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To my wife Norelys and my sons Emmanuel and Josué.

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CHAPTER I

CONTEXT OF THE PROBLEM

Historical Background

The year 1212 A.D. marks the beginning of the Spanish universities and from that year on, the Bulls of the different monarchs established the Studium in most cities of Spain. In 1422, a Bull of Martin V granted the constitution that was to conform the pattern of medical education in the universities during the next six centuries.

After the discovery of the American Continent, the Spaniards established the first universities in the New World, the first being the Dominican College of Santo Domingo (Dominican Republic) in October 1538 which conferred degrees of Bachelor, Licenciate, Masters and Doctor in Arts and Sciences. The foundation of other universities soon followed: the University of San Marcos de Lima, Peru in May 1551; the Royal Pontifical University of Mexico in the same year and the College of Santa Rosa de Lima, Caracas City, Venezuela in 1661.

The College of Santa Rosa de Lima in Caracas was not authorized at that time to grant degrees because it was then the sole privilege of the University of Santo Domingo. Despite the fact that in the year 1721, Phillip V ordered the foundation of the Royal Pontifical University of Caracas, medical education courses did not begin until 1763, when Lorenzo Campins y Bestes (1726-1875) commenced with an enrollment of only four students.

It was not until 1814 when a local graduate held the Chair for the first time that the University graduated a group of physicians, among them the famous Dr. Jose Maria Vargas (1786-1854) who later studied specialized courses in Edinburgh and London. When Dr. Jose Maria Vargas became Rector in 1827, he led the university of Caracas through a great period of reform that saw the replacement of the colonial institution (Guerra, 1975).

Only one other university was established during the colonial period - the University of Merida in the Andes Mountains in the year 1810. Other Venezuelan universities were founded only recently: the University of Zulia in the City of Maracaibo in 1946 and Carabobo University in 1958. The latter was founded by decree, with its four faculties, including medicine when democracy was restored. Since then, approximately 20 new universities have been founded in Venezuela where, almost sixty percent of the 12 million inhabitants are under 30 years of age.

Around 1960, the Faculty of Medicine of Carabobo University joined the rest of the medical faculties in other universities across the country, establishing an enrollment limit of 100 students in an attempt to ensure the quality of their graduates. But due to student pressure, the Supreme Court declared the law restricting enrollment unconstitutional, since all Venezuelans have the right to attend public universities. At that time also, the country was in urgent need of more doctors to cope with difficult health problems.

University authorities, aware of the consequences if Medical Faculties accepted unlimited enrollment without minimum requirements,

implemented new admittance procedures, creating a compulsory Basic Course which would admit up to 800 students in two groups each year. In addition Carabobo University and the Ministry of Health sponsored a program with the Panamerican Health Organization to organize a pilot project through the Medical Faculty whereby a multidisciplinary curriculum would be implemented; the pilot project would in the long run serve as an example not only for Venezuelan universities but for other countries in Latin America.

In this way a new faculty structure was created, its curriculum overlapping with that of the prior Medical Faculty's so as to continue the flow of graduating medical personnel. Three new specialties were also included in the new Health Sciences Faculty: Dentistry, Bioanalysis and Nursing; these, together with the new Medical School and the Basic Course, constitute the pilot project. For the first time in Venezuela, different specialties were functioning under one administrative unit, the Health Sciences Faculty. The objectives were to save time, cut the waste of human resources and money, and permit the creation of new specialties according to regional needs.

A new departmental structure was also created in order to facilitate communication. Despite all of these changes some obstacles remain, adding a sense of uncertainty to the venture.

Today's stagnation is due to an array of constraints which press the entire system. First of all the annual budget has not been raised to meet the costs of the changes introduced. This has imposed limitations on hiring new staff, expanding physical space and developing new learning resources. Overcrowded classrooms and lack of staff motivation

in problem-solving are typical. This growing problem has slowed communication through regular channels amongst the different segments of the Faculty's educational system.

Goals of the Health Sciences Faculty

The University of Carabobo is located in the industrial city of Valencia, surrounded by slum neighbourhoods inhabited by impoverished people who have left the countryside looking for a better life.

The Health Sciences Faculty's goals are co-ordinated with the nation's priorities and specifically with those of the country's central region where the socioeconomic and sanitary deficiencies are extremely acute. Therefore the faculty's goals are to:

1) educate health professionals in different specialties according to the needs of the Venezuelan public health care;
2) enable teaching and a research personnel to cope with the demands in the different specialties of health sciences;
3) scientifically investigate and develop programs according to the country's priorities;
4) participate actively and permanently in the formulation of a national strategy to meet the Venezuelan Ministry of Health's goals in public health care;
5) further the humanistic development of the Health Sciences students so that they may understand the needs of the most socially disadvantaged people in the country.

In this manner, the Health Sciences Faculty intends to graduate health professionals capable of coping with the most immediate health problems of the Venezuelan population. The Faculty especially aspires to educate personnel in preventive medicine thereby enabling all socially and economically disadvantaged people to deal with the hazards of contagious diseases, poor hygienic practices and unbalanced diets.

Despite the fact that other universities in Venezuela are also working to bring change and to cope with controversial problems that affect all of them, the Carabobo Health Sciences Faculty shoulders additional responsabilities. The Faculty must deal with the pilot project that serves as the spinal cord of health care development in the nation's central region by graduating the qualified personnel who will work in public health. In this role it must pose as a successful example of the integration of a multidisciplinary curriculum.

However, during the last few years, the Faculty's educational process has been deteriorating unavoidably due to the constraints previously referred to, while Faculty officials have been considering alternatives which might lead toward general improvements. Amongst these alternatives the possibility of implementing various kinds of learning resources such as CCTV, CAI, etc. has been studied.

Closed circuit television systems have been viewed in Latin America as a means of coping with large enrollment and achieving higher teaching standards; accordingly, Health Sciences Faculty officials have been considering the installation of an exclusive system for the Faculty. There are also a few persons who favor the use of

Computer-Assisted Instruction as a solution to the educational problems. However, such sophisticated systems can be tremendous hazards for institutions with budgetary limitations. Discovering that such systems are too expensive to maintain could only add to, rather than solve, existing problems.

There are other approaches which have been studied and are more likely to be implemented at the Health Sciences Faculty if planned adequately to cope with the institution's priorities. One is the idea of implementing a centralized learning resources system.

Statement of the Problem

Presently, learning resources systems are being considered important tools in facilitating learning at different levels within the educational system, challenging the traditional institutionalized knowledge-structure. Specifically, learning centres present a viable alternative to traditional education while representing an acceptable implementation of Educational Technology.

Learning centres can operate through several approaches: producing and evaluating learning materials, setting up instructional development courses for staff, implementing workshops for students and teachers, as well as experimenting with materials produced and acquired. In short, the potential activities to be developed through the learning centre are broad in scope.

Specifically, in the Health Sciences field, learning resources centres have lately been proven effective and economical; consequently, modern medical faculties have been considering the creation of learning centres as a means to effect individualized learning (McMaster Report, 1974).

The objective of the present study is to design a learning resources centre at Carabobo University. The study attempts to analize the general constraints (ranging from budget restriction to space limitation, lack of learning resources, high enrollment and unmotivated staff) that currently affect the operation of the Faculty. The idea then is to identify and facilitate the appropriate decisions needed to realistically implement a learning resources centre in a specific context.

The design envisages creation of the learning resources centre in several stages. At the same time, the design would be evaluated with respect to short and long range goals. The former would, in part, be a gradual process to assess student achievement through assignments, reports and examinations. The latter would, in part, involve Faculty graduates feeding back their experience from hospitals, clinics, health institutions, etc., concerning their proficiency and the centre's enrichment of it.

CHAPTER II

REVIEW OF LITERATURE

The Concept of the Learning Resources Centre

Henderson (1972) defines the learning centre as

> a community of well-trained people adequately equipped with educational facilities located in attractive places to encourage and help students and teachers communicate, investigate and learn together as a team (page 19).

The concept of the learning resources centre has become increasingly important in different levels of education with special emphasis in higher education during the last decade. The principles for the planning of learning centres at any level of the educational system need not vary, but adjustments and modifications are valid according to the specific goals set from primary, secondary or higher education. Learning centres are, however, variously interpreted within those different levels. Interestingly enough, most of the time, the concept involves a library resources centre, while at other times it is interpreted as a media centre working independently as a hardware service. Consequently it is important to review the concept of the learning centre according to different authors and its use at the different educational levels.

The Learning Resources Centre in Primary School

Learning centres were first organized at the primary level to cope with the demanding activities of young students. In this way, teachers could inspire the high involvement and motivation required by young inquisitive minds.

The main differences between the use of learning resources centres in primary schools and their use at other levels is the degree of guidance and supervision provided by teachers. In the former, the teacher's role is maximal. In the latter, students work more freely at their own pace (especially at university level) although considerable teacher-assistance is still required at the secondary level.

Holder et al (1974) explain that in modern times, old knowledge already institutionalized is constantly challenged by new knowledge being developed. They see this process of knowledge enrichment as an important role in the learning resources centre, in addition to its role in transmitting existing knowledge. Holder et al stress the role of a learning resources centre as follows:

> The Resource Centre can make an increasing range of resources accessable to both teachers and pupils and support the teacher in providing home produced items to fill the gaps. Most of all, it can help the teacher provide work guides and instructions specifically tailored to the needs of his pupils and related to the resources that he knows are available in the centre (Chapter I, page 3).

Further, they assert that in this way schools become centres of inquiry, where knowledge is approached in a critical manner, putting the stress on learning and not simply on teaching, as in the tradi-

tional approach. They also discuss the role of teachers in the centre and explain that teachers become planners, guides, editors etc., in addition to their traditional role as expositors. Teachers thus interact more thoroughly with students, and have the opportunity to better all the pupils, instead of a few of them. They add that traditionally, the learner was supposed to acquire only that which he/she received from teachers. However, through the learning centre, both teachers and pupils learn, due to the open educational format. Teachers and pupils are able to plan and produce together, the school becoming a base where projects are planned and discussed in order to undertake future activities.

Finally, Holder et al conclude that through a learning resources centre, schools have the potential for greater community involvement, where adults and children may interact on common projects, with adults helping pupils in their own projects.

More concerned with problems that education faces today, Horton (1974) points out that the major problem of education is that of personalizing instruction. He in some ways agrees with Holder, in his references to the shift in emphasis from teaching to learning. He admits that there is a greater demand for student responsibility, for self-accountability, self-learning and self-evaluation. Explaining his concept of the learning centre he states:

> The concept of learning center is that the effective teacher is one who functions as a facilitator of learning, that is, one who aids the learner in structuring and administrating his own learning designed to meet his needs and his present stage of academic growth (Chapter I, page 10).

Furthermore, he adds that changes occuring in today's educational system have been initiated by the increase of knowledge, the population explosion and the use and expansion of educational media.

Horton suggests that the learning resources centre can contribute to the learning process by providing, at the minimum, the following services:

a) a media centre, having various hard and software;

b) a diagnostic and prescriptive centre where teachers and pupils can work together;

c) a motivational tool for student-staff learning;

d) a distribution and location place for an ample variety of learning resources;

e) a production centre for instructional materials;

f) a co-ordinator of materials and people so as to ensure learning;

g) a support and comfort place for teachers innovating instructional materials;

h) a clearing-house for new materials;

i) a multiple-purpose room for a variety of educational activities;

j) a consultation service for teachers and other school personnel.

As Horton also points out, a learning centre can provide a multiplicity of services in the school environment that change the concept of the school itself. Horton, like Holder et al, stresses the importance of the teaching-learning process in general:

> The learning center exists for the purpose of contributing to the learner's total learning experience. The physical and emotional environment of the learning center should be created with this purpose in mind. The name learning center suggests that the learner is the central concern (Chapter V, page 35).

In the same vein, the Central Committee of Advisers in Audiovisual Education and the Central Committee of Teachers' Audiovisual Aids Groups in Great Britain have produced a report (Smith (editor) 1970), whereby they express their views regarding the functions of a learning centre in primary school. They consider the four main functions to be:

a) the evaluation of current resources for learning;

b) the provision of information;

c) the provision of services;

d) the provision of in-service courses in the educational use of media communication and, where necessary, in the proficiency handling of the associated equipment.

The report does not further delineate functions of the learning centre in education, other than its major practical activities.

Glogau (1972) through a concise guide on organizing a media centre in primary school, establishes the following goals:

a) to find and locate materials;

b) to use media materials;

c) to learn to appreciate media materials;

d) to produce media materials.

