators to have information, skills, and attitudes necessary to perform the specific roles that are part of the organization.

Second, as a consequence of the above, technology was considered only in its very general aspects in this study. Probably, in research involving more detailed technological aspects and roles, results would be more significant in their relation to organizational results.

A third consideration relates to the fact that for individuals, psychological factors are probably more crucial to effectiveness than rational organizational aspects, such as compatibility between social and technological systems. More research considering individual differences among faculty and administrators is needed for the improvement of universities as organizations.

Sentience

In this study, trust and loyalty represent the dimension sentience. Consistently, it was found to be lower for faculty than administrators. Furthermore, it was found to be lower for faculty and administrators with lower qualifications, lower rank, or less dedication (part-time) to the university. Two aspects may be stressed in this situation. As indicated above, administrators feel more committed to the organization, and as a result of their performance as administrators they develop stronger identification and membership in the university. Second, faculty member in Brazilian universities do not have different functions related to rank, or other characteristics, with the exception of teaching at the graduate level. Thus, one explanation for lower levels of trust and loyalty may be the similarity of roles (Miller & Rice, 1967). Sentience is dependent upon a differentiation of individual contributions. 'Professional' recognition is an essential element for sentience in sociotechnical theory. Regarding the influence of sentience on productivity, data indicate a positive, significant correlation between the level of trust and the percentage of graduate students completing their programs, but not the same relation with the percentage of graduates from undergraduate programs.

Some reasons for these results may include: Sociotechnical theory was formulated on the basis of observations in organizations

other than universities, predominately industry. Professionals working in these organizations were performing their activities as professionals of their respective fields. Therefore, trust and loyalty to the organization were the same as to the profession. In other words, they had no split loyalties (Gouldner, 1957, 1958), at least to the extent that faculty members do.

Second, in the university, faculty members, with few exceptions, are professionals of different fields performing roles as teachers, researchers and administrators. They are not professionals in education, research and administration. In this case, sentience to the profession may be more important than sentience to the organization, to achieve the desired results. Commitment to professional standards has a decisive influence in terms of performance at the university and its results. Consequently, sentience should be studied from these two different perspectives in the case of the university, i.e., loyalty to the university and loyalty to the profession, and their influence on results.

Third, organizational commitment is dependent upon the rewards a person receives in the organization (Grusky, 1966). If the rewards received from the Medical Association, for instance, are greater than the ones received from the university, the greater

commitment will be with the former. Studies about the control and reward structure of the organization is thus recommended.

Fourth, as a consequence, programs with faculty members who invested the most in the university (having higher degrees, higher rank, and being full time), and therefore, who receive more rewards are programs with faculty who are more trustful and loyal to the university. Thus, possibly, the higher the relation between sentence and the percentage of students finishing graduate programs, is due to the fact that faculty in graduate programs generally have higher degrees and are full time.

In summary, it is evident that more research is needed regarding the effectiveness of universities. The important point to consider is that a university is a different kind of organization, with a highly heterogeneous group of professionals performing various tasks. These professionals often have no special training for these very specific tasks. This exceptional situation from the organizational point of view has to be considered in studies of universities. A parallel kind of study, considering the profession outside the university and their performance in teaching, research, etc., might be developed to identify what are the real determinants of effectiveness of universities.

Program Effectiveness

The indicators of effectiveness used in this research were (a) productivity of the programs in terms of the percentage of students completing their programs and in terms of an index of publications of faculty; (b) level of participant-satisfaction of the internal constituencies; and (c) impact, i.e., the perception on the part of the graduates of the program of the importance of the education to their job as well as their satisfaction with their academic training. What should be emphasized here is that the principles of sociotechnical theory, used as the frame of reference in the present study, were established on the basis of organizations not linked to education. Second, according to the same theory, each kind of primary task requires a specific social and technological system to be effective. This is not observed in Brazilian universities. What is required is that only one structure be responsible for such differentiated tasks as, for example, teaching at the graduate and undergraduate level, extension, basic and applied research, as well as several different activities, all under the general heading of 'service', besides administration. In terms of each of the components of effectiveness, the following comments may be presented:

Program Productivity. The analysis of productivity indicates no consistency in results referring to undergraduate and graduate teaching, nor publications. The programs vary widely in their results, probably demonstrating that they have, in reality, different tasks which they are trying to achieve. Another point that should be considered in this context is the inputs of the programs. Medicine, for example, has the highest percentage of undergraduate students completing the program, but then, 100 percent of the students in this program selected it as their first choice, and the students have the highest average score on the university entrance exam, as well as the highest ratio of applicants to admitted. Quality of students can make a difference. Characteristics of faculty is another component to be considered. Specifically, their academic qualification, professional standards, qualifications for teaching and research, as well as the kind of contract with the university, i.e., full or part time commitment.

Future research should consider these aspects and their influence on effectiveness of universities with more emphasis. Given the relevance of the "products" of a university to other organizations, quality together with quantity is essential. As a consequence, more emphasis on what is called impact is suggested.

Participant-Satisfaction. The results of the expressed satisfaction already reported indicate that faculty and administrators who expressed to be the most satisfied, are also the ones which mentioned to be the most trustful. Another relation found is between satisfaction, trust and loyalty with higher degree, higher rank and more dedication to the university in terms of time. These results probably are related, as commented before, to the system of reward which contemplates more generously the ones who have invested the most in the organization. In the context of Brazilian universities, other aspects have to be considered, such as performance outside the university (demand, competition, status, standards). Dissatisfaction can be viewed as a sign of comparison between different conditions of performance. If one of the reasons for the existence of organizations is satisfaction of internal constituencies, more study on the determinants of participant satisfaction is needed. Furthermore, other participants in the university organization should be included, i.e., students and staff.

Impact. The results of the relevance of the academic program for professional performance as appraised by using perceptions of graduates shows some results which deserve attention. Graduates considering their programs as having the highest impact on their professional career reported that the technical competence acquired was less than good. This fact may be related to the

level of organization of the professional field, the standards and demands of professional organizations on the individual. Impact, as measured in the current research, examines aspects of relation and use of the knowledge, skills, etc., acquired in the academic program and the level of competence, refers more to the perceived general result of the program. The findings on this aspect do suggest more research and careful consideration about programs reported as having a weak relation to professional performance. It means that the graduate went through one program and has a job which does not relate to it. It is essential to remember that the output of universities constitutes input to other organization systems (Parsons, 1960).

Recommendations

The present study does indicate the feasibility of developing a model for the assessment and improvement of organizational effectiveness in universities. Thus, the study has significant implications, both for institutions of higher learning, as well as other service institutions, and represent an alternative for innovation and improvement in higher education. It points out differences in perceptions of organizational aspects providing evidence of need for faculty and administrator development, organizational renewal, and even university restructuring.

The following suggestions are offered for future research:

1. Specific attention be given to effectiveness components of universities to determine their major influential factors. Studies considering diverse domains of effectiveness, i.e., productivity, participant-satisfaction or morale, and impact or relevance of the outputs to other organizations, and its determinants need to be conducted.
2. Certain components of the sociotechnical model, such as technology and structure need to be clarified for studying each task, i.e., different kinds of teaching, according to the area, nature of the program, the clientele, as well as different kinds of research and service.
3. More research about organizational impact and relevance for others is recommended. More graduates and members of other organizations should be included in future studies.
4. Research on participant-satisfaction should include, besides faculty and administrators, students and staff.
5. Studies regarding the technological system of universities for different tasks and results will add knowledge about adequate technologies for diverse purposes.
6. Given the relation of satisfaction, trust and loyalty to some results and specific characteristics of faculty, an examination of the system of reward, specifically as related to faculty of lower rank, with less advanced degrees, and/or less time dedicated to the university, is recommended.
7. Related to the previous recommendation, the continuity of policies related specifically to faculty qualification should be considered.
8. Given the results related to *impact*, not only more research about what the graduates of different programs are doing and why, is needed, but also, considerations about possible modifications of the curriculum, the number of students to be accepted, entrance requirements, etc., may be indicated for some programs.

