

AN IDEALIZED DESIGN OF A UNIVERSITY

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1 INTRODUCTION

One who attempts to improve existing universities is very likely to become preoccupied with removing current deficiencies. Unfortunately, getting rid of what one does not want does not necessarily yield what one does want. This is apparent to those who get rid of television programs they do not want by changing channels. They have a high probability of getting programs they want even less. Therefore, effective design of a university must be directed at getting what one wants, not at getting rid of what one does not want.

Moreover, improving the performance of parts of a system taken separately -- and universities are systems -- does not necessarily improve the performance of the system taken as a whole. The performance of a system is never the sum of the performances of its parts; it is the product of their *interactions*. Therefore, *efforts to improve universities should begin with preparation of a comprehensive design of what one would like a university to be ideally.*

An *idealized design* of a system is one with which its designers would replace that system *right now* if they were free to replace it with whatever system one wanted. The only constraints imposed on such a design are that it be technologically feasible and operationally viable; that is, capable of surviving in the current environment.

The product of an idealized design is not ideal or utopian, but the best ideal-seeking system of which its designers can conceive.

An ideally designed system need *not* be realizable. If it cannot be realized, it can be approximated. Such approximation is the objective of subsequent planning and its implementation.

The system designed should enable its management to improve over time. Therefore, its design should incorporate means of rapid and effective learning and adaptation. Because our concept of what is ideal changes over time, our current formulation of it is at most a *relative absolute*. Furthermore, since our concepts and ideals are rooted in our cultures, our idealized designs may not be perceived as ideal in other cultures. Therefore, they are also *absolutely relative*.

A comprehensive design of a university should consider undergraduate, graduate, and continuing education, but in the design developed here, only the latter two are considered. However, its extension to cover undergraduate education would not be a major task.

2 THE DESIGN

2.1 FINANCIAL STRUCTURE

2.1.1 The university will be a for-profit corporation with a not-for-profit corporate foundation that can receive research grants, and tax-free gifts and endowments.

2.1.2 The university's income will derive from tuition and fees for research, consulting, and other services related to education.

2.2 ACADEMIC PROGRAMS

2.2.1 Initially, the university will offer only graduate professional degrees. Over time, it will add, in sequence, continuing education, other graduate degrees, and under-graduate degrees.

2.2.2 The initial graduate programs will be in those scientific and technological fields that are at the frontiers of the Post-Industrial Revolution.

2.3 PEDAGOGY

We cannot predict accurately how many of each type of college graduate will be required a decade from now. Even if we could, we would still have the problem of allocating these requirements to individual autonomous institutions. Our ability to forecast manpower requirements is not likely to improve because the rate of technological change will continue to increase. This will augment an already considerable tendency of college graduates to switch fields after completing their formal education. For example, almost 30 years ago W. G. Ireson (in Peirson, 1959) reported that surveys over a period of thirty years revealed "that more than 60 percent of those persons who earned [engineer- ing] degrees in the United States, either became managers of some kind within ten to fifteen years or left the engineering profession entirely to enter various kinds of business ventures..." (p. 507).

Even when graduates remain in the field in which they were educated, they have to replace a major portion of their college-acquired knowledge and add to it if they are to maintain their effectiveness. For these reasons, it is essential that college graduates be ready, willing, and able to learn continually.

Therefore, the underlying theme of this section is that the objectives of education are learning, not teaching, learning how to learn, and being motivated to learn continually.

The things that ought to be learned in a university are not all best learned in the same way. In what follows, a variety of different learning procedures is discussed.

2.3.1 Learning Cells. The best way for a student to learn a well-defined and recorded body of knowledge is to teach it to another.

This is common knowledge among those who have taught, but it does not apply to courses that involve acquiring a skill, for example, surveying, drafting, and speaking a foreign language.

Given a number of students each of whom should learn a subject, each cannot teach all of it to all the others. Therefore:

2.3.1.1 Small groups of students (no more than ten) should be organized into learning cells, in which they share responsibility for teaching each other the subject being "taken".