Glogau, like Smith, does not detail other functions of the centre. In fact, according to the stated goals, he admits that the centre is dedicated primarily to media work.

In an extensive monograph defining the British concept of resources centre, Beswick (1972) outlines the functions of a library resources centre as:

a) providing adequate facilities for the production of learning materials;

b) compiling a comprehensive selection of learning resources in a variety of formats for the use of students individually or in groups;

c) storing resources for the use of students and teachers;

d) classifying and indexing all available materials whether stored in the centre or elsewhere in the institution;

e) advising and guiding students and teachers in individual inquiries or in planning future work;

f) maintaining liaison with outside bodies;

g) maintaining suitable loan services of materials;

h) acting as a co-ordinating agency for maintenance and repair of equipment in the institution.

Beswick has found that the learning resources centre plays a vital role in the schools' programme of curriculum building and revision, and that senior staff members concerned with curriculum development usually had key roles in the centres.

In ascertaining other roles of the centre with regard to training courses for teachers and staff personnel, Beswick further suggests that:

> The resources centre has a valuable role to play in in-service training. The interrelation of these factors will be apparent, and underlines the need for the involvement with the resources centre of high calibre staff with broad outlook and high

standing within the school (page 16).

Finally, Beswick concludes that resources centres serve as the heart of the schools, fulfill the needs of each department and subject interest as they enhance the communication process among teachers, staff and pupils.

Learning Resources Centre in Secondary School

In the United States, learning centres have long been functioning at the primary level. In high schools and colleges, centres were developed years later, based on their success at the lower level. Currently, it seems that most secondary institutions are designed with the resources centre as an important element of its structure.

Interestingly enough, a report on the implementation of a learning centre has been presented at Oakland Community College by Tirrel (1966). Tirrel presents five major functional requirements for creation of a learning centre:

1) an instructional systems approach to coordinate the management efforts of administrators and school personnel;
2) an orientation and training plan for the implementation of an independent study approach;
3) a development of instructional materials to meet school specifications;
4) a design of extensive carrel facilities for student use;
5) a selection of equipment to be used in the centre.

Furthermore, Tirrel reports that such requirements were met at Oakland Community College to form over a one-year period a learning centre which effectively serves a population of 15,000 students, chang-

ing the entire educational process:

> Requested modifications in the instructional system, insertions and deletions will be based solely on performance criteria derived from the actual process of operation. Quality assurance in the achievement of learner products becomes the central system of this system management model. The student is paramount in the definition of policies and procedures for total system operation (page 130).

This vast plan then, developed from the study of the evidence of success and/or failure of teaching through different approaches should lead to a new educational environment wherein the teaching-learning process acquires extraordinary dimensions.

From the valuable experience at Oakland Community College it might be inferred, then, that the organization of a learning resources centre must consider not only the immediate instructional benefits it will produce, but also its functions within the entire educational institution.

Hostrop (1973) believes that resources centres make education more productive because they accelerate the rate of learning in students, while helping teachers better utilize their time. Taking this argument a step further, he adds that learning centres individualize education by combining teachers, learning resources, facilities and time to give instruction a more scientific base by employing reinforcement as an integral factor in teaching. These factors, he says, will strengthen instruction because they make the educational experience more instant and graphic to the learner. He concludes that learning centres personalize education through the accessibility of learning materials to all students.

Peterson (1975) admits that learning centres are appropriate tools for making education more palatable, taking advantage of the technology of the communications revolution. On the other hand, he emphasizes that through the learning resources centre, the delivery-response system becomes more individualized.

For Peterson, learning centres may vary from a single carrel outfitted with instructional materials to the large, multiservice organization.

Learning Resources Centres in Post-Secondary Education

Principles employed in the development of resources centres in post-secondary education are not greatly different from those used in the lower levels of the educational system. Learning centres are relatively new in universities and so far there have been various approaches at this level that have been successfully developed.

As was previously mentioned in this review, centres are often developed jointly with libraries or as media extensions of libraries. They may also be organized as independent entitites to provide the educational environment with a variety of services ranging from the production of instructional materials, to student use of audiovisual equipment, to the organization of instructional development courses.

In March, 1972, a conference was held at Oklahoma Christian College, bringing together educators from different regions of the United States to share their interests and ideas revolving about the central theme: "What are we Learning about Learning Centers?"

Gores (1972), one of the participants in the Oklahoma conference has examined the utility of the learning centre concept for the educational process in the seventies. As a specialist in educational facilities, he sees the learning centre as a solution to the various problems present in modern education, adding that some financial considerations must be taken into account for the effective functioning of the centre. The foundations he cites for building a successfully functioning centre deal with building systems and how centres should be immediately constructed to avoid rising costs; with flexibility in the construction for future remodelling; with comfortable environments adequate for learning; and with advanced instructional equipment to enhance the teaching process.

Gores, however, does not appear to penetrate beyond the facade of the centre because in his report there are no suggestions for potential central services such as production of instructional materials, provision of in-service courses, participation in curriculum design and many other possible roles.

Meierhendry (1972), brings up an interesting point with regard to the integration of learning centres into the curriculum. One alternative, as he sees it, is to first install technology, then attempt to attract personnel to use it. Another is to aid the faculty in the reconceptualization of their courses and programs. His third suggestion is to set up media centres as close to the faculty as possible.

Another of Meierhendry's strategies is to buy or rent commercial materials for the initial introduction of programs before beginning to produce materials. He finally suggests that the Faculty's interest in

meaning of learning at the higher education level be developed substantially.

There are inherent problems in some of Heierhendry's strategies. The trial and error procedure for setting up a learning centre is wasteful of money and human resources. His second strategy, which recommends careful faculty planning prior to installation of a technological system, is more reasonable. This and the third strategy together are the basic phases necessary to carrying out changes at a higher-education institution.

Gunselman (1971) summarizes some basic conclusions that were drawn from the conference at the Oklahoma Christian College. He points out that the main functions of the learning centre revolve around individual opportunities geared to the interests, abilities and time schedules of the students. He further states that the centre concept is derived from four segments of learning theory as follows:

1) new instruction should begin when students are intellectualy motivated;
2) learning experiences should be as realistic as possible through the use of conserved experience;
3) students should be active, rather than passive participants in the learning process;
4) students should be allowed to progress at their rates as much as possible.

Gunselman also indicates where that emphasis should be placed on learning through resources centres during the 1970's, if institutions intend to expand, provide high quality education and more accounta-

bility in every sector of the educational community. According to Gunselman, there seems to be a re-dedication of the professor to teaching. Changes in admission policies should also be forseen in order to include a variety of ages and abilities. Gunselman believes that there exists a continuous need for "recycling" the knowledge and skills of people from every walk of life. He finally adds that students now require more dynamic experiences, opportunities and involvement from education.

In Scotland, manuals by the Scottish Educational Film Association, edited by Malcom (1973), suggest that resources centres should provide guidance to teachers and students in finding materials they wish to use. In the same manuals, Fothergill(1973) states the following:

> The Resource Centre, then, should provide access to multiplicity of materials which exploit individually or collectively a number of communication channels. The variety of media involved adds its own interest and motivation for switching from one form to another introduces changed viewpoints which activate different patterns (page 46).

Here too, Holder (1973) points out that the classroom crisis has been created by the drive for curriculum development and the need for innovation. He asserts that this is the reason teachers are being asked to provide much of their own materials since the teaching aspect is vital to the entire concept of resources centre. Thus, Holder explains:

> The Resources Centre would combine the two key concepts of curriculum development and teacher development and provide a working environment, within the school (page 36).

Holder finally suggests that the development of resources centres in educational institutions inevitably questions the role of the lecturer as the unique knowledge transmitter.

Henderson (1972) describes in detail through a report for Georgetown University officials, the principle insights of the university learning resources centre. She identifies the implementation of possible modes of operation of the system and gives recommendations for equipment and supporting of illustrations of such implementations. Henderson also delineates the steps to be carried out by the planning group before designing the centre:

1) determine the scope and nature of the current system of learning resources at the university;
2) examine the modes of the operation that form the overall system of resources;
3) identify the different functions of various elements of the system;
4) select the functions to be served by the centre;
5) complete the major centre requirements according to the functions that it will perform.

Henderson concludes that, in order to determine which needs should be satisfied by the development of a learning centre, a specific set of tasks to be carried out must be identified: for example, provision of facilities, assistance in the production of instructional materials, organization of seminars for the implementation of technology in education, etc.

Merrill (1977), establishes priorites for the development of learning resources centres in higher education. First he defines a learning centre as:

> an organized activity consisting of director, staff, and equipment housed in one or more specialized facilities for the production, procurement and presentation of instructional materials and the provision of developmental and planning services related to the curriculum and teaching on a general university campus (Chapter 2, page 15).

The priorities to which Merril refers are those which Baker and Schutz (1972), identify as instructional systems, training systems, installation systems, accountability systems and modification systems.

The instructional system refers to all methods and materials which have been developed to achieve specific instructional objectives. The training systems deal with in-service courses to train personnel. The installation systems encompasses the procedures and materials needed in order to establish instructional programs. The accountability systems include the mechanism required to maintain high student performance. The last of the systems, the modification system, deals with the strategies which evaluate and recommend changes in programmes and performances.

Merrill contends that through the establishment of a resources centre, the university gains three important advantages: facilities savings, improvement of instruction and institutional coherence through the provision of five major types of services (1. the introduction service for learning materials; 2. the group presentation service which supports the instructor when teaching in the classroom, seminar room or labora-

tories; 3. the self-instructional presentation service to support students as they assume responsibility for their own learning process; 4. the instructional development service which is provided by centre consultants; and, 5. the planning service which is provided by the centre staff to the entire educational institution).

Many of Merril's ideas can be practically implemented while others pertain strictly to his experience at the University of California.

Learning Resources Centre in Medical Education

Let us turn to the literature directly connected with medical education which will be of great value in developing the learning resources centre at Carabobo University. This literature takes different points of view that range from the simple organization of an instructional development unit to the basic principles required to set up extensive carrel facilities.

Waldron (1974) concisely explains the main concepts behind an instructional development unit at a medical faculty whose purpose it is to improve the teaching-learning process. Referring to the identification of an instructional development procedure as suggested by the Special Media Institute in Washington, Waldron includes the following steps:

1) Definition and analysis of the instructional problem;
2) Organization of management resources;
3) Identification of behavioral objectives and performance measures;
4) Specification of methods;

5) Construction of prototypes and evaluation design;
6) Try-out for prototype;
7) Analysis of try-out results;
8) Decision concerning consequent steps. (page 2).

This unit, according to Waldron, works on the basic principles of a learning centre, but focuses on a restricted area. Since an instructional development unit is necessary to the ultimate goals of the proposed centre at the Carabobo Health Sciences Faculty, Waldron's study will serve as a stepping stone for the improvement of the teaching process at the Faculty.

Referring to the improvement made in the teaching-learning process through the implementation of an instructional development unit, Waldron states:

> This improvement is gained through the use of a variety of procedures and practices that are implemented within a framework where a statement of a real need is made, the need is translated into specific educational objectives, real world constraints are defined, alternative educational paths are generated, and the selection of the best alternatives is made based on critical evaluations (page 11).

Waldron also suggests that throughout the organization of an instructional development unit, consultations should be carried out within the community in order to determine the educational priorities and the expectations of students and faculty.

Hunter (1973) reports a case study which focuses on the problems encountered and the knowledge acquired in establishing an audiovisual learning resources centre at the Dana Medical Library of the Unviersity of Vermont. It is important to mention that the idea here was to supply the already established library with an audiovisual unit.

Hunter's project deals strictly with the development of the audiovisual aspect, not exploring other areas related to the activities of a learning centre. Thus, he sees the audiovisual units as a main section for the library supplying users with soft and hardware aids to teaching and learning.

Benschoter (1974) after visiting educational institutions and becoming acquainted with literature with regard to learning centres, started a learning resources centre at the University of Nebraska Medical Center Library, incorporating a carrel section; areas for media production and hardware storage, as well as a group viewing section.

Among other goals, one of Benschoter's goals was the development of an operational policy setting out guidelines for potential users. In this respect a scheme was developed to evaluate the centre's effectiveness and the rate of media use. In his report, Benschoter makes suggestions for the expansion of the centre in order to serve a greater number of users:

> expansion, then, must be planned and planned as flexibly as possible. You must try to foresee the needs of the groups as well as individuals and make allowances for both. If groups become structured, especially with scheduled supervised sessions, you may need to plan to expand your expansion, and try a new configuration of these demands (page 49).