9. The influence of sentience (to the profession and to the organization) and the characteristics of faculty as well as the probable influence of the characteristics of students should be considered in terms of planning, norms for admission to programs, selection of new faculty, and program qualification for faculty and administrators.

The nature of the different tasks performed in contemporary society by universities should be the object of study to provide the basis for university restructuring, if the institution is to be relevant to society. Determining which are the most relevant functions for a university for the next decades and a better understanding of the various possible tasks and processes for these organizations is urgent. Several questions need to be answered. Is this the type of organization which can carry on the expected mission? Would another type of organization be more adequate? Would it be necessary to differentiate within the organization to perform the various tasks attributed to the university by contemporary society?

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GLOSSARY

1. *Academic Departments* the smallest administrative unit of the university, responsible for the performance of the university functions: teaching, research, and service.
2. *Actual Role* (ROLEA) the role that is performed by organizational members. or its sub-units.
3. *Actual Task* (TASKA) the operative task, i.e., the task that is performed by the organization or its sub-units.
4. *Administrator* faculty member performing administrative functions, i.e., chairpersons, deans, etc.
5. *Compatibility* level of congruence among the components of a model, level of agreement of perceptions.
6. *Construct* a concept consciously adopted for a special scientific purpose.
7. *Construct Validity* a demonstrated relationship between theoretical constructs and a set of measures related to those constructs.
8. *Difference Role* the difference between the mean score of actual and ideal role.
9. *Difference Task* the difference between the mean score of actual and ideal task.
10. *Difference Scores* the difference between the score of actual task or role and ideal task or role.
11. *Effectiveness* the production of relevant results for internal constituencies and other organizations.
12. *Ideal Role* (ROLEI) the role expected to be performed by organizational members.

13. *Ideal Task* (TASKI) the task expected to be performed by the organization or its sub-units.
14. *Impact* the relevance of the results of a program for the graduates and to other organizations.
15. *Intangible Technology* policies and norms which give directions to actions.
16. *Integration* the aggregation of undergraduate and graduate programs and research in the academic department.
17. *Loyalty* (LOYAL) an attitude of commitment to the organization, to the task system, to the profession or to the discipline.
18. *Participation* the influence of faculty members have on the decisions of the academic department.
19. *Primary Task* the task an organization has to perform in order to survive (sometimes called objectives or mission).
20. *Productivity* the quantity of outcomes related to inputs.
21. *Relevance* the adequacy of programs to the needs of other organizations, or the graduates.
22. *Program* a set of courses leading to a degree.
23. *Reliability* consistency or repeatability of a measurement.
24. *ROLEA*, see Actual Role
25. *ROLEI*, see Ideal Role
26. *Roles* expectations oriented toward people who occupy a certain position in a social system or group.
27. *Sentience* commitment to the organization or to the group referring to the relevance of the activity in relation to the needs and/or objectives of the individual.
28. *Social System* the sub-system constituted by roles and interactions among people and groups in an organization.

- 29. *Sociotechnical System Theory* an open systems approach which describes the complex relationships among people, tasks, and technology within organizations. a frame of reference for organizational studies and organizational development.
- 30. *Tangible Technology* methods, resources, tools, to perform actions in organizations.
- 31. TASKA, see Actual Task
- 32. TASKI, see Ideal Task
- 33. *Task Systems* the sub-system constituted by tasks an organization has to perform.
- 34. TECHE, see Intangible Task
- 35. *Technology* actions that na individual performs upon a living being, human or otherwise, a symbol or an inanimate object.
- 36. TECHT, see Tangible Task
- 37. *Trust* an attitude of confidence and a feeling of competence toward the administrators or an organization.

Appendix A

Questionnaire Used with Faculty and Administrators

Portuguese Original

QUESTIONÁRIO

I - Informação sobre respondentes

1. Cargo:
 - 1 - Diretor
 - 2 - Chefe de Departamento
 - 3 - Coordenação de COMCAR
 - 4 - Coordenação de Pós-Graduação
 - 5 - Membro de Comissão Coordenadora de Pós-Graduação
 - 6 - Professor de Pós-Graduação
 - 7 - Professor de Graduação
2. Curso: -
3. Idade: -
4. Sexo: -
5. Classe:
 - 1 - Titular
 - 2 - Adjunto
 - 3 - Assistente
 - 4 - Auxiliar
 - 5 - Outro (Colaborador, Visitante, etc.)
6. Regime de Trabalho:
 - 1 - DE
 - 2 - 40 h.
 - 3 - 20 h.
7. Titulação:
 - 1 - Graduação
 - 2 - Aperf./Especialização
 - 3 - Mestrado na UFRGS
 - 4 - Mestrado no País
 - 5 - Mestrado no Exterior
 - 6 - Doutorado na UFRGS
 - 7 - Doutorado no País
 - 8 - Doutorado no Exterior
 - 9 - Livre Docência

8. Por quanto tempo desempenhou as seguintes atividades (nesta ou em outra instituição)?

- | | |
|--|------------|
| 1 - Ensino de graduação | _____ anos |
| 2 - Ensino de pós-graduação (mestrado/doutorado) | _____ anos |
| 3 - Orientação de alunos (estágios, dissertações, teses) | _____ anos |
| 4 - Pesquisa/publicação | _____ anos |
| 5 - Extensão (cursos, assist. técnica, projetos, etc.) | _____ anos |
| 6 - Atividades administrativas acadêmicas | _____ anos |
| 7 - Atividades em empresas privadas | _____ anos |
| 8 - Atividades em entidades públicas | _____ anos |
| 9 - Outra(s) (especifique) _____ | _____ anos |

9. Por quanto tempo exerceu as seguintes funções:

- | | |
|---|------------|
| 1 - Chefe de Departamento Acadêmico | _____ anos |
| 2 - Coordenador de Comissão de Carreira | _____ anos |
| 3 - Coordenador de Pós-Graduação | _____ anos |
| 4 - Membro de Colegiados ou Comissões | _____ anos |
| 5 - Presidente de Câmara | _____ anos |
| 6 - Vice-Diretor de Unidade | _____ anos |
| 7 - Diretor de Unidade | _____ anos |
| 8 - Pró-Reitor | _____ anos |
| 9 - Reitor | _____ anos |

10. Possui algum curso na área de Administração?

- | |
|------------------|
| 1 - 1 - Sim |
| 2 - Não |
| 2 - 1 - na UFRGS |
| 2 - no País |
| 3 - no Ext. |

11. Possui algum curso na área de Educação?

- | |
|-------------|
| 1 - 1 - Sim |
| 2 - Não |

- 2 - 1 - na UFRGS
- 2 - no País
- 3 - no Ext.

II - Questionário

A. Abaixo, encontrará uma série de afirmações, que representam objetivos de departamentos acadêmicos e da própria universidade. Examine-as e dê sua opinião sobre a real ênfase, ou importância, dada, atualmente, a elas em seu departamento.

12. Circule o número à direita que representa sua percepção:

O B J E T I V O S	NÍVEL DE ÊNFASE ATUALMENTE:				
	Muito Baixo	Baixo	Médio	Alto	Muito Alto
1. Fazer pesquisa. Colaborar com a expansão do conhecimento, a compreensão da realidade e a solução de problemas.	1	2	3	4	5
2. Publicar. Disseminar idéias, experiências ou resultados de pesquisas.	1	2	3	4	5
3. Promover a formação de profissionais, em nível de graduação, em consonância com o mercado de trabalho.	1	2	3	4	5
4. Promover o aperfeiçoamento de profissionais por meio de cursos de pós-graduação.	1	2	3	4	5
5. Realizar cursos e outros projetos de extensão com a finalidade de propiciar atualização ou complementação de conhecimentos no atendimento de necessidades específicas do meio.	1	2	3	4	5

6. Promover a renovação ou atualização continuada do sistema de ensino para adequá-lo à realidade (conteúdos, metodologia, enfoques, etc.).	1	2	3	4	5
7. Promover o desenvolvimento profissional e pessoal do corpo docente.	1	2	3	4	5
8. Exercer liderança cultural e política através de programas especiais (conclaves, conferências, etc.).	1	2	3	4	5
9. Promover condições (físicas, de comunicação, de clima organizacional) necessárias à produtividade de professores e alunos.	1	2	3	4	5
10. Facultar aos docentes os recursos necessários ao atingimento de seus objetivos profissionais.	1	2	3	4	5

B. Novamente considere as afirmações do item A. repetidas abaixo, e dê sua opinião a respeito da ênfase que deveria ser dada a cada uma no departamento.