2.3.1.2 Unless asked by the students not to do so, the faculty adviser(s) will attend learning cells and serve as resources to be used only in ways the students specify. Before the beginning of the cell, the adviser(s) will specify the minimal subject matter that should be covered, and identifying the principal sources that can be used.

2.3.1.3 Students will be evaluated at the end of each cell, by each other member of the cell, including faculty, on how much they have taught others, rather than how much they have learned.

A subject that has not been well learned cannot be well taught.

2.3.2 Seminars. Advanced subjects -- ones which are either not well developed, well-defined, or systematically recorded -- will be made available to students through seminars led by a faculty member who has contributed to the development of the subjects.

2.3.2.1 Such seminars will be at least as much concerned with questions as answers, with developing the under-developed subject as reviewing what development there has been. The focus of seminars will be on understanding (explanations) -- not knowledge (instruction) or information (description).

2.3.2.2 Students will be evaluated at the end of seminars by each other member, including faculty, on how much they have contributed to the development of the subject of the seminar or understanding of it.

Students are motivated to learn and best learn how to do so in solving real problems under real conditions with the guidance of one already so motivated and who knows how to learn. They will do so in 'research cells'.

2.3.3 Research Cells will consist of no more than ten students working with one or more faculty members on a real problem in the environment in which the problem exists and, where possible, those responsible for the problem should pay for the research.

This will assure their commitment to the research and the realism of the problem(s) attacked.

2.3.3.1 Students in research cells will be evaluated for their contribution to the solution of the problem undertaken, by each other member of the cell, including faculty, and those responsible for doing something about the problem.

2.3.4 Instructional Courses (including studios and laboratories) will be used to provide skills.

2.3.4.1 Faculty will evaluate students in these courses for their ability to apply the skills they have learned in the real world.

2.3.5 Independent Study which a student may elect as a way to learn a subject on his own.

2.3.5.1 Students who elect independent study will be evaluated by the faculty member(s) under whose supervision the study takes place. This evaluation will be based on papers prepared and discussions, not on written examinations.

2.3.6 Lectures. Each member of the faculty will give a lecture series each year which students can attend without credit. These lectures will be video-taped and be made available in subsequent years through the University's library. Video tapes of similar series presented by outstanding faculty of other institutions will also be obtained and made available to students and faculty.

2.3.6.1 Copies of the tapes of lectures made at this University will be made available to others for purchase or rent.

2.4 EVALUATION OF STUDENTS

Note that conventional examinations -- questions to be answered or exercises to be solved -- will not be used to evaluate students in any of the learning situations described. This will eliminate cheating. Cheating is more an evil of the conventional examination system than of students. Typical closed book examinations are not an adequate model of any real situation in which a person must demonstrate his competence in a subject.

Note also that the type of pedagogy and examinations described require large amounts of personal interactions between students and faculty.

2.4.1 Faculty will meet at the end of each term to formulate a collective evaluation of the performance of each student. This evaluation will be reviewed with the student by his adviser and entered in his record. These evaluations will focus on ways the student can improve rather than on what he or she has done wrong.

2.4.2 The faculty may advise a student whose work and prospects are unsatisfactory to leave the program. The student may nevertheless elect to continue. If his or her work remains unsatisfactory, the faculty may drop the student.

2.5 ADMISSION TO A PROGRAM

There will be no entry requirements to programs, only exit requirements. However, each applicant will be evaluated by a faculty-student committee -- three of each -- to determine whether the student is suitable for the program applied to. Whenever possible, the applicant will be personally interviewed by at least one member of the committee or a graduate of the program who is more accessible to the applicant. If the applicant is found to be unsuitable, he or she will not be admitted to the program. If the applicant's suitability is in doubt, he or she may be admitted conditionally; the conditions being explicitly stated.

2.6 CURRICULA

2.6.1 There will be no required courses. However, there will be a suggested curriculum for each program.

2.6.2 In each program the number of cells/courses required for receipt of a degree will be specified.

2.6.3 The M.S., PhD, and D.S. degrees will be offered in each program.

2.6.4 Preparation of an acceptable thesis will be required for each graduate degree. The thesis for a PhD must contribute to the development of the field. The thesis for the D.S. must be an innovative application to a real situation. The PhD will be the more suitable degree for those who intend to enter an academic or research career; the D.S., for those who intend to practice in nonacademic organizations.