A study of a learning resources centre at a medical faculty was made by Moreland and Craig (1974), both medical doctors with extensive education and experience in the field of Educational Technology. They examine initial planning activities in a thorough guide to the organization of a learning resources centre. They suggest certain actions to be taken during the initial planning stages:

1) identify the educational problems and needs of the institution;
2) determine the role and functions of the learning resources centre in the institution;
3) identify those educational problems considered among the responsibility of the centre's functions;
4) specify the objectives of the learning centre which may help to solve the institution's previously identified problems;
5) collect data regarding the objectives identified previously;
6) review literature about learning resources centres;
7) visit existing facilities;
8) develop a file for relevant information sources;
9) seek advice from experienced and qualified personnel;
10) analize objectives in view of collected information related to professional supportive staff, equipment, etc.;
11) examine available space and environmental conditions;
12) determine administrative support when analizing budget, personnel, space, etc.;
13) examine faculty support including the needs and desires of the faculty;
14) develop architectural plans, flowcharts, budget requests, equipment, etc.

Moreland et al also point out that evaluative procedures should be developed. They suggest that through a systematic evaluation, the director and staff of the centre will be in a position to focus on long and short range goals, identifying both strengths and weaknesses and effecting desirable changes in their administrative work, the activities of other personnel, students, teachers and the quality of services provided by the centre.

The basic steps recommended by Moreland and Craig are crucial in organizing a learning resources centre at any higher education institution.

Summary and Discussion

The review of the literature presents different interpretations of the concept of the learning resources centre and its various functions. The author of this project considers it valuable to summarize some of the basic principles for setting up a learning centre, as well as discuss and compare the main steps and services suggested by the authors quoted throughout the literature review.

Realizing that development of the learning centre at the Carabobo Health Sciences Faculty will challenge established knowledge, it is important to consider the opinions and views that some of the researchers have with regard to this point.

Horton (1974) outlines the importance of enriching existing knowledge, which would then provide a wide range of resources

available to faculty members. Interestingly enough, in this respect it is possible to link what Waldron (1974) says regarding the organization of an instructional development unit in order to improve the teaching process, with Holder (1974) and Horton's remarks stressing the improvement of learning. Both processes, the improvement of teaching and learning, may be merged through the learning centre with the purpose of re-orienting the entire educational process. On the one hand, students will benefit from the improvement of the quality of learning, which they may approach through the learning facilities. On the other hand, the learning centre too, would train faculty to provide better teaching and obviously, in the long run, better learning as well.

Horton and other authors have a common view of the services to be provided by the learning centre. Among the suggestions are that it can: house various kinds of soft and hardware media; produce instructional materials; aid teachers in employing new teaching innovations; and promote student self-learning.

There is no doubt about what Smith (1970) emphasizes as the main functions of the learning centre in the educational environment. His viewpoints are also shared by other authors, especially Glogau (1972). They conclude that the learning resources centre should produce, locate and use media materials, although they do not foresee other important functions, with the exception of Smith who does suggest the organization of in-service courses.

Beswick (1972) explains some of the centre's roles that have been previously mentioned but strongly reafirms (coinciding with Smith) that the organization of training courses through the centre is a vital function to be carried out in any educational institution.

Tirrel (1966) is more precise in pointing out five major functional requirements for the creation of a L.R.C., some of which are crucial to the development of the learning centre at Carabobo University. He explains that the centre must effect an instructional approach which coordinates management efforts, implements independent study, develops instructional materials, organizes facilities, and selects equipment to be used.

Among the various interpretations of a learning centre at the three levels of the intructional system, the most important comes from studies carried out exclusively in higher education. Some authors outline basic principles which are important to the development of a learning resources centre, and specifically the one to be developed at the Health Sciences Faculty in Venezuela. Henderson (1972), states five major concepts in designing a centre which deal first with determining the scope and nature of the existing educational system at the institution; examining the modes that form the proposed learning centre; identifying its different functions; selecting the ones to be served; and completing the requirements according to the functions that the learning centre will perform.

Merril (1977), even though he wrongly states that the learning resources centre is an activity, is very specific in explaining some major services of the learning centre, in accordance with some of

Henderson's opinions. Merril points out the following as the centre's most important activities: providing learning materials for classroom support; ensuring student accountability for instructional development; and planning services for the entire institution. At this point, Henderson and Merril's statements are very valuable because the development process and the services proposed are conceived within a reasonable scope, suitable for the environment of Venezuelan Universities.

The most important study in the review of the literature, one that sheds more light on the development of this project, is that by Moreland and Craig (1974). Due to their extensive experience as educators, and the fact that they have developed a learning resources centre for the University of Maryland School of Dentistry, Moreland and Craig's study seems to be very interesting.

Among the basic principles relevant to the Health Sciences Faculty centre they suggest:

1) specification of centre's objectives;
2) identification of educational problems and needs of the institution;
3) determination of the centre's roles;
4) review of literature
5) visit existing facilities;
6) develop file about information sources;
7) seek advice from qualified personnel;
8) analyze centre's objectives related to collected information;
9) examine space and environmental conditions
10) determine administrative support;

11) examine faculty officials' support;

12) develop layout planning for the future centre.

The facilities and services essential to developing a L.R.C. might be developed in any environment regardless of nationality or curriculum speciality. However, the author of this project will take into consideration those which apply to the Health Sciences Faculty at Carabobo University.

CHAPTER III

LEARNING RESOURCES CENTRES SITE VISITS

In order to more accurately develop this learning resources project for the Health Sciences Faculty of Carabobo University, the author will outline visits made to institutions where such centres are currently functioning.

In 1976, the author had the opportunity to visit two educational institutions in Great Britain. One was the modern Dundee College of Education in Scotland, where the International Conference of Educational Technology, 1976, took place; and the second was the British Life Assurance Trust for Health Education (BLAT) in the city of London. These institutions are developing learning centres in two different fields. The former is adapted to general education while the latter is concerned with medical education. The author also draws on the experience of the Instructional Communications Centre of McGill University in Montreal which has been developed to serve the entire university.

In assuming this information it is of course necessary to take into consideration the difference amongst the respective environments at Dundee, London and McGill and Carabobo University.

The Library Resources Centre at Dundee College of Education in Scotland

The International Conference of Programmed Learning and Educational Technology in 1976 took place at Dundee College of Education because it was inaugurating one of the most modern and well-equipped learning centres in the United Kingdom. This institution has been offering annually, a

solidly structured program in Educational Technology.

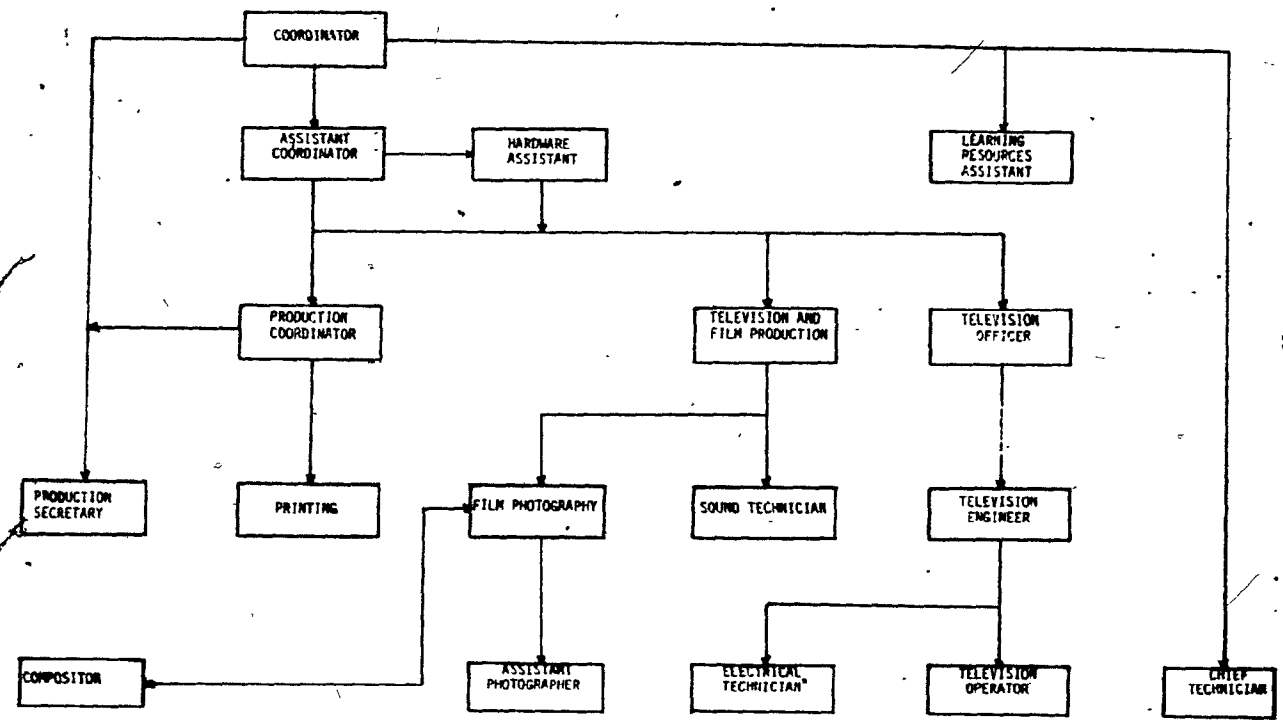
The new College campus was inaugurated in 1975 with a massive building, housing 1,200 students with 200 staff members. The installation was planned to develop a well-structured curriculum based on the latest innovations in educational technology. In 1971, Dundee College of Education was already developing applicable educational strategies and, once moved to the new installation became more highly organized. The educational activities of the College are based on the following aspects (Clark, 1976): 1) lecturing staff; 2) course design, production and adaptation of learning materials; 3) management of resources-based learning; 4) retrieval systems; 5) financial provisions; 6) assessment of students; 7) evaluation of materials and, 8) record keeping.

The main section of the college's learning resources is considered to be the library which houses extensive book and non-book resources. It occupies an area of 17,000 square feet.

At the level of production services there are four types of facilities, each comprised of five facets depending upon the Library/ Resources Centre. Figure I shows the management structure of the learning resources centre's production area and its chain of command.

The learning resources centre also has specific units to effect the production and adaptation of learning materials as aids in the teaching-learning process, these are: Print; photography, audio and motion pictures production. For each of these units the following facets are required: a) accomodation; b) equipment; c) staff; d) control and, d) management.

FIGURE I MANAGEMENT STRUCTURE OF L.P.C. OF DUNDEE COLLEGE OF EDUCATION



The Library/Resources Centre contains 60,000 books and a large selection of non-book materials. The College facilitates individual learning by providing over 200 serviced open carrels with equipment for the presentation of television, synchronized tape-slides and tapes. It also has fifteen enclosed carrels, available for the replay of color video cassettes, microfiches and other items. A well-equipped workshop area for the preparation of audio-visual materials is included in the audiovisual department.

The Dundee College of Education's Resources Centre is supported by a staff of 30 graphics, photographic, reprographic and electronic personnel. It is associated with the Scottish Centre for Science and Technical Education and the Regional Centre for Computer Education (which has an Interdata 732 computer), and also with the department of Medical Education in the School of Medecine of the University of Dundee.

The BLAT Centre for Individual Learning Materials in Medical Education of London Medical School

The British Life Medical Association, together with the British Life Assurance Trust for Health Education and with the collaboration of the World Health Organization established the Department of Audiovisual Communication with the Centre for Individual Learning Materials in Medical Education in the year of 1969.

The goal of the resources centre is to assist in health and medical education through the application of educational technology. Its main function is to investigate and evaluate educational planning, teaching methods and methods of assessment and to provide advice, information and facilities to specialists working in the Health Sciences. The BLAT Resources Centre intends to promote high standards of health and medical education by teaching the design, production, classification, and distribution of related materials (BLAT Report, 1975).