13. Circule o número à direita que representa sua opinião:

O B J E T I V O S	NÍVEL DE ÊNFASE QUE DEVERIA SER DADA:				
	Muito Baixo	Baixo	Médio	Alto	Muito Alto
1. Fazer pesquisa. Colaborar com a expansão do conhecimento, a compreensão da realidade e a solução de problemas.	1	2	3	4	5
2. Publicar. Disseminar idéias, experiências ou resultados de pesquisa.	1	2	3	4	5
3. Promover a formação de profissionais, em nível de graduação, em conso-					

nância com o mercado de trabalho.	1	2	3	4	5
4. Promover o aperfeiçoamento de profissionais por meio de cursos de pós-graduação.	1	2	3	4	5
5. Realizar cursos e outros projetos de extensão com a finalidade de propiciar atualização ou complementação de conhecimentos no atendimento de necessidades específicas do meio.	1	2	3	4	5
6. Promover a renovação ou atualização continuada do sistema de ensino para adequá-lo à realidade (conteúdos, metodologia, enfoques, etc.).	1	2	3	4	5
7. Promover o desenvolvimento profissional e pessoal do corpo docente.	1	2	3	4	5
8. Exercer liderança cultural e política através de programas especiais (conclaves, conferencias, etc.).	1	2	3	4	5
9. Promover condições (físicas, de comunicação, de clima organizacional) necessárias à produtividade de professores e alunos.	1	2	3	4	5
10. Facultar aos docentes os recursos necessários ao atingimento de seus objetivos profissionais.	1	2	3	4	5
14. Examine novamente as proposições dos itens anteriores e destaque:					
a) As três mais enfatizadas e as três menos enfatizadas atualmente;					
b) As três que deveriam ser mais e menos enfatizadas.					
Ordene-as de 1 a 3 usando o número das afirmações como identificação.					

Atualmente:

Mais enfatizadas: 1 - _____
 2 - _____
 3 - _____

Menos enfatizadas: 1 - _____
 2 - _____
 3 - _____

Deveriam ser:

Mais enfatizadas: 1 - _____
 2 - _____
 3 - _____

Menos enfatizadas: 1 - _____
 2 - _____
 3 - _____

C. Examine as seguintes possíveis atividades docentes e dê sua opinião sobre a ênfase que cada uma realmente tem em seu departamento (isto é, quais são exigidas ou estimuladas e reconhecidas).

15. Faça um círculo ao redor de cada número que melhor representa seu ponto de vista:

ATIVIDADES DOCENTES	NÍVEL REAL DE ÊNFASE:				
	Muito Baixo	Baixo	Médio	Alto	Muito Alto
1. Ensino (atuação em sala de aula).	1	2	3	4	5
2. Orientação de alunos (estágios, dissertações, teses, projetos especiais).	1	2	3	4	5
3. Preparação de livros, monografias, artigos e relatos de experiências para uso interno, apresentação em conclave ou eventual publicação.	1	2	3	4	5
4. Realização de pesquisa, visando a aumentar a compreensão da realidade e colaborar para a solução de problemas de nossa realidade.	1	2	3	4	5
5. Assistência técnica e/ou desenvolvimento de programas especiais de ensino pa-					

2. Orientação de alunos (estágios, dissertações, teses, projetos especiais).	1	2	3	4	5
3. Preparação de livros, monografias, artigos e relatos de experiências para uso interno, apresentação em conclaves ou eventual publicação.	1	2	3	4	5
4. Realização de pesquisa, visando a aumentar a compreensão da realidade e colaborar para a solução de problemas de nossa realidade.	1	2	3	4	5
5. Assistência técnica e/ou desenvolvimento de programas especiais de ensino para empresas e instituições públicas e privadas, visando a estimular o contato necessário com a realidade.	1	2	3	4	5
6. Participação, como discente, em programas especiais (cursos, seminários, etc.), visando a elevação da competência profissional.	1	2	3	4	5
7. Participação no processo de renovação ou atualização continuada do sistema de ensino para adequá-lo à realidade.	1	2	3	4	5
8. Participação em atividades administrativas (comissões, colegiados, chefia, coordenações, etc.).	1	2	3	4	5
9. Participação em conclaves (congressos, seminários, encontros, conferências, jornadas, com atuação efetiva).	1	2	3	4	5
10. Participação, como membro, em grupos de: ensino, pesquisa, projetos diversos, em atuação interdisciplinar e/ou interdepartamental.	1	2	3	4	5

17. Leia novamente as afirmações do item anterior e identifique:

a) As três mais enfatizadas e as três menos enfatizadas atualmente.

b) As três que deveriam ser mais enfatizadas e as três que deveriam ser menos enfatizadas.

Use o número das afirmações como identificação.

Atualmente:

Mais enfatizadas: 1 - _____
2 - _____
3 - _____

Menos enfatizadas: 1 - _____
2 - _____
3 - _____

Deveriam ser:

Mais enfatizadas: 1 - _____
2 - _____
3 - _____

Menos enfatizadas: 1 - _____
2 - _____
3 - _____

E. Qual a sua percepção das seguintes condições e procedimentos para o ensino, nesse curso? Considerando as seguintes condições e procedimentos para o ensino e a pesquisa, neste curso, - qual - é a sua percepção a respeito deles? Circule o número que melhor representa sua opinião.

18. Condições físicas das salas de aula (tamanho, ventilação, nível de ruído, limpeza, etc.):

1	2	3	4	5
Completamente inadequadas	Bastante inadequadas	Medianamente adequadas	Bastante adequadas	Completamente adequadas

19. Instalações e mobiliário das salas de aula (quadro-de-giz, número de cadeiras, mesas, outros materiais indispensáveis):

1	2	3	4	5
Inapropriadas	Insuficientemente apropriadas	Medianamente apropriadas	Bastante apropriadas	Totalmente apropriadas

20. Uso de recursos instrucionais (materiais auxiliares, tais como: retroprojektor, diapositivos, amostras, gráficos, etc.) pela maioria dos professores do curso. Marque primeiro se são disponíveis ou não:

() disponíveis

() não disponíveis

1	2	3	4	5
Não são usados	Insuficientemente usados	Medianamente usados	Bastante usados	Amplamente usados

21. Variedade de métodos, adequados ao objetivos, usados no ensino pela maioria dos professores (aulas expositivas, seminários, simulações, trabalhos de campo, diferentes técnicas de grupo, projetos, etc.):

1	2	3	4	5
Nenhuma variedade	Pouca variedade	Regular variedade	Muita variedade	Grande variedade

RECURSOS DE BIBLIOTECA (LIVROS, PERIÓDICOS, OUTROS MATERIAIS):

22. Livros básicos mais importantes da área:

1	2	3	4	5
Completamente inadequados	Bastante inadequados	Medianamente adequados	Bastante adequados	Completamente adequados

23. Número de periódicos especializados com relato de resultados de pesquisa:

1	2	3	4	5
Completamente insatisfatório	Bastante insatisfatório	Medianamente satisfatório	Bastante satisfatório	Completamente satisfatório

24. Apoio para o ensino (existência de pessoa ou grupo de especialistas em aprendizagem e ensino, que ofereçam apoio técnico, tais como: sugestões sobre diferentes procedimentos ou técnicas de ensino, informações sobre recursos instrucionais diversos, assistência na solução de problemas de ensino e aprendizagem) no Departamento () ou na Unidade () (assinale aquele ao qual se refere):

1	2	3	4	5
Não há	Raramente dis-	As vezes dis-	Muitas vezes	Sempre dis-
	ponível	ponível	disponível	ponível