2.6.5 Each student will design his or her own curriculum and submit it to a faculty committee of three with whom it will be discussed. If found suitable, the student may follow that curriculum. Subsequent changes will be permitted with the approval of the student's adviser.

2.6.5.1 Curricula may include any cells/courses given in the university and, with faculty approval, courses at other institutions.

2.6.6 Each student will either select an adviser (who will have the right of refusal) or have one assigned to him or her. Later, when beginning work on his or her thesis proposal, each student will select a thesis adviser (who will have the right of refusal) or have one assigned to him or her.

2.6.7 Oral thesis examinations will be conducted by committees of five which include no more than three members of the faculty of the relevant program. Two or more examiners will be from other programs or from outside the University. The student will have the right to select two of the examiners.

2.6.7.1 A thesis may either be (a) accepted as submitted, (b) accepted subject to revisions to be reviewed by one or more designated faculty members, or (c) rejected. Those whose theses have been rejected will be given a second but no further chance to redo and resubmit.

2.7 CONTINUING EDUCATION

2.7.1 The University will provide a wide variety of Continuing Education Programs, varying in length from several days to several years. These will yield certificates or, in some cases, degrees.

2.7.2 The University will also provide Competence Maintenance Programs which, for a fixed annual fee, will keep their subscribers up to date in one or more designated fields. They will receive annual reviews that inform them of significant developments made in the last year in these fields. In addition, they will be given an opportunity to come to the University for discussion of these reviews with the faculty and students who prepared them and other subscribers.

2.8 RESEARCH AND PRACTICE

2.8.1 Each full-time member of the faculty will spend at least half of his or her time on research or in practice that involves at least three students.

2.8.2 The research and practice engaged in within each program will be administered and managed through a Research Center (Institute, or Group).

2.8.3 At least half of the practice engaged in through the Center (Institute or Group) will be at the frontier of the field involved, and therefore require research.

2.8.4 Research and practice will be billed to clients on a cost-plus basis. Costs will include salaries and benefits provided to faculty and students. Where the client is a for-profit organization the "plus" will be large enough to enable the Center to accumulate funds that can be used for development purposes by the Center or the Program of which it is a part.

2.8.5 Students will be compensated for their work on projects but faculty will not. It will be considered as part of their job. However, faculty will be permitted to spend up to three days a month for personal consulting or other activities which contribute to their personal development.

2.8.6 All students will either be (1) employed up to half-time on center-based projects, (2) engaged on such projects without compensation, or (3) employed outside the University doing work that is related to their program of study. The relevance of their work to their program will be judged by their advisors.

2.9 PUBLICATIONS

2.9.1 The University will operate a Press for publication of books, monographs, journals, and audio and audio-visual tapes.

2.9.2 The Press will operate as a profit center.

2.9.3 The Press will employ the latest technology in the production of documents and tapes.

2.10 ORGANIZATIONS

2.10.1 The University will have three types of organizational units: input, output, and executive. (See Figure 1.)

2.10.1.1 Input Units will be of three types: (Disciplinary and Multidisciplinary) Departments, Libraries, and Service Units.