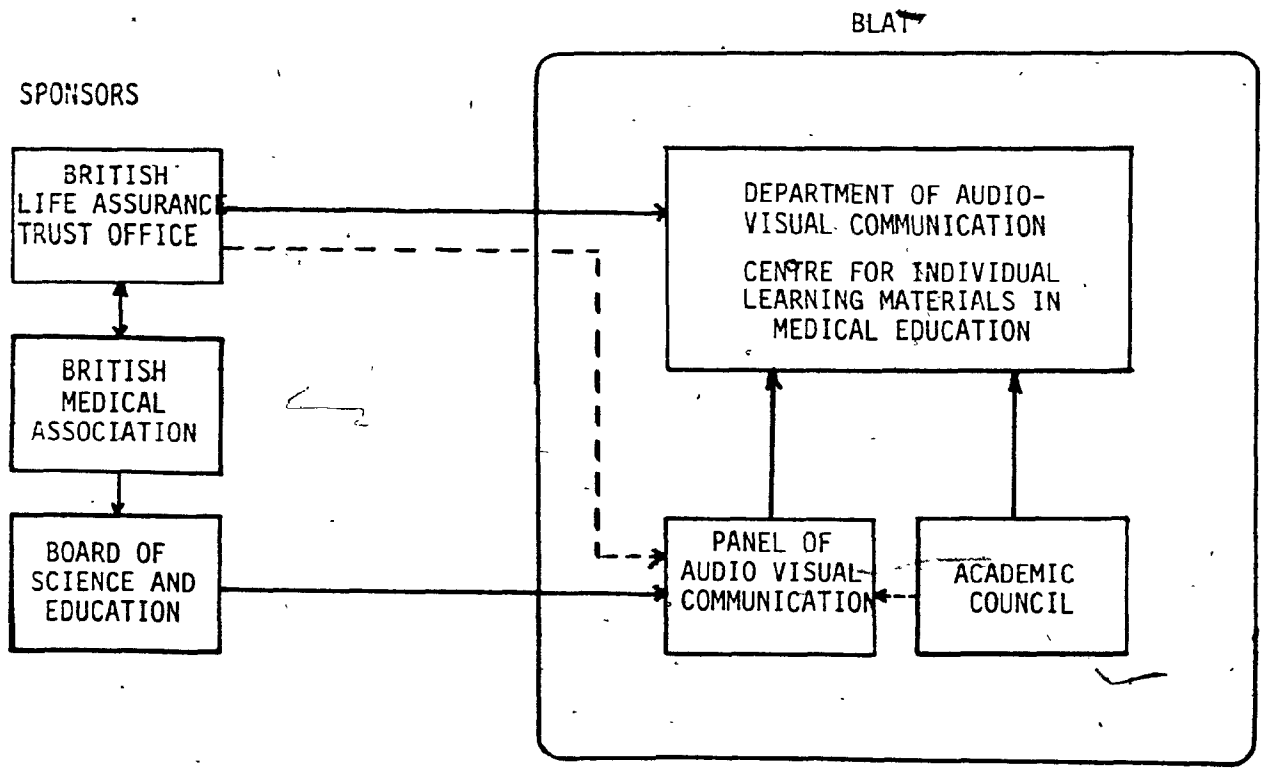
Figure II depicts the administrative structure of the BLAT centre and its relation to the different institutions which sponsor it.

The BLAT Resources Centre has a well-equipped library with 600 films, most of which are not available from any other source. Information and counselling are also provided on 6,000 films which deal with health and medical education in general. The centre's library possesses a great number of books, reports and journals, as well as information gathered through world-wide correspondence consisting of approximately 8,000 letters, 12,000 telephone calls and 1,000 visitors during 1975-76 (BLAT Report, 1975).

The centre also provides short courses to foreign and British visitors for periods of one week to twelve months dealing with specific aspects of education or work on educational projects.

The BLAT Learning Resources Centre has been assisting teachers and educational institutions with the design, production and evaluation of their own study programs. The centre has been recognized by the World Health Organization (WHO) as a collaborating centre for educational

FIGURE II ADMINISTRATIVE STRUCTURE OF BLAT RESOURCES CENTRE AND SPONSORS



technology in the Health Sciences. It provides information and assistance to WHO and other international organizations.

The Instructional Communications Centre of McGill University

The Instructional Communications Centre (ICC) of McGill University in Montreal is a third resources centre visited by the author. The ICC provides communication resources to the entire institution and other services through equipment, personnel and professional assistance.

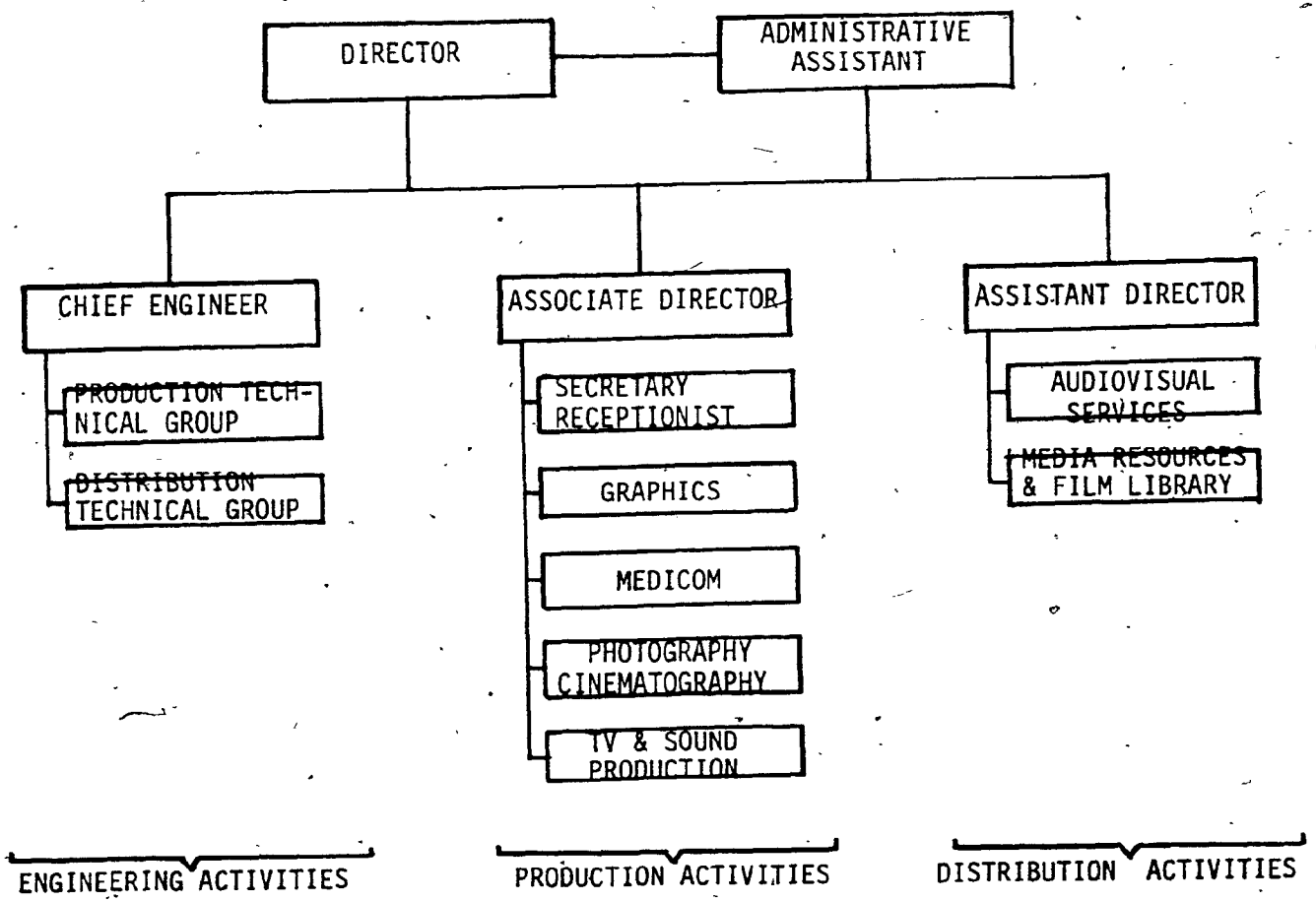
The ICC consists of several instructional sections which support lecturers and students in the utilization of the appropriate communication methods to best facilitate the teaching-learning process.

The Instructional Communication Centre has five administrators on its staff who carry out its policies and manage the resources which range from the centre's physical environment to funds and personnel. Figure III explains the 3 major areas covered by the centre and its internal organization.

The instructional sections that operate through the ICC provide a diversified service to the entire community. These sections are as follows: Audiovisual services; engineering; media resources; medical communication (MEDICOM); photography and cinematography; television, sound production and graphics.

Audiovisual services of the Instructional Communication Centre provides educational aids to the university staff and students, which include audiotape units, portable sound systems, overhead, film and

FIGURE III ORGANIZATION OF MCGILL INSTRUCTIONAL COMMUNICATION CENTRE



slide projectors. This section is responsible for maintaining this equipment.

The engineering section is responsible for technical standards in all aspects of television, sound and film production; it also provides technical personnel for operation, maintenance and construction of production and distribution facilities for McGill University.

Media resources deal with the distribution of all audiovisual software such as films, audio-recordings and video recordings. It also provides a list of titles stored in the film library.

The medical communication section, or MEDICOM, serves exclusively the Faculty of Medicine of McGill, providing on-site audiovisual aids and services, and acts as a liason between the students and staff of that faculty and the centre itself.

The photography and cinematography section's main goal is to assist community members in still photography and film development and production. This section also produces films with and without sound.

The television and sound production section contributes to the preparation of teaching materials through television, filmstrips, slide and audio presentation. The graphic section is concerned with the preparation and production of graphic arts materials for other sections of the Centre, at the same time it produces complete programs for any part of the university. Graphics also produces designs and illustrations to be used in classroom teaching, in university publications, etc.

Discussion

In analyzing the author's visits to the various learning centres located in Dundee, London and Montreal, there are important general observations which can be made to profit the future learning resources centre of the Health Sciences Faculty of Carabobo University.

The Dundee College of Education's learning centre is highly equipped and provides the institution with modern facilities for the improvement of the educational process. Although it appears to be an integral part of the library, in fact, they are two separate entities which causes problems in policy-making. The delay that the centre has experienced in effectively achieving its objectives is not only due to its bureaucratic chain of command, but also to the fact that sometimes both branches seem to be working in opposite directions. This situation has persuaded the author to conceive of the L.R.C. as an independent branch within the Health Sciences Faculty instead of being attached to the main library.

Apart from providing instructional services, the Dundee learning centre has thoroughly developed in-service courses for internal personnel and extended such courses for the training of the city's educational community members. In this manner, the learning resources centre also organizes seminars, conferences, and workshops for the College's personnel and others.

This concern for internal and community services is important to bear in mind when developing a learning resources centre that will attempt to provide services within a developing country's university. In this respect, the centre is not only producing instructional materials or housing media hardware, but also extending its services to other important areas within the educational process.

The BLAT Learning Resources Centre of London is another type of centre, dedicated exclusively to medical education.

It serves in the areas of production and evaluation of instructional materials, as an information source and at a training centre for medical teaching personnel.

The BLAT centre might serve to a certain degree, as a model for the development of a health sciences learning resources centre with the exception that its scope is as limited as its clientele: all course participants are specialized medical personnel at the graduate level.

Nevertheless, the production of instructional materials at the BLAT centre is regarded as optimal, particularly production of software such as filmstrips, slides, photography, motion pictures, etc.

In comparison with the two previous cases, the ICC of McGill University more accurately meets the author's standards for a learning resources centre.

Although the ICC is not directly involved in organizing in-service courses because these are developed by a sister organization, the Centre for Learning and Development, the ICC does organize workshops and short courses to teach faculty the use of simple audiovisual equipment.

McGill's ICC is regarded as a media centre; nevertheless it is an adequate example of achieving the author's objectives in providing instructional services efficiently and effectively to the entire community. However, it must be acknowledged that McGill University has vast resources which cannot be compared directly to those of a recently created institution such as Carabobo University.

The provision of essential services at McGill through the ICC, specifically in the instructional area has been thoroughly developed. Services are provided in graphics, photography and cinematography; sound production, audiovisual services (delivery, maintenance and repair) and media resources.

In general, the author's experience with the ICC indicates that the Centre is well-organized and meets instructional goals. These services which the ICC provides to the McGill community have been taken into consideration to develop the Health Science Faculty's plan in a more restricted manner; of course, based on funds available at Carabobo University. In the latter case, however, provision has also been made for an instructional development unit for in-service training of faculty.