25. Apoio financeiro para projetos especiais e inovações no ensino (alterações curriculares, uso de novas técnicas, reequipamento, aquisição de materiais específicos, experiências em ensino, etc):

1	2	3	4	5
Não há dis-	Raramente dis-	As vezes dis-	Muitas vezes	Sempre dis-
ponível	ponível	ponível	disponível	ponível

26. Apoio financeiro para a produção de estudos e trabalhos de interesse do ensino, para uso interno ou eventual publicação (livros, monografias, artigos, etc.):

1	2	3	4	5
Não há dis-	Raramente dis-	As vezes dis-	Muitas vezes	Sempre dis-
ponível	ponível	ponível	disponível	ponível

27. Atividades práticas (observações, visitas, estágios, etc.):

1	2	3	4	5
Não são reali-	Raramente rea-	As vezes rea-	Muitas vezes	Sempre
zadas	lizadas	lizadas	realizadas	reali-
				zadas

28. Reuniões do corpo docente para estudos e debates de assuntos teóricos, apresentação de trabalhos de professores, etc.:

1	2	3	4	5
Não são rea- lizadas	Raramente rea- lizadas	Às vezes rea- lizadas	Muitas vezes realizadas	Sempre rea- lizadas

29. Pessoal auxiliar para serviços como: datilografia, preparação de materiais, manutenção de equipamento e outros:

1	2	3	4	5
Não há dis- ponível	Raramente dis- ponível	Às vezes dis- ponível	Muitas vezes disponível	Sempre dis- ponível

30. Serviço de computador, para pesquisa:

1	2	3	4	5
Nunca dis- ponível	Raramente dis- ponível	Às vezes dis- ponível	Muitas vezes disponível	Sempre dis- ponível

31. Consultoria, para pesquisa:

1	2	3	4	5
Nunca dis- ponível	Raramente dis- ponível	Às vezes dis- ponível	Muitas vezes disponível	Sempre dis- ponível

32. Auxiliares para pesquisa:

1	2	3	4	5
Nunca dis- ponível	Raramente dis- ponível	Às vezes dis- ponível	Muitas vezes disponível	Sempre dis- ponível

F. Examine os itens abaixo e considere a situação no curso ora em exame. Circule o número que reflete a situação presente.

NESTE DEPARTAMENTO:

33. Os professores são incentivados a fazer pesquisa:

1	2	3	4	5
Nunca	Raramente	Às vezes	Muitas vezes	Permanentemente

34. Os professores são encorajados a aperfeiçoar seus procedimentos de ensino (emprego de novas técnicas, mais adequados recursos auxiliares, novas abordagens, realização de cursos ou seminários sobre ensino e aprendizagem):

1	2	3	4	5
Nunca	Raramente	Às vezes	Muitas vezes	Permanentemente

35. Os professores são estimulados a participar em atividades de extensão como: lecionar em cursos, conduzir seminários, dar palestras, conduzir projetos, etc.:

1	2	3	4	5
Nunca	Raramente	Às vezes	Muitas vezes	Permanentemente

36. Os professores são incentivados a escrever(livros, monografias, artigos, etc., para utilização interna ou eventual publicação):

1	2	3	4	5
Nunca	Raramente	Às vezes	Muitas vezes	Permanentemente

G. Examine os seguintes itens e dê sua opinião sobre a situação atual no curso em que leciona.

37. Em que medida atividades de ensino de graduação, pós-graduação e pesquisa estão integradas, sendo administradas e desenvolvidas pelos respectivos Departamentos?

1	2	3	4	5
Não há integração	Integração fraca	Integração boa	Integração muito boa	Integração excelente

38. Em que medida o Departamento desenvolve pesquisa, cooperativamente, com outros Departamentos da Universidade?

1	2	3	4	5
Nunca	Raramente	Às vezes	Muitas vezes	Continuamente

39. Com que frequência professores desse Departamento conduzem projetos de pesquisa, individualmente (sem a colaboração de outros professores do Departamento)?

1	2	3	4	5
Nunca	Raramente	Às vezes	Muitas vezes	Continuamente

40. Em que medida os professores participam diretamente de decisões referentes ao curso (disciplinas, aquisição e uso de recursos auxiliares para o ensino e pesquisa, projetos, etc.):

1	2	3	4	5
Não participam	Participam muito pouco	Participam medianamente	Participam muito	Participam ao máximo

41. Quem, realmente, toma as decisões relativas a organização e funcionamento do curso? (assinale apenas um).

- 1 () o Diretor da Unidade
- 2 () o Conselho Departamental da Unidade
- 3 () o Chefe do Departamento
- 4 () o Colegiado do Departamento
- 5 () o Coordenador da Comissão de Carreira
- 6 () o Coordenador da Comissão de Pós-Graduação
- 7 () as Comissões de Carreira ou de Pós-Graduação (conforme o curso)
- 8 () os Professores

H. Considere os itens abaixo e circule o número que representa sua percepção sobre a situação do curso em exame:

42. Qual o nível de reconhecimento e compreensão das necessidades dos docentes, pelos seguintes administradores:

ADMINISTRADORES	NÍVEL DE RECONHECIMENTO E COMPREENSÃO:				
	NULO	BAIXO	MÉDIO	ALTO	MUITO ALTO
1. Diretor de Faculdade ou Instituto	1	2	3	4	5
2. Vice-Diretor	1	2	3	4	5
3. Chefe de Departamento	1	2	3	4	5
4. Coordenador de Comissão de Carreira	1	2	3	4	5
5. Coordenador de Pós-Graduação	1	2	3	4	5

43. Quanto esforço, em sua observação, os Administradores deste curso dedicam para tornar o local de trabalho adequado às atividades docentes?

1	2	3	4	5
Nenhum	Muito pouco	Algum	Muito	O máximo

44. Considero os Administradores responsáveis por este curso, quanto ao exercício das funções administrativas:

1	2	3	4	5
Completamente incompetentes	Bastante incompetentes	Medianamente competentes	Bastante competentes	Completamente competentes

45. A comunicação entre os Administradores e Professores deste curso é aberta, fácil e efetiva:

1	2	3	4	5
Nunca	Quase nunca	As vezes	Muitas vezes	Sempre

46. Há um nível alto de confiança mútua entre os membros do corpo docente deste curso.

1	2	3	4	5
Discordo completamente	Discordo	Não tenho opinião	Concordo	Concordo completamente

47. O grupo de Professores deste curso "representa papéis", eles não são espontâneos.

1	2	3	4	5
Discordo completamente	Discordo	Não tenho opinião	Concordo	Concordo completamente

48. Os Professores deste curso valorizam minhas contribuições ao grupo.

1	2	3	4	5
Discordo completamente	Discordo	Não tenho opinião	Concordo	Concordo completamente

49. Cada membro do corpo docente deste curso parece desempenhar um papel claramente definido e é respeitado pelo seu desempenho e não pelo tipo de tarefa que realiza.

1	2	3	4	5
Discordo completamente	Discordo	Não tenho opinião	Concordo	Concordo completamente

J. Considere os itens abaixo e circule o número que expressa sua si-

tuação e as condições do curso que está examinando:

50. A carga de trabalho que me é atribuída normalmente, em consonância com meu regime de trabalho, é:

1	2	3	4	5
Muito pequena	Pequena	Média	Grande	Excessiva

51. Considerando os pré-requisitos, em termos de conhecimento, classificaria a média dos estudantes deste curso como:

1	2	3	4	5
Inabilitados	Habilitados abaixo da média	Habilitados medianamente	Habilitados acima da média	Habilitados em nível excelente

52. Em termos de habilidades (saber estudar) e hábitos de estudo (estudar metodicamente), classificaria os estudantes como:

1	2	3	4	5
Sem condições	Com poucas condições	Com condições médias	Com boas condições	Com excelentes condições

53. A motivação geral dos estudantes deste curso é:

1	2	3	4	5
Muito baixa	Baixa	Média	Alta	Muito alta

54. Minha remuneração, tendo em vista minhas qualificações e meu regime de trabalho, é:

1	2	3	4	5
Muito baixa	Baixa	Média	Alta	Muito alta

55. Ter uma sala na Universidade é importante para (marque uma ou ambas, conforme sua opinião):

a () PROFESSORES DE TEMPO INTEGRAL

1	2	3	4	5
Nenhuma	Muito pequena	Razoável	Grande	Muito grande

b () PROFESSORES DE TEMPO PARCIAL

1	2	3	4	5
Nenhuma	Muito pequena	Razoável	Grande	Muito grande

56. As condições de minha sala de trabalho*, na Universidade, são:

* Se não possui sala, marque aqui e responda com base nas observações das salas de colegas.