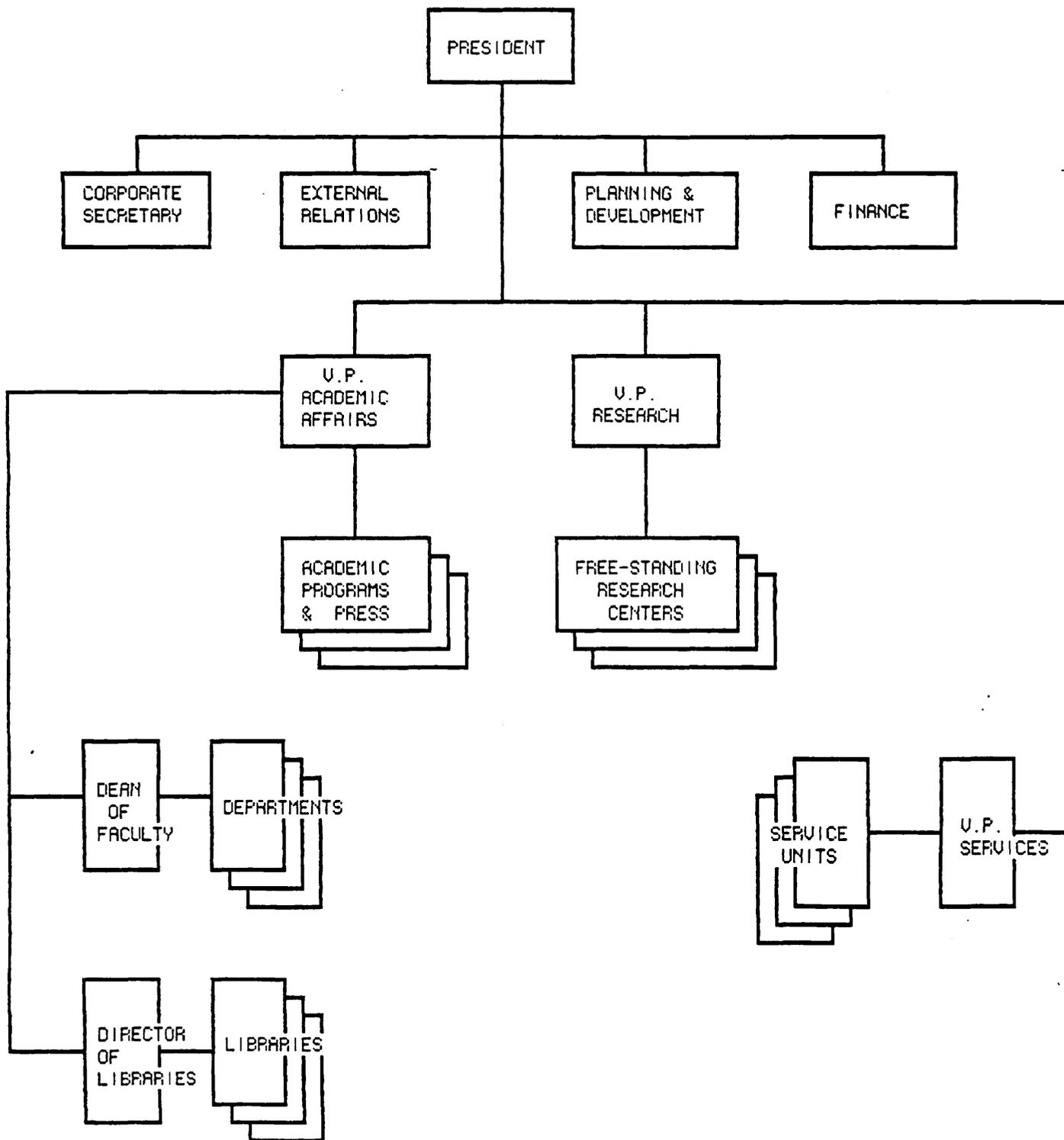


FIGURE 1. Organization of the University

2.10.1.1.1 Departments. Each faculty member will be a member of at least one Department. If he or she is a member of more than one, one of these will be designated as his or her principal affiliation.

2.10.1.1.1.1 Departments will have responsibility for all personnel transactions involving faculty.

2.10.1.1.1.2 The only income Departments will receive will come from sale of their members' time to other types of unit. Departments will establish the pricing of such time.

2.10.1.1.1.3 Departments will be profit centers. They will be able to retain a specified portion of their profits for use at their discretion for development and other purposes.

2.10.1.1.1.4 Their principal responsibility will be for the continuous development of their members.

2.10.1.1.2 Libraries will provide a complete array of documents, publications, and tapes together with equipment for their use and reproduction.

2.10.1.1.2.1 Libraries will be cost centers supported by the Executive Function.

2.10.1.1.3 Service Units will carry out such functions as Financial, Admissions, Placement, Financial Aid, Records, Registrar, Audio-Visual, Duplicating, Book Store, Housing, Dining, Purchasing, Buildings and Grounds, Human Resources, Health, and Mail.