CHAPTER IV

THE HEALTH SCIENCES FACULTY ENVIRONMENT

The Health Sciences Faculty of Carabobo University is a recently established pilot project in Venezuela wherein different specialties are integrated to minimize efforts and costs. In this way the Faculty is expected to efficiently graduate the health professionals required by the nation. In regard to specific objectives, the Faculty must:

1) integrate students at all levels and specialties in order to provide them with solid experience according to the needs of the health sciences team;
2) couple its research programmes with those of governmental institutions;
3) institute public health services to meet the needs of low-income communities;
4) create consciousness-raising attitudes in health sciences students so they feel and transmit the results of their professional experience;
5) graduate capable health sciences professionals with solid humanitarian foundations to efficiently deal with the public's health problems;
6) make potential graduates aware of their future role as community leaders. (Facultad Ciencias de Salud, 1976)

To meet these objectives, Faculty officials have attempted to maintain high standards in the Faculty's educational process while encouraging faculty and students to actively participate in the alleviation of some of the various constraints that currently affect the institution. Such constraints have been identified as space limitation, financial restriction, lack of learning resources, high student enrollment and lack of personnel motivation.

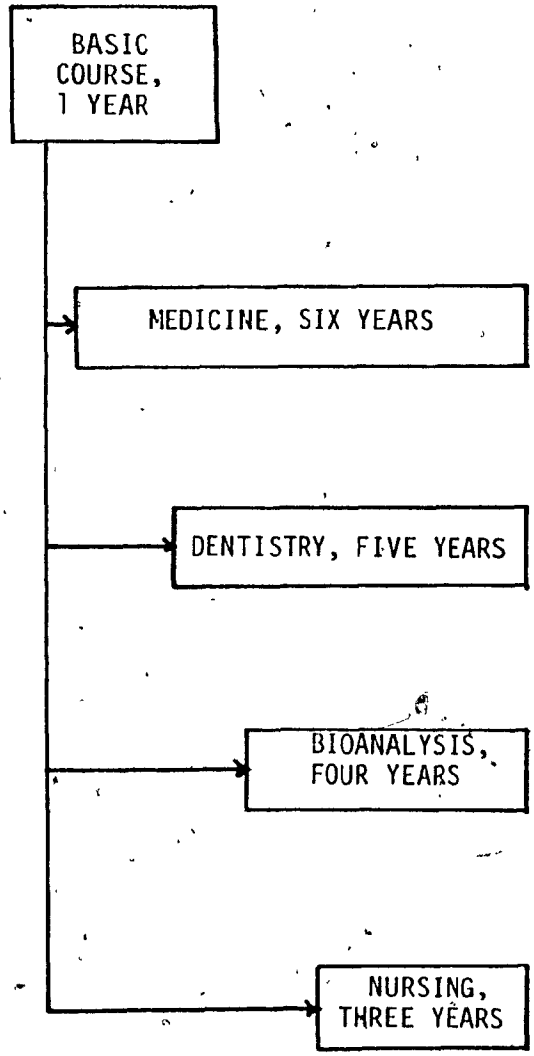
High Enrollment

In 1975 the Health Sciences Faculty found it necessary to rent outside campus accomodations for approximately 1,500 students entering the Basic Course. These facilities included large auditoria for the teaching of theoretical courses through the traditional lecture method. These courses are part of the basic curriculum providing general knowledge before the students enter any of the four specialties (see Figure IV).

Besides the Basic Course enrollment, the total number of students enrolled in each specialty during the academic year of 1976 was as follows: Medical School 1,358 students; Dental School 187 students; Bioanalysis School 165; and Nursing School 40 students.

The total figure for teaching and research personnel for the entire Faculty was 440 during 1976, distributed as follows: Medical School 283, Dental School 60; Bioanalysis School 53 and Nursing School 16 professors and 28 in the Basic Course.

FIGURE IV CURRENT ACADEMIC STRUCTURE OF THE HEALTH SCIENCES FACULTY



From the overall total of 440 lecturers, 10% (approximately 44 lecturers) are on sabbatical, leave of absence or studying graduate courses; 20% (approximately 88 lecturers) are dedicated in the research field. The rest (70%) are committed to teaching, classified according to their workload as follows: 50% are full-time with 12 teaching hours weekly; 20% part-time with 6 teaching hours weekly; and 30% are under contract hours teaching one three-hour course per week.

It is difficult to draw exact estimates with regard to student/faculty ratio at the Health Sciences Faculty to demonstrate how oversized classes are, because it varies in different courses. However, a parallel can be set comparing one specific department of the Health Sciences Faculty of Carabobo University with the same department of the Faculty of Medicine at McGill University.

For the academic year of 1976, Carabobo University Department of Anatomy had an enrollment of 450 students with 20 professors which yields a student/faculty ratio of 22.5:1; the same year at McGill, there were 160 students with 23 professors (McGill calendar, 1976-77) which yields a ratio of 6.9:1.

In conclusion, comparing both universities at the levels of the Departments of Anatomy, it is easy to view high enrollment as a constraint upon classroom teaching at the Health Sciences Faculty of Carabobo University.

Budgetary Constraints

The Carabobo University budget is provided by the National Ministry of the Treasurer, which assigns proportional grants to public universities according to their previous annual budget. Four of the public universities, including Carabobo University, have autonomy in nominating their administration as well as allocating their budgeted funds.

The grant assigned to Carabobo University is allotted in advance according to the specific needs and demands of each Faculty, covering academic expenditures such as faculty salaries, administrative staff salaries, equipment, assisted research, administrative overhead (which includes libraries expenditures, plant maintenance, student services, administration and other related costs).

During the last five years Carabobo University has been facing serious financial problems because the annual percentage increase that it receives in its grant has not met the increase in costs associated with the high enrollment.

For the academic year of 1976, the Health Sciences Faculty grant was 25 million of bolivares ($6 million in Canadian currency) which was allocated according to the following scheme (Reporte Financiero de la Facultad de Ciencias de la Salud, 1976):

Instructional and Research..B$	16,176,000
Plant Operation.....B$	1,400,125
Auxiliary Services.....B$	1,242,345
Administration.....B$	3,560,530

continued...

Fixed Charges.....	B$	1,320,600
Plant Maintenance.....	B$	1,300,400
Total	B$	25,000,000

Lack of Educational Resources

To cover the current costs and debt due to previous overruns, the Faculty budget will probably run into the red again, to pay extra expenditures associated with expanding educational demands. This situation has forced officials to seek immediate changes that will benefit both faculty and students while maintaining the high standards necessary in a health sciences institution.

An important dimension for potential change is improvement of the teaching-learning process at relatively low cost. In the last few years, Faculty officials have been making attempts to bring about some changes in the educational process without clearly stated objectives. The most remarkable step has been the encouragement given to heads of departments to purchase audiovisual equipment to be used as teaching aids, such as different kinds of display techniques and instructional materials where practical teaching is involved.

The Faculty has a main library which houses approximately 15,000 volumes of books with limited study space that makes it the most crowded place in the Faculty because the area dedicated for open study is furnished with only 40 individual "dry" carrels and approximately 15 open tables of six seats each for the total of 1,750 students in that specific campus.

There are other learning spaces which specifically belong to the school of Medicine such as two large auditoria with a capacity for 400 students each. Moreover, there are 15 classrooms for teaching small groups of 40 students each, as well as approximately 15 traditional laboratories for practical experiments in Bio-chemistry, Biology, Microbiology, etc. The Schools of Dentistry and Bioanalysis also have approximately 4 classrooms which are dedicated to lecturing small group sections of 50 students each.

Typical Examples of Lack of Resources

The Departments of Anatomy, Biology and Bio-chemistry can be presented as typical examples of the Faculty's lack of resources to shed some light on the critical defficiencies in the teaching-learning process. This can also give an idea of the importance of developing learning resources.

Department of Anatomy

The Department of Anatomy at any contemporary Medical School must be equipped to efficiently cope with ever-advancing medical standards. In past years this Department in the Health Sciences Faculty has been staffed by well-qualified personnel trained in Venezuelan institutions and universities abroad. However, due to the fact that courses have been broken into sections to increase the staff-student ratio,

instructor's schedules have become overloaded, exhausting, and repetitive. Moreover, the excessive numbers of course sections in dissection have made frequent corpse replacement necessary. This poses some difficulties in a Catholic country like Venezuela, where the acquisition of new corpses is somewhat complicated.

In an attempt to find solutions to the crisis, Faculty officials implemented the use of color video cassette recorders operated by the instructors themselves. In this manner they could record their own practical sessions in order to make them available to students. This seemed to be an appropriate solution but the content of the videotapes was poorly arranged, lacking clearly stated objectives. Also, the production of the video sequences usually occupied too much of the instructor's time.

The idea seems innovative in the context but the instructors could save a great number of teaching hours if video sequences were better produced. A specialized facility which could implement educational technology principles in producing these video tapes would improve results in terms of quality and cost.

Department of Biology

The Department of Biology receives students from different schools within the Faculty. Consequently, its course-sections are inevitably large, especially when there are not enough microscopes essential for observing smear preparations, etc. However, the teaching-learning

process could be enhanced using additional teaching aids, thereby reducing laboratory assistance to a minimum. Biology teaching at this level could be improved with the use of audiovisual aids such as tape-slides, filmstrips, transparencies and charts.

Department of Biochemistry

The Biochemistry course, conventionally taught through laboratory sessions, also faces problems similar to those outlined in the previous paragraph. Because the biochemistry program may appear overloaded with formulas and analytical procedures, it sometimes brings dissatisfaction to both students and lecturers. Therefore, new teaching methods could be implemented in overcrowded sections to efficiently cope with course demands. Thus, the department could develop a self-paced Audiotutorial Learning Method incorporating audio-tapes, slides-tapes, worksheets and demontrations in a non-traditional laboratory. This could be open approximately 8 hours daily, supervised by alternating instructors so that course objectives could be adequately achieved, eliminating routine and lessening the stress that characterizes traditional biochemistry courses.

Attempts to Solve Educational Problems

As explained earlier, Faculty officials, in an attempt to improve the educational process, have encouraged heads of departments to randomly purchase instructional media. The intention was to develop

independent resources in departments which deal with practical courses. Technical staff were also hired to assist in the production of instructional materials specifically designed for those course areas.

Independent Departmental Audiovisual Units

Although the idea of developing independent audiovisual units in some departments of the Faculty has not yet been realized due to the disorganization caused by the changeover to the experimental pilot program, Faculty officials admit that the institution is headed indirectly toward that aim, in that heads of departments have been encouraged to purchase media hardware. The overall plan is founded on the belief that as long as specific departments manage their own resources, solutions to educational problems may be anticipated.

However, what has not been realized is that improvements may not occur at all, if a sound diagnosis of Faculty educational problems is not carried out. It is more likely, then, that resource duplication will severely strain the Faculty's budget while at the same time, technical staff and equipment will be under-utilized within separate Departments.

The idea of establishing independent audio-visual units subtlely carried out by heads of departments is not based on feasibility studies. To some degree this idea reflects self-centered aspirations of departmental heads who may have triggered unhealthy competitive attitudes within the Faculty.

Closed-Circuit Television System for the Faculty

Early in the 1970's, certain Venezuelan education institutions, such as Simon Bolivar and Zulia Universities, installed C.C.T.V. systems in an attempt to alleviate constraints such as oversized classes, shortage of teaching personnel, etc. Currently, other private institutions and state owned universities have been installing C.C.T.V. systems when funds are available.

The Engineering Faculty of Carabobo University installed a small C.C.T.V. system to broadcast previously recorded lectures, seminars and conferences in an attempt to solve similar educational problems such as those present at the Health Sciences Faculty. Since then, some members of the Faculty Community have been pressuring the Faculty Council to install an independent C.C.T.V. system exclusively for the Health Sciences. This project was studied and very recently discarded by the Faculty Council due to its high cost. However, since the Health Science Faculty is on the same campus as the Engineering Faculty, there is an opportunity to develop a joint C.C.T.V. system. This could help resolve some problems affecting the teaching-learning process by, for example, broadcasting recorded lectures to the large auditoria or corpse dissection sponsored by the Department of Anatomy. Moreover, the system could be extended to broadcast surgical operations through a mobile station from the university hospital which is not far removed from campus.

Any use of the Engineering's C.C.T.V. system will have to take account of current realities. For one thing, the Engineering system will have to be used on a limited basis since it is not a powerful unit and during 1976 was fully dedicated to develop the Engineering curriculum. Any possible extension of the C.C.T.V. system to the Health Sciences Faculty could be a valuable help if it is integrated with other instructional resources.

In conclusion, the author believes that basic studies should be carried out to determine the feasibility of a C.C.T.V. extension to the Faculty which could at least partially contribute to the educational process on a cost-effective basis.