() Não possuo sala na Universidade

1	2	3	4	5
Completamente inadequadas	Bastante inadequadas	Parcialmente adequadas	Bastante adequadas	Completamente adequadas

57. Em sua opinião, qual o nível de reconhecimento da competência e desempenho docentes pelos seguintes Administradores (circule o número que expressa sua percepção):

ADMINISTRADORES	NÍVEL DE RECONHECIMENTO:				
	NULO	BAIXO	MÉDIO	ALTO	MUITO ALTO
1. Diretor de Faculdade ou Instituto	1	2	3	4	5
2. Vice-Diretor	1	2	3	4	5
3. Chefe de Departamento	1	2	3	4	5
4. Coordenador de Comissão de Carreira	1	2	3	4	5
5. Coordenação de Pós-Graduação	1	2	3	4	5

58. A participação dos professores em decisões do Departamento é:

1	2	3	4	5
Nenhuma	Pouca	Média	Grande	Muito grande

59. Como membro do corpo docente, meus objetivos profissionais (atuação em determinado nível de excelência, desenvolvimento de projetos de pesquisa, participação em atividades de extensão, produção intelectual, tais como: artigos, monografias, livros, etc., auto-aperfeiçoamento, clima adequado de trabalho, satisfação de interesses pessoais, etc.):

1	2	3	4	5
Não são atingidos	São insatisfatoriamente atingidos	São parcialmente atingidos	São satisfatoriamente atingidos	São completamente atingidos

L. Examine os itens abaixo e dê sua opinião sobre cada um, circulando o número que melhor representa sua percepção.

60. Sou estimulado intelectualmente, em especial através de (marque quantas forem adequadas, ordenando-as: 1, 2, 3; ...):

1	2	3	4	5
Contato com alunos	Diálogos com colegas do Departamento	Contatos com colegas da Universidade	Participação em Associação Profissional	Informações de periódicos, livros e outras publicações

61. Com quantos professores deste curso normalmente mantém relacionamento mais estreito, inclusive em situações sociais fora da Universidade?

1	2	3	4	5
1 - 3	4 - 6	7 - 9	10 - 12	13 ou mais

62. Com quantos docentes deste curso há condições de compartilhar interesses profissionais, discutindo idéias, trocando experiências, etc., visando ao aprimoramento do desempenho profissional?

1	2	3	4	5
1 - 3	4 - 6	7 - 9	10 - 12	13 ou mais

63. Se houvesse oportunidade, eu mudaria para outra Universidade:

1	2	3	4	5
Em qualquer situação	Se a remuneração fosse a mesma	Se as condições fossem melhores	Só em condições excepcionais	Não mudaria de forma alguma

64. Se houvesse oportunidade, eu mudaria para outra entidade não universitária (privada ou pública).

1	2	3	4	5
Se as condições fossem as mesmas	Se a remuneração fosse um pouco melhor	Se as condições gerais fossem melhores	Só em condições excepcionais	Não mudaria de forma alguma

M. Considere, de forma global, o curso que está sendo examinado e de sua opinião sobre as afirmações abaixo, circulando o número que melhor expressa sua percepção.

A PRODUTIVIDADE GERAL DESTE CURSO É:

65. Quanto ao número de graduados (percentagem dos que concluem o curso):

1	2	3	4	5
Muito fraca	Fraca	Boa	Muito boa	Excelente

66. Quanto à qualidade dos graduados (reais condições para o exercício profissional).

1	2	3	4	5
Muito fraca	Fraca	Boa	Muito boa	Excelente

67. Quanto à produção de pesquisa pelo corpo docente:

1	2	3	4	5
Muito fraca	Fraca	Boa	Muito boa	Excelente

68. Quanto à realização de atividades de extensão (cursos, palestras, consultoria, projetos, etc.):

1	2	3	4	5
Muito fraca	Fraca	Boa	Muito boa	Excelente

69. Quanto a publicações pelo corpo docente (artigos, trabalhos para congressos, livros, etc.):

1	2	3	4	5
Muito fraca	Fraca	Boa	Muito boa	Excelente

EM QUE MEDIDA OS PROFESSORES DESTA CURSO ESTÃO SATISFEITOS:

70. Com as condições de trabalho (aspectos de ambiente físico, clima organizacional, recursos necessários, etc.):

1	2	3	4	5
Completamente insatisfeitos	Pouco satisfeitos	Satisfeitos	Muito satisfeitos	Completamente satisfeitos

71. Com as condições dos alunos (pré-requisitos, motivação, desempenho, etc.):

1	2	3	4	5
Completamente insatisfeitos	Pouco satisfeitos	Satisfeitos	Muito satisfeitos	Completamente satisfeitos

72. Com as normas políticas e administrativas da Universidade:

1	2	3	4	5
Completamente insatisfeitos	Pouco satisfeitos	Satisfeitos	Muito satisfeitos	Completamente satisfeitos

73. Em que medida os professores deste curso conseguem atingir seus objetivos pessoais e profissionais?

1	2	3	4	5
Não atingem	Atingem insatisfatoriamente	Atingem parcialmente	Atingem satisfatoriamente	Atingem completamente

74. Qual sua percepção do impacto ou influência deste programa, por meio da maioria de seus egressos, em outras entidades?

CONSIDERANDO A COMPETÊNCIA TÉCNICA DO EGRESSO PARA O DESEMPENHO DE TAREFAS PROFISSIONAIS ESPECÍFICAS:

1	2	3	4	5
Muito fraca	Fraca	Boa	Muito boa	Excelente

75. Considerando atitudes profissionais em geral; como: compromisso, confiabilidade, autonomia, auto-aperfeiçoamento:

1	2	3	4	5
Muito fraca	Fraca	Boa	Muito boa	Excelente

76. Comparativamente com egressos de outras organizações de ensino

superior da Grande Porto Alegre, o nível de treinamento dos egressos da UFRGS é:

1	2	3	4	5
Completamente inadequado	Bastante inadequado	Adequado	Muito adequado	Completamente adequado

Appendix B

Questionnaire Used with Faculty and Administrators

Translation

Questionnaire

I. Information about respondents

1. Position: - 1 - Dean
 2 - Chairperson of Academic Department
 3 - Coordinator of the Committee for Undergraduate Program
 4 - Coordinator of Graduate Program
 5 - Member of Committee of the Graduate Program
 6 - Faculty Member of Graduate Program
 7 - Faculty Member of Undergraduate Program
2. Program: -
3. Age: -
4. Sex: - 1 - Male
 2 - Female
5. Rank: - 1 - Full professor
 2 - Associate professor
 3 - Assistant professor
 4 - Auxiliary professor
 5 - Other. Especificy: _____
6. Contract status: - 1 - Exclusive Dedication
 2 - Full-time
 3 - Part-time
7. Qualification: - 1 - Undergraduate
 2 - Specialization
 3 - Masters - UFRGS
 4 - Masters - Brasil
 5 - Masters - other country
 6 - Ph.D - UFRGS
 7 - Ph.D - Brasil
 8 - Ph.D - other country
 9 - Doctorate (L.D.)