2.10.1.1.3.1 Some Service Units will operate as profit centers, selling their services, to other Units at prices they establish. They will also be free to sell their services externally, subject to an executive override to be discussed below. Others (e.g., Admissions, Registrar, and Mail) will operate as cost centers.

2.10.1.1.3.2 All Units will be free either to provide themselves with the services they require, or buy them from either Service Units or externally, subject to executive override.

2.10.1.2 Output Units will be of three types: Academic Programs, the Press, and Research Centers (Institutes, or Groups).

2.10.1.2.1 Each Academic Program will have a faculty which does not contain a majority of its members from any one Department.

2.10.1.2.2 A faculty member's affiliation with a program will last only as long as his or her performance is satisfactory, and his or her Department is willing to let him or her participate in the Program.

2.10.1.2.3 Each Program and Center will operate as profit centers deriving income from tuition and research and practice. They will be responsible for providing financial support of the students that are part of them.

2.10.1.2.4 The Press will publish books and journals and market them vigorously. It will operate as a profit center.

2.10.1.3 Executive Units will support the executive function. They will include the Corporate Secretary, External Relations (including Alumni Affairs and Recruiting), Planning and Development, and Financial Services (e.g., Auditing, Accounting and the Controller).

2.10.1.3.1 These units will operate as cost centers.

2.10.2 The Executive Function will be directed by the President who will be assisted by a:

2.10.2.1 Vice President of Academic Affairs to whom the Heads of Academic Programs, the Director of the Press, the Dean of the Faculty, and the Director of Libraries will report.

2.10.2.2 Vice President of Research to whom the Directors of all free-standing Research Centers will report directly, and to whom the Directors of Research Centers incorporated in Academic Programs will have an indirect reporting relation.

2.10.2.3 Vice President of Services to whom the directors of all Service Units will report.

2.10.2.4 These three vice-presidents together with the President will constitute the Executive Office.

2.10.2.5 The President will be a profit center.

2.10.2.5.1 His/her income will derive from 1) a tax imposed on the profits of all Units that operate as profit centers, and 2) interest charged for capital that he/she provides for use by these Units.

2.10.2.5.2 His/her costs will include the costs of Units that operate as cost centers, and the costs associated with his/her decisions to override selection of sources of services or supplies by profit centers.

For example, if a profit center is required by the President to acquire a service from an internal unit that the center can obtain less expensively from an external supplier, the President must pay that unit the difference in cost. If a profit center is deprived by the President of the right to sell its services to an external customer, he/she must pay that unit an amount equal to the last profit.

2.11 MANAGEMENT STYLE

Nothing provides those directly involved with an organization with as much opportunity to learn and develop as participation in decisions that affect them directly, nor does anything else raise their morale and dedication to the organization as much. The management style described in what follows maintains the hierarchy necessary to manage the University while providing the opportunity for participation to those at all levels of the organization.

2.11.1 Boards. Each officer and head of any unit will have a Board whose members minimally are: 1) the officer or head whose board it is, 2) his or her immediate superior, and 3) his or her immediate subordinates.

2.11.1.1 Each board will be able to add others from inside or outside the University, as voting or non-voting members as it sees fit.

2.11.1.2 All students enrolled in Academic Programs will participate as members of the Board which will operate as a Committee of the Whole, in which the head of the Program, the Vice President of Academic Affairs, and all faculty, clerks, and secretaries associated with the Program participate.

Note that these conditions mean that every member of the University will be on at least one Board, that of his or immediate superior.

2.11.1.3 All Boards will have the following five functions:

2.11.1.3.1 Policy Making. Each Board will formulate policies that apply to its level and those below it, but it cannot violate any policy made at a higher level. However, it can appeal for change of a policy made at a higher level through its members who serve on higher level Boards.

A policy is a decision rule, not a decision. It states criteria according to which decisions are to be made. For example, "promote from within" is a policy, but promotion of an individual is a decision. Managers will make the decisions; Boards, the policies governing them. Therefore, the Boards are not management committees.

2.11.1.3.2 Planning. Each Board will prepare plans for its level of the organization. As in the case of policies, these plans must be compatible with those prepared at higher levels, but appeals for changing them can be made.