CHAPTER V

A CENTRALIZED LEARNING RESOURCES CENTRE FOR THE HEALTH SCIENCES FACULTY

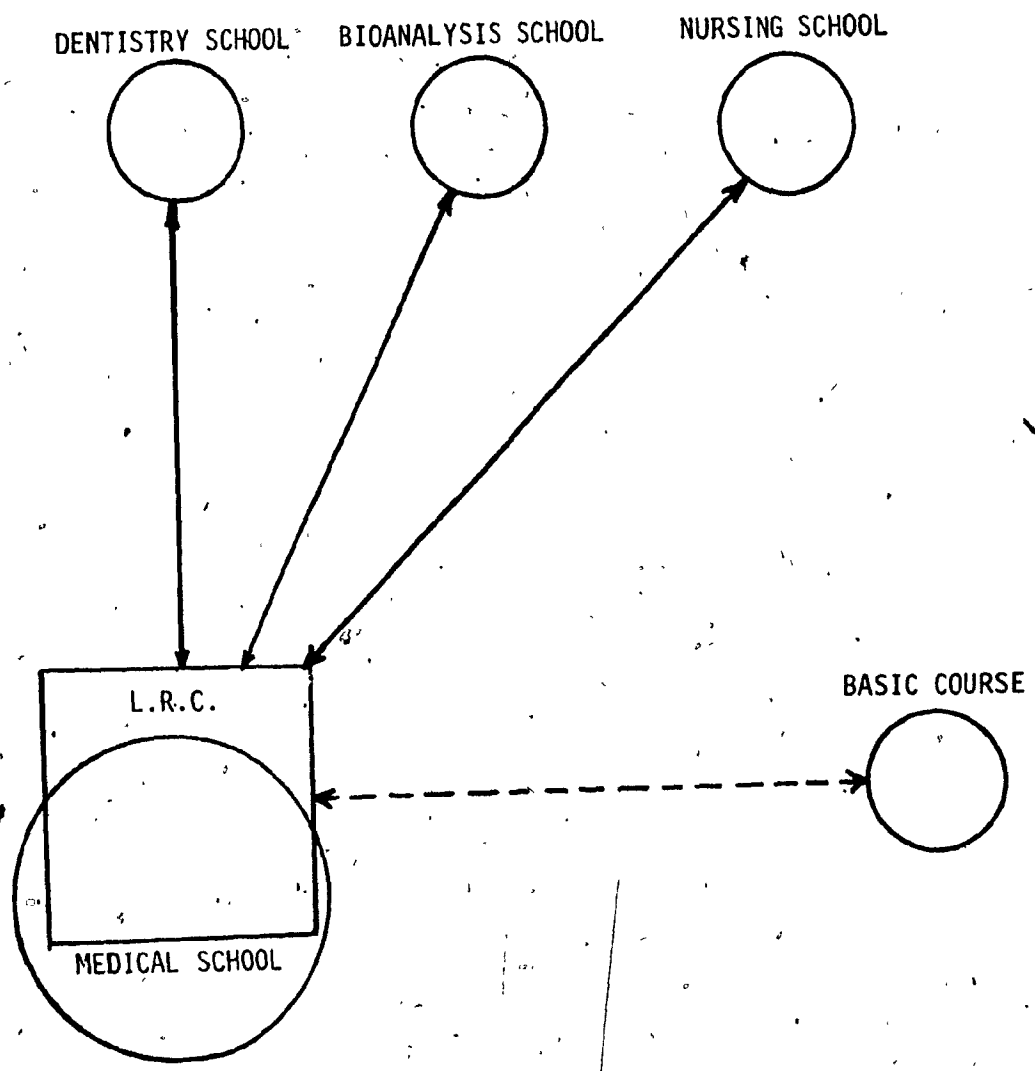
An alternative to the piece-meal approach to educational aids in the Health Sciences Faculty at Carabobo University is a centralized Learning Resources Centre. The first step in designing such a learning centre would be a detailed analysis of budgetary constraints, availability of physical space, the current inventory of educational aids, and personnel problems.

The objective of centralizing the resources in a single centre would take advantage of the scattered materials currently assigned to the different departments and organizing them adequately in order to better serve the entire institution.

Since many of these resources are assigned specifically to the School of Medicine, as the senior part of the Faculty, the project plan will start from that school and radiate to the other specialties as depicted in Figure V.

This plan will start with a three-fold modular scheme in tackling the most important problems of the Faculty curriculum. For instance, one module would provide audiovisual support for classroom teaching, laboratories, seminars, etc. Another module would adapt and produce instructional materials to be used by teachers in their daily classes and by students for self-learning in a carrel area. The third module would train Faculty personnel in various pedagogical areas such as advanced evaluation techniques, statement of behavioral objectives,

FIGURE V PROJECTION OF THE LEARNING RESOURCES CENTRE AT THE HEALTH SCIENCES FACULTY



operation of simple audiovisual aids for classroom teaching and even production of instructional materials. The Learning Resources Centre might set up through the instructional development module, a permanent counselling service in curriculum development and encourage personnel to more actively participate in the solution of problems ocurring in the educational process.

Developing the Learning Resources Centre

The Learning Resources Centre's general goal summarizes the Faculty's main goals:

The L.R.C. will contribute to the effective development of the Faculty members' capabilities to efficiently educate prospective graduates in the Health Sciences Field.

The Learning Resources Centre's specific objectives can be stated as follows: 1) improve the educational process through the design and adaptation of instructional materials; 2) assist students and faculty in the use of instructional materials; 3) implement individualized learning facilities to enhance student learning; 4) assist faculty in the utilization of audiovisual aids; 5) organize in-service courses for faculty personnel in strategic areas of the pedagogic field; 6) provide counselling services in curriculum development to Faculty personnel.

Constraints

The various constrains the Health Sciences Faculty currently faces (see earlier discussion) will inevitably affect, in some way, the development of the Learning Resources Centre. On the one hand, the design of the centre will have to take these constraints (e.g. lack of funds) into account. On the other, a successful design can be expected to alleviate some of these constraints (e.g. overcrowded classes).

In developing the L.R.C., three sets of identifiable constraints may be encountered; they are environmental, organizational and operational constraints (Samuelson, 1977). First to be considered are the limiting conditions outside the learning resources sytem, which are beyond its control. These limitations are defined as environmental constraints; for example a government change of health policy would affect the Faculty as well as the L.R.C.; similarly, financial restrictions from the Ministry of Finance would affect the Faculty and the L.R.C. too.

The second set is termed organizational constraints, which are within the control of the system. These include the development of personnel and equipment with regard to availability to physical space, funds, etc.

The last set of constraints, the operational, concern the standard operations that the system must perform, the number of units per week or month it will have to produce; the flow of communication between the L.R.C. Committee and other Faculty branches and within the system itself.

Currently, there are factors that may alleviate these constraints so that the L.R.C. can achieve its objectives more effectively. In regard to the environmental set for example, that Faculty officials have shown a positive concern in resource budgeting decisions, in providing solutions to problems in the teaching-learning process, in giving grants to lecturers to attend seminars, courses or persue graduate studies. All of this tends to generate innovations at home. On a wider scale, the Government Ministry of Finance has recently adopted a policy whereby State-owned universities will be given substantial increases in their financial allocations from 1978 onwards, to expand educational projects. Likewise, the Ministry of Education is also examining new alternatives, such as an Open University, and creating new higher education institutions to provide education on a wider scale. This might ease the pressure that Venezuelan autonomous universities are currently functioning under, by distributing students more evenly (Memoria y Cuenta del Ministerio de Education, 1976).

In regard to alleviation of organizational constraints, the L.R.C. will have to organize its personnel and equipment at a temporary physical space. Consequently, this will be available as a result of the Economic Sciences Faculty's recent move to the new campus.

Finally, operational constraints may hopefully be overcome by the structure of the L.R.C.: the L.R.C. Committe will act as a liaison between the Faculty, which defines its educational needs, and the modules which attempt to meet these needs.

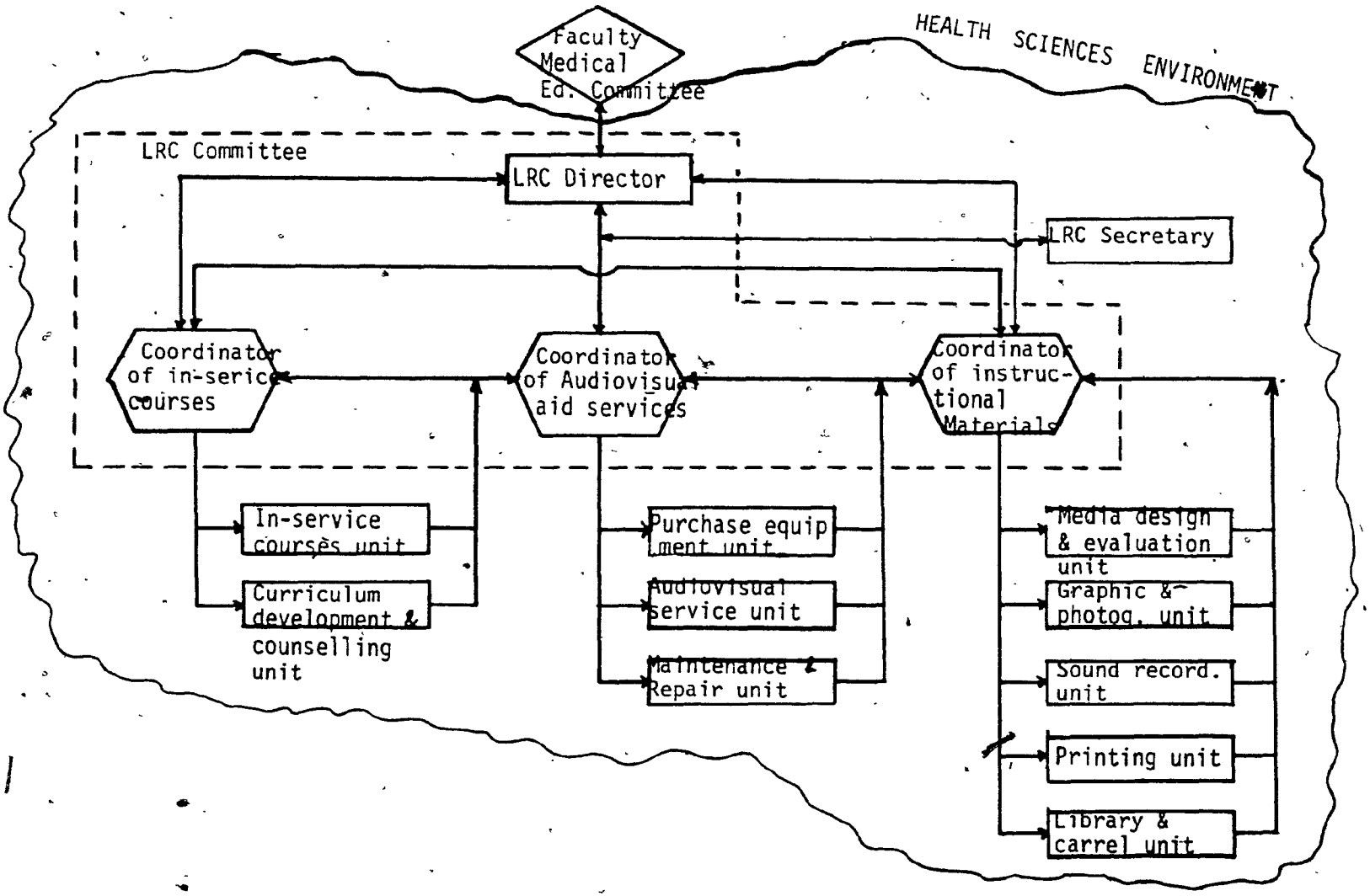
The L.R.C. as a Resources System

Educational systems are designed to meet the requirements of their clients, whether lecturers or students. An important aspect in the planning of the resources system is an examination of the different types of potential users, who must be identified in advance as part of the environmental description.

The users of the learning resources system for the Health Sciences Faculty are defined as university students and lecturers of the Faculty, particularly in the areas of Medicine, Dentistry, Bioanalysis and Nursing. The Basic Course will not be considered as an area of influence for the L.R.C. during the development of the first phase, because of its special characteristics as an introduction to the different areas of specialization.

The plan does not foresee difficulties nor limitations in meeting the needs of the users, because the communication flow within and between the subsystems guarantees control of methods, quality and quantity of production. Figure VI schematises the flow of communication within the entire learning resources system.

FIGURE VI LEARNING RESOURCES SYSTEM FLOW OF COMMUNICATION



The learning resources system to be developed in the Health Sciences Faculty will be a simple organizational structure embedded in the larger system, with its own objectives formulated in accordance with those of the Faculty. The system does not include complicated functional procedures since it pursues very specific goals in its initial phase. The main structure consists of three modules which are 1) instructional development; 2) audiovisual aids services; 3) instructional design. They are attached directly to overseeing the L.R.C. committee, which determines the needs and operations of the entire system.