8. Estimate how many years have you spent in each of the following activities (in this or other organization):

- | | |
|--|-----------|
| 1 - Teaching undergraduate courses | ___ years |
| 2 - Teaching graduate courses | ___ years |
| 3 - Advising students | ___ years |
| 4 - Doing research and/or writing | ___ years |
| 5 - Developing extension programs | ___ years |
| 6 - Working in academic administration | ___ years |
| 7 - Working in private organizations | ___ years |
| 8 - Working in public organizations | ___ years |
| 9 - Others (Especify) _____ | ___ years |

9. How much time (if any) have you spent in the following positions?

- | | |
|--|-----------|
| 1 - Department Chairperson | ___ years |
| 2 - Coordinator of Academic Committees | ___ years |
| 3 - Coordinator of Graduate Programs | ___ years |
| 4 - Member of Collegiates | ___ years |
| 5 - Chairperson of the Committee of the area | ___ years |
| 6 - Dean of College or Institute | ___ years |
| 7 - Vice-President of the University | ___ years |
| 8 - President of the University | ___ years |

10. Have you taken formal courses in administration?

- 1 - 1-yes
2-no

- 2 - If yes, where? 1 - UFRGS
 2 - in Brasil
 3 - in other country

11. Have you taken formal courses in education?

- 1 - 1 - yes
2 - no

- 2 - If yes, where? 1 - UFRGS
 2 - in Brasil
 3 - in other country

II. Questionnaire

A. Below you will find a series of statements about goals of academic programs. Examine these statements and give your opinion about the actual emphasis given to them in your programs.

12. Circle the number among the choices on the right, which best represents your perception.

STATEMENTS	LEVEL OF EMPHASIS				
	Very low	Low	Avg.	High	Very high
1. Doing research. Generating knowledge. Providing bases for understanding and resolving problems.	1	2	3	4	5
2. Disseminating ideas and results of research. Publishing.	1	2	3	4	5
3. Promoting professional education according to the work market.	1	2	3	4	5
4. Promoting professional development by means of graduate programs.	1	2	3	4	5
5. Participating in social development by extension courses and other projects	1	2	3	4	5
6. Promoting the continual renewing of the educational system to adequate it to the context.	1	2	3	4	5

7. Promoting professional and personal development of faculty.	1	2	3	4	5
8. Exerting cultural leadership through scientific, cultural and art programs, conferences, displays, etc.	1	2	3	4	5
9. Providing conditions (physical, organizational climate, communication) for productive work of faculty, administrators and students.	1	2	3	4	5
10. Providing for satisfaction and achievement of personal goals of its members.	1	2	3	4	5

B. Again, consider the statements in Question 1, repeated below, and indicate your opinion as to the emphasis each should receive in the program.

13. Circle the number which best represents your judgment.

STATEMENTS	RECOMMENDED LEVEL OF EMPHASIS				
	Very low	Low	Avg.	High	Very high
1. Doing research. Generating knowledge. Providing bases for understanding and resolving problems.	1	2	3	4	5
2. Disseminating ideas and results of research. Publishing.	1	2	3	4	5
3. Promoting professional education according to the work market.	1	2	3	4	5
4. Promoting professional development by means of graduate programs.	1	2	3	4	5

5. Participating in social development by extension courses and other projects.	1	2	3	4	5
6. Promoting the continual renewing of the educational system to adequate it to the context.	1	2	3	4	5
7. Promoting professional and personal development of faculty.	1	2	3	4	5
8. Exerting cultural leadership through scientific, cultural and art programs, conferences, displays, etc.	1	2	3	4	5
9. Providing conditions (physical, organizational climate, communication) for productive work of faculty, administrators and students.	1	2	3	4	5
10. Providing for satisfaction and achievement of personal goals of its members.	1	2	3	4	5

14. Go over the same statements again. In your opinion which are the three actually emphasized most and the three emphasized least in the program? Which are the three you think should be most emphasized and least emphasized? Rank order them from 1 to 3 below, using the statements' numbers as identification.

Actually:

Most emphasized: 1 - _____
 2 - _____
 3 - _____

Least emphasized: 1 - _____
 2 - _____
 3 - _____

Should be:

Most emphasized: 1 - _____ (last one)
 2 - _____
 3 - _____

Least emphasized: 1 - _____
 2 - _____
 3 - _____

C. Examine the following tasks and give your opinion about the emphasis each one actually has in this program.

15. Circle the number which best represents your judgment.

T A S K S	ACTUAL LEVEL OF EMPHASIS				
	Very low	Low	Avg.	High	Very high
1. Teaching (classroom activities)	1	2	3	4	5
2. Advising students (internships, thesis, dissertations, projects etc.).	1	2	3	4	5
3. Doing research (generating knowledge, providing basis for understanding and resolving of problems).	1	2	3	4	5
4. Writing articles or reports for publication, or mimeo to use in the program.	1	2	3	4	5
5. Consultations in business, industry, government or other organizations.	1	2	3	4	5
6. Participating in the renewal process of the educational system to adequate it to the environmental demands.	1	2	3	4	5
7. Participating in: congresses, seminars, symposiums, etc., presenting papers or in special positions.	1	2	3	4	5
8. Participating in courses or seminars, seeking personal and professional development.	1	2	3	4	5
9. Participating as group member in teaching, research or extension projects.	1	2	3	4	5
10. Participating in academic committees or collegiates.	1	2	3	4	5

D. Please go over the same set of tasks again and give your opinion about the level of emphasis each one should receive of optimal program effectiveness (i.e. achieving more and better results, providing for faculty satisfaction and having more relevant impact in the broader society through its graduates).

16. Circle the number which best express your perception.

T A S K S	RECOMMENDED LEVEL OF EMPHASIS				
	Very low	Low	Avg.	High	Very high
1. Teaching (classroom activities)	1	2	3	4	5
2. Advising students (internships, thesis, dissertations, projects, etc.)	1	2	3	4	5
3. Doing research (generating knowledge, providing basis for understanding and resolving of problems).	1	2	3	4	5
4. Writing articles or reports for publication, or mimeo to use in the program.	1	2	3	4	5
5. Consultations in business, industry, government or other organizations.	1	2	3	4	5
6. Participating in the renewal process of the educational system to adequate it to the environmental demands.	1	2	3	4	5
7. Participating in: congresses seminars, symposiums, etc., presenting papers or in special positions.	1	2	3	4	5
8. Participating in courses or seminars, seeking personal and professional development	1	2	3	4	5

9. Participating as group member in teaching, research or extension projects.	1	2	3	4	5
10. Participating in academic committees or collegiates.	1	2	3	4	5

17. Go over the same statements again. In your opinion which are the three actually emphasized most and the three emphasized least in the program? Which are the three you think should be most and least emphasized? Rank order them using the statements' numbers as identification.

Actually:

Most emphasized:	1 - _____	Least emphasized:	1 - _____
	2 - _____		2 - _____
	3 - _____		3 - _____

Should be:

Most emphasized:	1 - _____	Least emphasized:	1 - _____
	2 - _____		2 - _____
	3 - _____		3 - _____

E. Considering the following elements or conditions and procedures for teaching in this program, what is your actual perception of these? Circle the number which best represents your opinion.

18. Classroom's general physical condition (size, level of noise, ventilation, etc.).

1	2	3	4	5
Completely inadequate	Somewhat adequate	Fairly adequate	Quite adequate	Completely adequate

19. Classroom facilities (number of chairs, tables, blackboard, etc.).

1	2	3	4	5
Not at all appropriate	Somewhat appropriate	Fairly appropriate	Quite appropriate	Extremely appropriate

20. Use of available instructional resources (audio-visual materials such as: overhead projector, slides, flip charts, real samples, etc.).

1	2	3	4	5
Not used	Somewhat used	Fairly used	Quite used	Widely used

21. Variety of methods used in teaching by most of faculty (i.e. lectures, seminars, simulations, projects, etc.).

1	2	3	4	5
No variety	Little variety	Average variety	Much variety	Great variety

22. Number of specialized basic technical books in the library.

1	2	3	4	5
Not at all adequate	Somewhat adequate	Fairly adequate	Quite adequate	Completely adequate

23. Number of specialized periodicals.

1	2	3	4	5
Not at all adequate	Somewhat adequate	Fairly adequate	Quite adequate	Completely adequate

24. Instructional support (persons or groups to provide technical support such as suggestions about different procedures, information about various instructional resources, etc.).