2.11.1.3.3 Coordination. Each Board will coordinate the activities of the level immediately below it.

Since the heads of the lower level units thus coordinated constitute the majority of the Board that has this responsibility, the coordination is largely self-administered.

2.11.1.3.4 Integration. Each Board will assure the compatibility of what is done at its level and below with the policies and plans issued by higher levels.

2.11.1.3.5 Performance Evaluation. Each Board will be responsible for evaluating the performance of the person whose Board it is. A Board can remove that person from his/her position, but it cannot fire him/her; only his/her boss will be able to do this.

This means that no one can hold a position of authority without the approval of a majority of his/her subordinates and immediate superior. This also means that no one can be appointed to a position of authority without both these approvals.

2.11.1.4 All Boards will operate by consensus, complete agreement.

2.11.1.4.1 Where complete agreement cannot be reached, a test of the proposed alternatives will be sought, one which gains the approval of all.

2.11.1.4.2 Where complete agreement on the design of a test cannot be obtained, the opinion of the person whose Board it is will prevail subject to the following condition: the person whose Board it is will inform the Board of the decision he/she will make if the Board does not reach consensus.* Once this is done, the Board is given another chance to reach consensus. If it fails to do so, that person's decision prevails.

* Once a Board is so informed, if it fails to reach consensus, it has in effect reached consensus on the decision of the person whose Board it is.

2.11.1.4.3 Each Board will develop its own rules of procedure and way of selecting a Chairman.

2.11.1.5 The role of an executive/manager/administrator in the University will involve the following functions.

2.11.1.5.1 Create an environment and provide support that enhances the effectiveness of his/her subordinates.

Subordinates who require supervision are not fit for their jobs. Work of those who are fit requires facilitation, not supervision.

2.11.1.5.2 Manage the 'Interactions' of his or her unit with other units in the University.

Managers will focus on managing over and up, not down.

2.11.1.5.3 Control allocation of resources below his/her level.

2.11.1.5.4 Define the responsibilities and authority of his/her subordinates.

2.11.1.5.5 Encourage and facilitate the development of his/her subordinates.

2.11.1.5.6 Those subordinates who are themselves managers will be "managed by objectives". Their objectives will be set in negotiation with their immediate superior. Once set, they will be free to select whatever means they want.

2.12 FACULTY

2.12.1 All faculty members will have the same rank: professor.

2.12.2 Tenure will not be provided to faculty members. The initial appointments of those who have had no previous academic experience will be for two years. Subsequent appointments will be for four years, eight years, sixteen years, and until retirement. Initial appointments for those with previous academic experience will take such experience into account.

For example, a person who has been in academia for ten years will receive an eight year appointment. Those with twenty years, a sixteen year appointment, and so on.

2.12.3 Academic freedom will be protected. A board of five members of other academic institutions, each appointed for five-year renewable and staggered terms, will hear any appeals concerning violation of such freedom. Its decision will be final. Members of this board must have the approval of a majority of the standing faculty members.

2.12.4 Faculty members will be profit centers. Their income will consist of a designated amount for each student credit hour they provide, and the payment their department receives for their time spent on research. Faculty members who incur annual losses will receive no increase in salary the following year. Those who incur losses in two consecutive years will not be reappointed unless they receive executive approval when their contract is complete.

2.12.5 Faculty members' salaries will consist of a fixed and a variable component. The variable component will take into account the profit they have earned, the amount of research they have brought to the University, and the amount and quality of their publications in the last year, all in the last year. The fixed part of their salaries will be approximately 75% of their market value.

2.12.6 Faculty members will be evaluated annually by 1) the students who have worked with them that year, 2) the peers in their Departments, and in the Programs and Research Centers in which they have participated that year, and 3) the heads of these

Departments, Programs and Research Centers. These evaluations will be reviewed with each faculty member by his or her Departmental Chairperson each year, then made a matter of record and used in setting his or her salary level and deciding whether to renew his or her contract.