Each module is responsible for a number of service units which will carry out the learning resources system's main objectives. Through the units, the modules also develop a communication process amongst themselves to improve the entire system's effectiveness. In this way the different activities developed through the system stimulate the free flow of information from top to bottom and vice-versa. This flow of information is expected to positively influence the quality and quantity of the system's outcome.

Evaluation of the Learning Resources System

Evaluation of the learning resources system with respect to short and long-term goals will be carried throughout its implementation and utilization. These goals will be established by both the L.R.C. and the Faculty.

The analysis of the system's efficiency via short and long range evaluation will be used first, to introduce adjustments and modifications so as to correct flaws. The short range evaluation will feed back information over limited time spans. Such information will be acquired during the student's performance throughout the Health Sciences' curriculum. The long range evaluation will be accomplished over longer time spans, at the end of each year, or when students have completed the entire curriculum. Relevant information will also be compiled from employed graduates.

Short Range Evaluation

Different methods can be utilized for the short range evaluation scheme: for example, questionnaires and surveys to measure student and faculty attitudes, judgements, suggestions, etc. (Neagley et al, 1969). In this way it is possible to find out what groups of students use the centre and its instructional materials, at what hours, and which media and facilities are preferred. It is also feasible to evaluate the centre according to student performance in specific courses, comparing groups using different modalities.

North (1972) discusses important variables for accurately carrying out evaluations with regard to methods, materials and facilty arrangement (see Table I). Through the variable "method", different instructional approaches can be compared in order to determine which one is more effective, e.g., video cassette versus tape-slides. The

TABLE I STEPS TO FOLLOW A SHORT RANGE EVALUATION

(NORTH, S. EVALUATION OF LEARNING CENTERS, 1971)

VARIABLE	*EFFECT	POPULATION	MEASURE
METHOD	LEARNING OUTCOMES	INDIVIDUALS	STANDARDIZED TEST
MATERIALS	ATTITUDES	COURSE	LOCAL COMPARISON OF SUBJECT
ARRANGE-MENT	USAGE	SCHOOL	PERCENTAGE ACHIEVING OBJECTIVES

*When North refers to "effect" he is focusing attention on results of population performance.

same comparative procedures can be carried out in an attempt to contrast and evaluate different methods of preparation and presentation. For example, the evaluation might compare two different tape-slide sequences to find out which one is more efficient.

The "arrangement" variable refers to the comparison of different teaching facilities for learning e.g., whether the use of carrels for individualized learning is more effective than group teaching by the traditional lecture approach.

Three categories of "effects" can also be evaluated, the first one being "learning outcomes", measured by comparing students' performances to determine whether they learn more or less through a specific method. The next effect, "attitudes", measures student reactions to methods, materials, and arrangements. The last effect, "usage", is a measure of how and to what extent methods, materials, and arrangements are used. Several other usage aspects can be measured according to the interests of the evaluator; he/she may determine the amount of time a student spends studying an instructional package or using the carrel facility.

Population is another important factor from which interesting conclusions can be drawn when applying an evaluation scheme. Here, inquiry is made into the composition of the user population: the target to whom the program is directed; how it is arranged by individuals, large groups or small groups; and a measurement of objective achievement of an entire population in any educational setting.

The last factor deals with measurement itself, to determine what category of measures should be applied. One possibility may be to use standardized tests to compare students' learning outcomes. Using two groups, control and experimental, comparisons can be made and conclusions drawn.

Thus, short range evaluation should determine whether the learning resources system meets the requirements for achieving positive performance. Through the evaluation of different variables, such as methods, arrangement, etc., the system can be reoriented or adjusted based on the outcomes obtained.

Long Range Evaluation

Long range evaluation is a more complex process because the time span needed varies from one year to the end of the entire career, or following professional practice of the student.

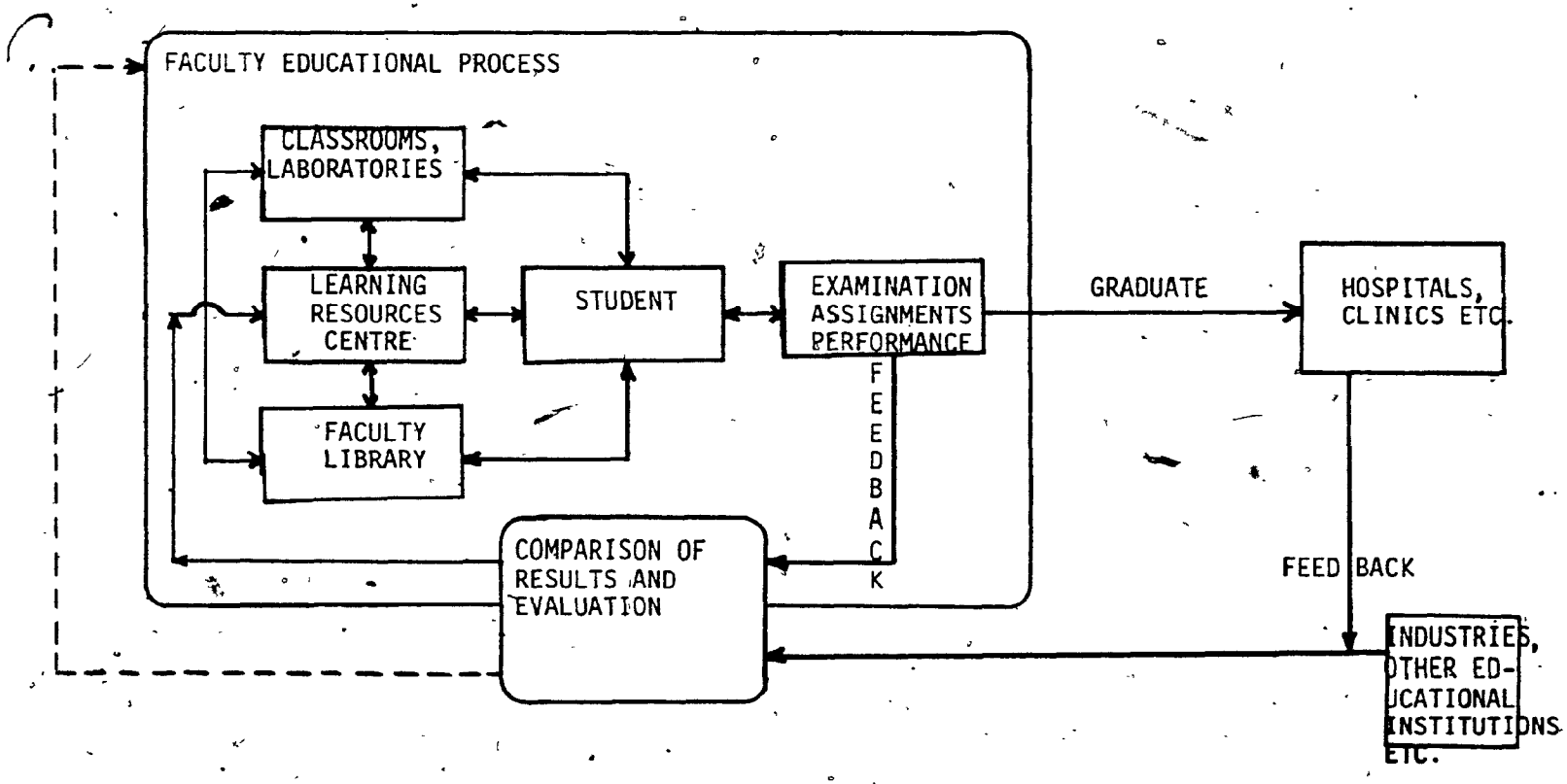
Comparisons can be carried out between different course-sections after a year of study, simply comparing the progress of two groups of students - one that has used the learning resources system and another which has not. Correlational studies can be carried out by comparing frequency of usage and educational progress in the same student.

Surveys can also be utilized within faculty and student populations in order to discern attitudes towards innovations and opinions of the strengths and weaknesses of the learning resources system. Information on usage of facilities may also be useful for long range planning.

Assessing the long range effects of the system, a difficult task, can be accomplished through ongoing evaluations of employed professionals (doctors, dentists, nurses and bioanalysts) who have utilized the Learning Resources Centre compared to those who have not. These practioners also feed back their opinions with regard to changes which might contribute to the consolidation and improvement of the system.

Figure VII depicts the way a long range evaluation scheme would operate. Comparisons of results and evaluation would improve the L.R.C. as well as the Health Sciences Faculty's educational process in general.

FIGURE VII PROCESS OF LONG-RANGE EVALUATION



CHAPTER VI

THE LEARNING RESOURCES CENTRE AND PHYSICAL FACILITIES

The first phase of the learning resources centre will operate from adapted facilities in the former Economic Science Faculty building or in other physical space provided by the Health Sciences Faculty until completion of the new campus buildings early in 1979. In any case, the location of the centre will be provisional, and therefore the initial scale must be modest.

The plan allots a total of 630 square meters for the operation of the centre's modules and their respective units. It should be pointed out that this area is a minimal realistic estimate. Figure VIII details the layout of the area to be occupied by the learning centre.

The allocations to the different activities that will be carried out at the centre are estimated according to established standards for higher education (Bareither et al, 1968).

Table II presents details of allocation of space following the floor plan in Figure VIII.

Learning Resources Centre Environment

An appropriate learning environment for the centre projected for the Health Sciences Faculty must be based on modern standards for educational settings. It must be comfortable and pleasant, providing conditions conducive to the learning process. The learning centre has to be more than a showcase of electronic devices and printed materials. The environment must transmit a sense of support for the students'

Table II ALLOCATION OF SPACE IN THE L.R.C.

General Considerations

AREA CODE	DESCRIPTIVE OF SPACE	NET ASSIGN-ABLE SQ. FT.	REMARKS
LRC-1	Learning Resources Centre's entrance and waiting room	13.5 sq. mts.	This space will be provided with adjustable furniture near the walls to be used as a waiting room for approximately 8-10 people.
LRC-2	Director's secretary's office	17.1 sq. mts.	This office will contain the secretary's desk and chair, two filing cabinets, one electric typewriter with table and 5'x8' bulletin board.
LRC-3	Learning Resources Centre Director's office	28.12 sq. mts.	This office will contain a desk and chair, one open shelf and a filing cabinet.
LRC-4	Coordinator's Office	20.25 sq. mts.	Same furniture as in Director's office.
LRC-5	Coordinator's Office	20.25 sq. mts.	Same furniture as in Director's office.
LRC-6	Coordinator's Office	20.25 sq. mts.	Same furniture as in Director's office.
LRC-7	Seminar room	42.75 sq. mts.	This room will contain two large open tables for 15 persons, one chalkboard, one viewing screen and one overhead projector.
LRC-8	Duplicating and printing room	36 sq. mts.	This room will contain one filing cabinet, four open shelves, one desk and chair, one small caliber off-set press, one ink duplicator, one alcohol duplicator and one portable xerox copier machine.
LRC-9	Clerical Secretary	18 sq. mts.	This office will contain the secretary's desk and chair, an electric typewriter and table, one open shelf, one filing cabinet and a 5'x8' bulletin board.

continued...

Table I continued...

ALLOCATION OF SPACE IN THE L.R.C.

General Considerations

AREA CODE	DESCRIPTIVE OF SPACE	NET ASSIGN-ABLE SQ. FT.	REMARKS
LRC-10	Graphic Artist and Photographer's work room	27 sq. mts	This room will contain a drawing table and chair, one desk and chair, one open shelf, one filing cabinet, and the following equipment: a transparency making device and slide/filmstrip making equipment.
LRC-11	Dark room	18 sq. mts	The dark room will contain sinks, close cabinets attached to the walls, a photodrier, one copier and enlarger camera, one table and chair.
LRC-12	Storage room	36 sq. mts	The storage room will contain open shelves from floor to ceiling to store hardware such as overhead, slide and film projectors as well as other small items. It will also contain a small desk and chair and a filing cabinet.
LRC-13	Theatre for Production and Evaluation of instructional materials.	54 sq. mts	This room will be used for the production of instructional materials of various kinds, such as video recording, filming and for teaching training activities. When not in use for the previous stated activities, it will be used as a viewing room for small groups of students or lecturers. This room will contain two open reading tables for 15 people, one chalkboard, one viewing screen, one open shelf, one filing cabinet, one desk and a chair.
LRC-14	Sound Recording room	27 sq. mts	This room will be used for audio recording. The walls will be covered with cork material and carpeted. It will contain recording equipment such as a reel to reel console and a cassette copier, one table and chair, one open shelf and one filing cabinet.