1	2	3	4	5
None available	Somewhat adequate	Fairly adequate	Quite adequate	Extremely adequate

25. Financial support for innovation or special projects in teaching.

1	2	3	4	5
None available	Rarely available	Sometimes available	Often available	Always available

26. Financial support for conducting studies and projects for publication.

1	2	3	4	5
None available	Rarely available	Sometimes available	Often available	Always available

27. Practical activities (i.e. observations, visits, internships) are:

1	2	3	4	5
None available	Rarely available	Sometimes available	Often available	Always available

28. Faculty meetings to present papers or other type of exchanging experience.

1	2	3	4	5
Never occurs	Rarely occurs	Sometimes occurs	Often occurs	Always occurs

29. Support staff (for typing, preparation of materials, maintenance of equipment).

1	2	3	4	5
None available	Rarely available	Sometimes available	Often available	Always available

30. Computer services for research.

1	2	3	4	5
Never available	Rarely available	Sometimes available	Often available	Always available

31. Statistical consulting.

1	2	3	4	5
Never available	Rarely available	Sometimes available	Often available	Always available

32. Research assistants.

1	2	3	4	5
Never available	Rarely available	Sometimes available	Often available	Always available

F. Examine the items below and give your opinion about the situation in the program being analyzed. Circle the number which reflects the present situation.

33. Faculty members are encouraged to do research.

1	2	3	4	5
Never encouraged	Rarely encouraged	Sometimes encouraged	Often encouraged	Always encouraged

34. Faculty members are encouraged to improve their teaching.

1	2	3	4	5
Never encouraged	Rarely encouraged	Sometimes encouraged	Often encouraged	Always encouraged

35. Participation in consulting and other service activities is encouraged in this program.

1	2	3	4	5
Never encouraged	Rarely encouraged	Sometimes encouraged	Often encouraged	Always encouraged

36. Faculty members are encouraged to publish in this program.

1	2	3	4	5
Never encouraged	Rarely encouraged	Sometimes encouraged	Often encouraged	Always encouraged

G. Examine the following statements and give your opinion about the situation in your program.

37. To what extent are research and teaching, undergraduate and graduate activities integrated in your program?

1	2	3	4	5
Not at all integrated	Not much integrated	Fairly integrated	Well integrated	Completely integrated

38. To what extent does your program develop cooperative research projects with other programs in this university?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Quite frequently

39. How frequently do faculty in your program conduct research

projects (i.e. projects carried out within the program)?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Quite frequently

40. To what extent faculty members participate in decisions about the program (courses, resource acquisition and use projects, etc.)?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Quite frequently

41. Who make the decisions related to the organization and functioning of the program? (Indicate only one).

- 1 - () The Dean
- 2 - () The Department Council
- 3 - () The Chair
- 4 - () The Collegiate of the Department
- 5 - () The Coordinator of the Academic Committee
- 6 - () The Coordinator of the Committee of Graduate Program
- 7 - () The Academic Committee (Under or Graduate)
- 8 - () The Faculty Members

42. To what extent are faculty needs recognized by the administrators mentioned below:

ADMINISTRATORS	LEVEL OF RECOGNITION				
	None	Low	Average	High	Very high.
1 - Dean	1	2	3	4	5
2 - Vice-Dean	1	2	3	4	5
3 - Chair	1	2	3	4	5

4 - Coordinator of Academic Committee	1	2	3	4	5
5 - Coordinator of Graduate Program	1	2	3	4	5

43. How much of their time and energy do you feel the Dean and Chairperson devote to making this a place where faculty can work productively?

1	2	3	4	5
None	Not very much	Some	Adequate amount	A great deal

44. I can say that the administrators of this program, in their administrative position, are:

1	2	3	4	5
Not at all competent	Somewhat competent	Fairly competent	Quite competent	Extremely competent

45. Communication between administrators and faculty members in this program, is open, easy and effective.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Quite frequently

TRUST

46. Faculty members in this program trust each other very much.

1	2	3	4	5
Strongly disagree	Disagree	Don't know	Agree	Strongly agree

47. Faculty members are playing roles in this program and not being themselves.

1	2	3	4	5
Strongly disagree	Disagree	Don't know	Agree	Strongly agree

48. My colleagues have a high opinion on my contributions to the group.

1	2	3	4	5
Strongly disagree	Disagree	Don't know	Agree	Strongly agree

49. Each faculty member in this program seems to play a definite and clear role and is respected on the basis of how well he performs that role.

1	2	3	4	5
Strongly disagree	Disagree	Don't know	Agree	Strongly agree

J. Consider the statements below and circle the number which represents your perception about the situation in your program.

50. My teaching load is:

1	2	3	4	5
Very light	Light	About average	Heavy	Extremely heavy

51. Considering the prerequisites in terms of knowledge, I would rate the majority of the students of this program as:

1	2	3	4	5
Incompetent	Not very competent	Competent	Very competent	Completely competent

52. In terms of general study skills, I would rate the students of this program as:

1	2	3	4	5
Incompetent	Not very competent	Competent	Very competent	Completely competent

53. In terms of general motivation, I would rate the students in this program as:

1	2	3	4	5
Very low	Low	Average	High	Very high

54. My present salary, in the light of my qualifications is:

1	2	3	4	5
Very low	Low	Average	High	Very high

55. The importance of having an office at the University is:

a) () FOR FULL-TIME FACULTY

1	2	3	4	5
None	Very low	Average	High	Very high

b) () FOR PART-TIME FACULTY

1	2	3	4	5
None	Very low	Average	High	Very high

56. The general conditions of my office are:

1	2	3	4	5
Completely inadequate	Inadequate	Partially adequate	Quite adequate	Completely adequate

57. To what extent are faculty competence and performance recognized by the following administrators:

ADMINISTRATORS	LEVEL OF RECOGNITION				
	None	Low	Average	High	Very high
1 - Dean	1	2	3	4	5
2 - Vice-Dean	1	2	3	4	5
3 - Chair	1	2	3	4	5
4 - Coordinator of Academic Committee	1	2	3	4	5
5 - Coordinator of Graduate Program	1	2	3	4	5

58. Participation of faculty members in decision-making in the Department is:

1	2	3	4	5
None	Few	Average	High	Very high

59. As faculty member in this program, my personal professional objectives are:

1	2	3	4	5
Not at all achieved	Not very much achieved	Partially achieved	Well achieved	Completely achieved

L. Examine the statements below and give your opinion about each one by circling the number which best represents your perception.

60. I get the most of my intellectual stimulation from:

1	2	3	4	5
Discussions with students	Colleagues in the department	Colleagues at the university	Professional associates outside the university	Periodicals, books, other publications

61. About how many faculty members do you maintain close relationship in your department?

1	2	3	4	5
1 - 3	4 - 6	7 - 9	10 - 12	13 or more

62. With how many faculty members is it possible to share professional interests, discuss new ideas, exchange experience?

1	2	3	4	5
1 - 3	4 - 6	7 - 9	10 - 12	13 or more

63. If I had the opportunity I would go to other university.

1	2	3	4	5
In the first opportunity	If my salary were the same	If the general conditions were better	Only if the conditions were better	I would not change

64. If I had the opportunity I would go to work in another kind of organization (public or private).

1	2	3	4	5
In the first opportunity	If my salary were the same	If the general conditions were better	Only if the conditions were better	I would not change

M. Consider, in general terms the program being examined and give your opinion about the statements below. Circle the number which express your perception.

PRODUCTIVITY, IN THIS PROGRAM, CONCERNING:

65. Number of graduates (percentage of the ones who finish the pro-

gram).