2.12.7 Faculty salaries will be set by the Chairman of their Departments.

2.12.8 Renewal of a contract will require approval by a majority of the members of a faculty member's Department.

2.13 ACADEMIC SCHEDULE

2.13.1 The academic year will be divided into trimesters, each 15-weeks long. There will be two two-week breaks and one three-week break between trimesters.

2.13.2 Each student who is not employed on a continuing basis by a Research Center or as a teaching assistant will take classes during two trimesters and engage in relevant work during the other trimester. The schedule will be as follows:

YEAR	TRIMESTER		
	1	2	3
1	Class	Class	Work
2	Class	Work	Class
3	Work	Class	Class

This will enable Research Centers and other employers of students to have a workforce of constant size throughout the year. It will also enable more senior students to orient and instruct those who are more junior on the work to be done. Finally, it will reduce facility requirements because the entire student body will not be in class at the same time.

2.14 FACILITIES

2.14.1 Facilities for Academic Programs and Research Centers will be arranged to approximate the schematic drawing shown in Figure 2.

2.14.2 Every faculty member will have a private office with sufficient room to hold at least three visitors at a time.

2.14.3 Every student will be provided with a desk, a book case, and a file cabinet.

2.14.4 A sufficient number of PCs will be provided so that each faculty member and student either has, or has easy access to, one. A comprehensive integrated network will tie together a Central Computing facility, the Libraries, Research Centers, Program and Departmental Units, Service Units, and individual PCs.

2.14.5 All the usual service facilities associated with a University will also be provided, for example, housing, dining, recreational facilities, a school store, and so on.

2.14.6 If the University is located in a climate in which inclement weather is not unusual, all buildings will be connected by enclosed walkways.

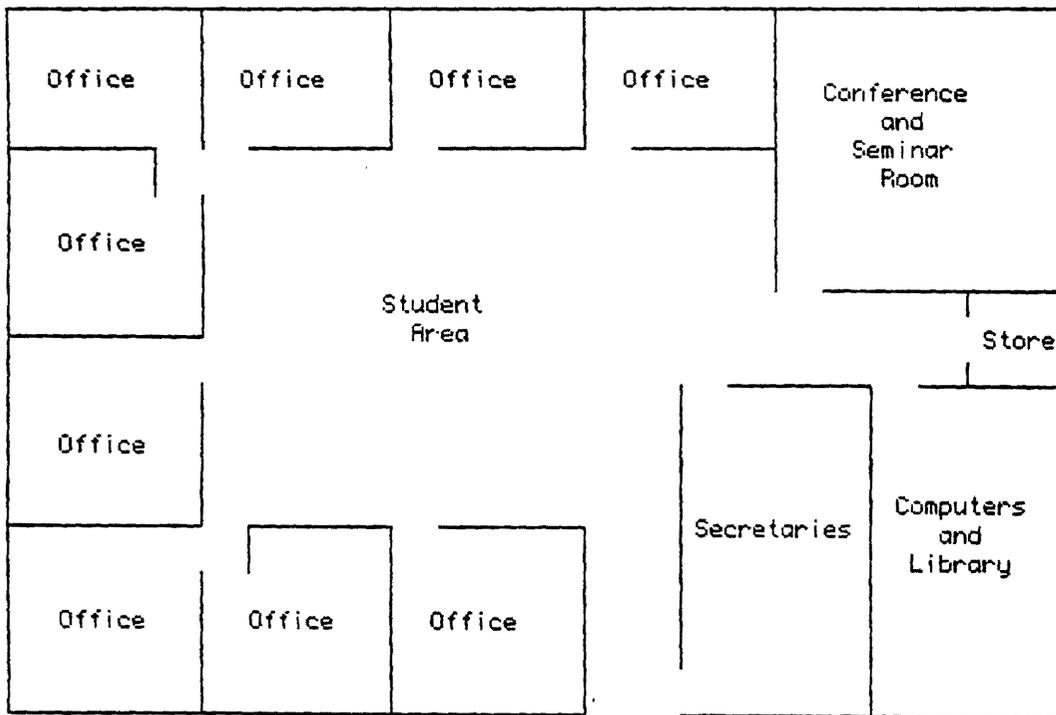


FIGURE 2. Schematic Diagram of Program and Research Center Areas.