1	2	3	4	5
Very low	Low	Average	High	Very high

66. Quality of graduates (capacity for professional performance).

1	2	3	4	5
Very low	Low	Average	High	Very high

67. Production of research by faculty members.

1	2	3	4	5
Very low	Low	Average	High	Very high

68. Development of extension activities (courses, seminars, lectures, projects, consulting).

1	2	3	4	5
Very low	Low	Average	High	Very high

69. Publications (articles, papers, books).

1	2	3	4	5
Very low	Low	Average	High	Very high

In what extent faculty members of this program are satisfied with:

70. General work conditions (physical environment, organizational climate, auxiliary resources)

1	2	3	4	5
Not at all satisfied	Somewhat satisfied	Fairly satisfied	Quite satisfied	Completely satisfied

71. Students pre-requisites, motivation, and performance.

1	2	3	4	5
Not at all satisfied	Somewhat satisfied	Fairly satisfied	Quite satisfied	Completely satisfied

72. Policies and norms of the university.

1	2	3	4	5
Not at all satisfied	Somewhat satisfied	Fairly satisfied	Quite satisfied	Completely satisfied

73. To what extent faculty members, in this program, attain their professional and personal objectives?

1	2	3	4	5
Never attain	Rarely attain	Sometimes attain	Often attain	Always attain

What is your perception about the impact of this program in other organizations by means of its graduates.

74. Considering the technical competence of the graduate for the performance of specific professional tasks.

1	2	3	4	5
Very low	Low	Average	High	Very high

75. Concerning professional attitudes, as: commitment, reliability,

independence.

1	2	3	4	5
Very low	Low	Average	High	Very high

76. Comparing the graduates of this program with others from other universities in the "Great Porto Alegre" their level of training is:

1	2	3	4	5
Not at all adequate	Somewhat adequate	Adequate	Very adequate	Completely adequate

Appendix C

Questionnaire Used with Graduates

Portuguese Original

Examine as questões abaixo e responda, preenchendo os espaços vazios ou circulando o número que representa sua opinião.

1. Que curso(s) o(a) Senhor(a) concluiu na UFRGS?

2. Em que ano os concluiu? _____

3. Qual seu cargo atual? _____

4. Há quanto tempo o exerce? _____

5. Que outros cargos o(a) Senhor(a) já exerceu?

6. Em que medida seu atual trabalho se relaciona com o curso realizado?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Não se relaciona.	Se relaciona fracamente.	Se relaciona medianamente.	Se relaciona muito.	Se relaciona totalmente.

7. Em que medida o(a) Senhor(a) ficou satisfeito com seu desempenho profissional após o curso?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Completamente insatisfeito.	Bastante insatisfeito.	Medianamente satisfeito.	Muito satisfeito.	Totalmente satisfeito.

8. Em que medida o curso foi útil, proporcionando conhecimentos e capacidades específicas necessárias à execução ou desempenho de tarefas relativas ao seu atual trabalho ou em outros já desempenhados?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Inútil	Pouco útil.	Medianamente útil.	Muito útil.	Totalmente útil.

9. Com que frequência o(a) Senhor(a) usa os conteúdos ou aprendizagens de seu curso no desempenho de suas funções?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Nunca uso.	Raramente uso.	Uso às vezes.	Uso seguidamente.	Sempre uso.

10. Em que medida os conhecimentos e habilidades adquiridas no curso o auxiliaram no processo de seleção para seu atual cargo?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Não auxiliou.	Auxiliou muito pouco.	Auxiliou parcialmente.	Auxiliou muito.	Auxiliou totalmente.

11. Em que medida o curso o auxiliou em seu desenvolvimento pessoal (atitudes, valores, hábitos) relativos à profissão para a qual se preparava?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Não auxiliou.	Auxiliou muito pouco.	Auxiliou parcialmente.	Auxiliou muito.	Auxiliou totalmente.

12. Como o(a) Senhor(a) avaliaria sua competência técnica logo após ao término do curso, para o desempenho de suas tarefas no trabalho?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Muito fraca.	Fraca	Boa	Muito boa.	Excelente.

13. Considerando: o tamanho das organizações, as tarefas a serem desempenhadas e os conhecimentos necessários, seu preparo profissional após o curso era:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Completamente insuficiente.	Bastante insuficiente.	Adequado às necessidades.	Acima do necessário.	Excessivo, muito acima do necessário.

14. Em que medida o relacionamento com pessoas desta ou de outra organização influenciou na obtenção do presente cargo?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Não influenciou.	Influenciou muito pouco.	Influenciou de alguma forma.	Influenciou muito.	Influenciou decisivamente.

15. Quais as tres mais importantes modificações que poderiam colaborar para o aperfeiçoamento do curso que o(a) Senhor(a) realizou, no sentido de torná-lo mais efetivo?

16. Em sua opinião, quais deveriam ser os três mais importantes objetivos para uma universidade neste Estado?

17. Qual sua idade? _____

18. Sexo: () Feminino () Masculino

19. Área em que atua: _____ Ciências Biológicas
_____ Ciências Exatas
_____ Ciências Humanas e Filosofia
_____ Tecnologia

Appendix D

Questionnaire Used with Graduates

Translation

This study was designed to assess the effectiveness of the Federal University of Rio Grande do Sul. As a graduate of this university we ask you to answer the questions below. Your sincere cooperation is essential to the achievement of the objectives of the study. Confidentiality of responses is assured. Do not put your name on the questionnaire.

Please, indicate your educational background and position in the spaces below:

1. Program: _____
2. Year of graduation: _____
3. Current position _____
4. Time in this position (Months or years) _____
5. Other positions you had before: _____

6. How closely is your job related to your undergraduate major field?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Unrelated	Slightly related	Somewhat related	Very related	Closely related

7. How satisfied are you with your program?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Not at all satisfied	Slightly satisfied	Somewhat satisfied	Very satisfied	Completely satisfied

8. How useful was your program in providing the knowledge and skills needed in your current job?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Not at all useful	Slightly useful	Somewhat useful	Very useful	Completely useful

9. How frequently do you use the content of your undergraduate major coursework in your current job?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Never	Rarely	Sometimes	Often	Almost always

10. To what extent did the knowledge and skills acquired in your program helped you in the selection process for this job?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Not at all	Slightly	Somewhat	Very much	Completely

11. How much has the program helped in your personal development (i.e. development of attitudes, values, habits)?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Not at all	Slightly	To some extent	Consider- ably	Very much

12. How would you evaluate your technical competencies for the performance of specific professional tasks on the job?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Very poor	Poor	Good	Very good	Excellent

13. Considering the size of the organizations, the tasks to be performed and the knowledge required , your professional training after graduation was:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Completely insufficient	Somewhat insufficient	Adequate	Over the necessary	Exaggerated. Over the necessary.

14. How much did personal relationships play a part in helping you gain this position?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Not at all	Slightly	Some	A good deal	Very much

15. In your opinion, which are the three most important modifications to be made to improve the program you graduate in?

1. _____
2. _____
3. _____

16. In your opinion, which should be the three most important objectives for a university in the State of Rio Grande do Sul?

1. _____
2. _____
3. _____

17. Your age: _____

18. Sex: _____ Male _____ Female

19. Area: _____ Basic Sciences
_____ Biological Sciences
_____ Human and Social Sciences
_____ Technology
_____ Letters and Arts

Appendix E

Program Characteristics in Terms of Number of Candidates and Percentage of Students Completing the Program

Dimension	AGR	ARC	ENG	PHY	MAT	PHA	MED	PHI	ECO*
Number of Places	80	100	150	80	110	100	126	30	120
# Students Selecting 1st Option	1174	1407	1264	233	299	622	1987	96	541
# Students Selecting 2nd Option	201	164	208	498	1518	590	77	682	799
Applic/Place Ratio	14.7	14.1	8.4	2.9	2.7	6.2	15.8	3.2	4.5
Admitted to 1st Option	79	100	150	80	58	89	126	18	106
Admitted to 2nd Option	1	0	0	0	52	11	0	12	14
Lowest Score	648	636	619	556	525	564	681	522	549
% Drop-Out	24	36	46	20	24	10	4	17	15
% Completing	65	79	64	22	30	68	85	42	39

*AGRONomy, ARChitecture, ENGINEERING, PHYsics, MATHeMATICS, PHARmacy, MEDicine, PHIlosophy, ECONomics.

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