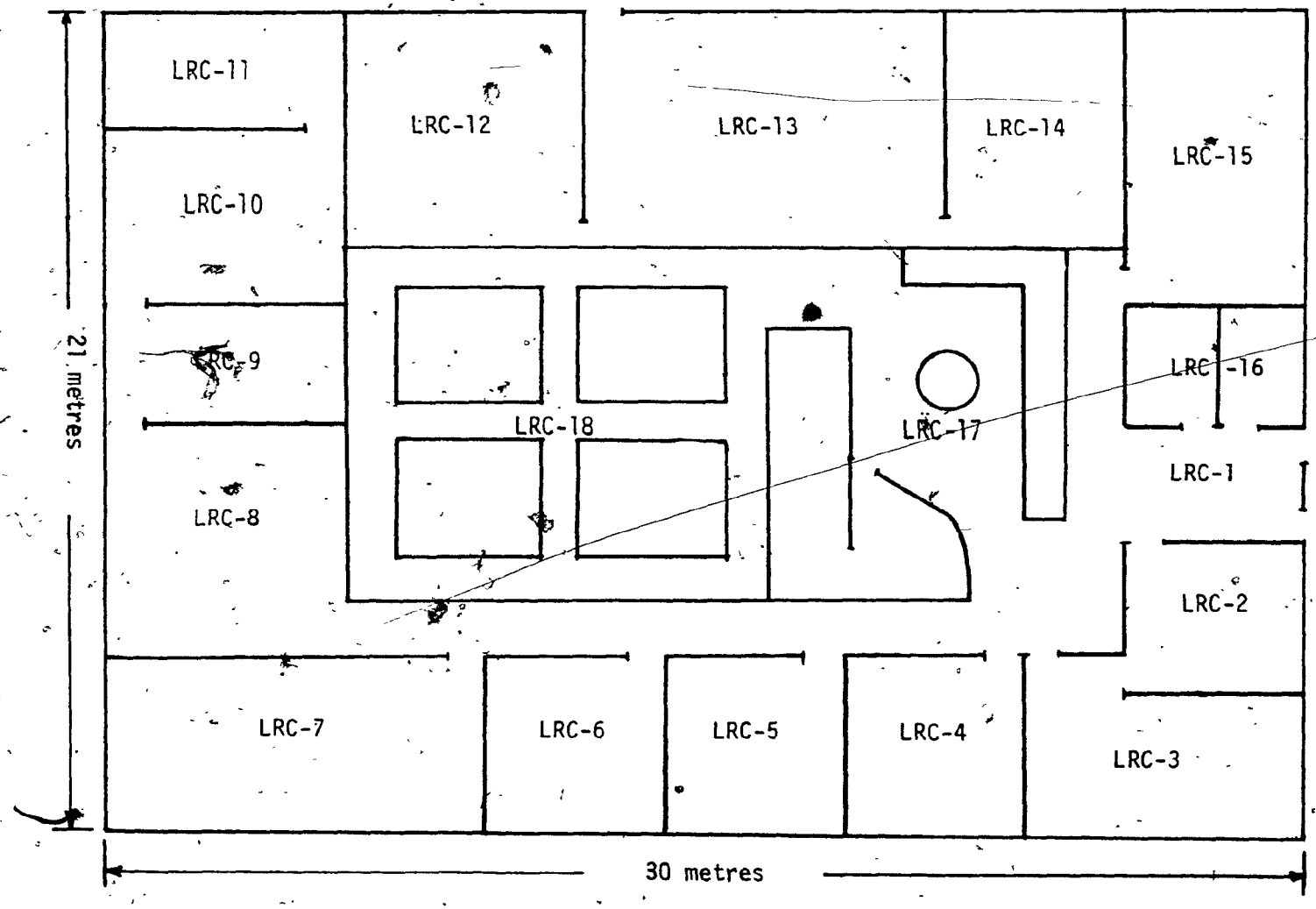
continued...

Table II continued... ALLOCATION OF SPACE IN THE L.R.C.

General Considerations

AREA CODE	DESCRIPTIVE OF SPACE	NET ASSIGN-ABLE SQ. FT.	REMARKS
LRC-15	Maintenance and Repair room	33.75 sq. mts.	This room will be used exclusively for repair and maintenance of all equipment in possession of the LRC. It will contain one desk and chair, one open large table with two chairs one filing cabinet and two metal cabinets for tools, parts and equipment such as a drill press, oscilo-scopes, etc.
LRC-16	Rest rooms	13.50 sq. mts.	This area will contain two toilets, one for males and the other for females.
LRC-17	Specialized Library	58.5 sq. mts	The specialized library will have two sections: one for reading purposes with approximately 8 "dry carrels", and one circular open table for six persons to provide reading space for students and lecturers. The other section will be utilized to stack learning packages, films, etc. for carrel and classroom use. It will also stack specialized periodicals and books in Educational Technology. This room will contain a circulation desk, one desk and chair, an electric typewriter and table, four open shelves from floor to ceiling and one filing cabinet.
LRC-18	Carrel area	94.5 sq. mts.	This area will be occupied exclusively with six units of four carrels each; in total 24 individual carrels which will be equipped with cassette recorders and players and slide projectors.

FIGURE VIII LEARNING RESOURCES CENTRE LAYOUT



Scale: 1:40 (1 mt. = ¼ inch)

search for knowledge, suggesting a fresh, new concept of the educational process. The learning resources centre, then, must function as an important part of the entire educational system.

Lighting

The lighting system must be suitable to all activities likely to be performed in an educational setting - for example, note-taking even when projection of transperencies, filmstrips, and slides is taking place in carrels or in other areas (Cannon, 1976).

Planning of lighting for the learning resources centre will be based on the theory that poor classroom lighting tends to fatigue the learner's eyes, possibly leading to nervousness, irritability and even damage of the eyes' mechanisms.

In the learning centre, a level of illumination will be maintained according to the specific requirements in each area. In recent studies, (Simpson, 1970) it has been satisfactorily proven that, in order to have a well-illuminated study environment, from 70 to 100 footcandles are required for reading or writing. Moreover, Simpson adds that the number of footcandles should be raised to between 100 and 200 and up, if detailed work is performed. For the L.R.C. sections such as graphic arts, Simpson's suggestions will be taken into consideration.

Acoustics

Background noise will be another important problem that will be taken into account when developing the centre's environment. Street noise need not be considered in this case due to the fact that Carabobo University campuses are not located near the city of Valencia.

Background noise will interfere with two key activities in the learning resources centre: 1) student study in the work areas; 2) production of instructional materials in the studio areas. In order to reduce interference, the following measures will be taken: 1) sound proofing in carrel areas using baffles, use of earphones, etc. 2) strategic location of studio areas, away from travelled areas, soundproofing, etc.

Floors should be carpeted to minimize noise produced by people walking or talking, because it has been established that most sound is produced closer to the floor than the ceiling, especially when individuals are seated. This situation causes noise to bounce back and forth between floor and ceiling (Coburn, 1973).

With the use of absorbent materials, noise is effectively reduced. Moreover, ceilings at the learning centre will be covered with corrugated plastic diffusers below the lamps to covert distinct sounds to "white noise". This will, in fact, reduce the intelligibility of sound and hence, its distractive quality within the library-carrel area.

When designing the sound recording room annexed to the production theater, measures will have to be taken to exclude outside noise when recording is in progress. Relevant to this point are the concepts of

Flynn et al (1970) in regard to sound and specifically, the human voice which, they explain, ranges from 500-3000 Hz. Consequently, wall surfaces of the centre and specifically the sound recording room should be covered with porous material that allows a maximum of 40 decibels of noise transmission within the 500-3000 Hz, range. Nevertheless, it is worthwhile to mention that most Venezuelan construction in higher education commonly utilizes concrete brick walls with 3/8" plywood panelled ceiling and marble floors, all of which do not often require extraordinary acoustic measures to prevent noise transmission from one classroom to another.

Climate Control

Venezuela is a tropical country located in the northern part of the South American Continent which has four different climatic zones: tropical, moderate, cool and cold, with a maximum temperature of 95° F. and an average in the capital city of Caracas of 74° F. over the year. The city of Valencia where Carabobo University is located, is two hours from the capital and its average temperature is approximately 78° F.

Most of Carabobo University's buildings are equiped with central air conditioning. Single offices and small-sized classrooms are usually equipped with low-powered 250 B.T.U. units. It is expected, however, that the Learning Resources Centre will be provided with a central air conditioning unit.

According to the recommended standards, an interior temperature of 70°F. is the most appropriate for a learning environment (Environmental Engineering, 1974), this will be set at the learning centre during summer

season and increased to 75° F. during the rainy season when the climate becomes milder.

These temperature settings follow the recommendations of educational environmentalists (Berlowitz, et al, 1969) who suggest a range of relative humidity of 22-35% and relative air flow at about 15-25 feet per minute. These educational environment standards will be applied when developing the learning centre at the Health Sciences faculty according to the specific circumstances.

Financial Considerations

The Health Sciences curriculum is periodically revised by the Medical Education Committee (which is connected with the Faculty Council). The Committee suggests changes and innovations to be implemented by the Faculty. Programme changes and financial plans are also recommended to the Faculty Council which finally determines their feasibility and inclusion in the Planning Programming Budgeting System. When departmental financial plans are approved, the Council delegates authority to lower committees to carry out plans already approved with the direct supervision of the Dean of the Faculty.

The Learning Resources Centre for the Health Sciences Faculty will deal with recurrent and non-recurrent costs that will be encountered during the fiscal year, which begins each January first. Table III presents a financial plan for the projected learning centre.

Table III L.R.C. FINANCIAL PROGRAM

Projected expenditures for the L.R.C., in bolivares. One bolivar is equivalent to 25 cents in Canadian currency (November, 1977 rates)

Total gross of financial program costs for the L.R.C. is B$ 990,220 without deducting costs of existing equipment and salaries of personnel currently in use and working respectively at the Health Sciences Faculty.

Recurring Costs	
Direct:	
Personnel:	
a) Salaries	B$ 428,600
b) Social Security	B$ 20,400
c) Retirement	B$ 20,100
d) Hospitalization	B$ 3,500
e) Unemployment Compensation	B$ 2,000
Learning Resources:	
Library Materials:	
a) Books	B$ 10,000
b) Periodicals	B$ 5,000
c) Stationary Materials	B$ 2,500
d) Software	B$ 15,000
Other expenditures:	
a) Research project	B$ 10,000
b) Travel Expenses	B$ 3,000
c) Supplies	B$ 1,500
TOTAL	B$ 543,500
Non-Recurring Costs	
a) Equipment	B$ 229,057
b) Furniture	B$ 111,631
TOTAL	B$ 340,688
Gross of Recurring Costs	B$ 543,500
Gross of Non-Recurring Costs	B$ 340,688
Total Gross Financial Program Cost	B$ 884,188

Specification of Human Resources

To a certain extent, the efficiency of a learning resources centre depends on the quantity and quality of the personnel as well as the variety of tasks that are to be performed. However, it must be realized that financial constraints will also largely determine the staff roles.

A basic staff will be selected in accordance with the stated objectives of the learning centre to carry out educational technology activities at a minimal level; hence specialized personnel will be required. Table IV presents a list of suggested positions and salaries based on the current Venezuelan talent market and the needs to be met at the Learning Resources Centre.

The personnel listed in Table IV are, by the author's estimates, the minimum required to launch the first phase of this project, establishing the learning centre in accordance with its goals, while respecting the financial constraints in the Health Sciences Faculty.

Some of the personnel have already been working for different departments of the Faculty. One of the objectives of this project is the re-allocation of existing resources; savings thus achieved will be specified later in this chapter.

Equipment: Specifications and Costs

The development of electronic media has permitted the expansion of education, especially in developed countries where educational television, program instruction machines and Computer Assisted

Table IV

List of positions and salaries of staff to be employed at the learning resources centre.

	POSTITION		SALARY	
1	Learning Resources Director	B$	56,000	per annum
1	In-service Course Coordinator	B$	36,000	per annum
1	Instructional Designer Coordinator	B$	36,000	per annum
1	Hardware Media Specialist Coordinat.	B$	36,000	per annum
1	Instruction Evaluator	B$	28,800	per annum
1	Photographer and Film Procucer	B$	28,800	per annum
1	Graphic Artist	B$	28,800	per annum
1	Audio Visual Technician	B$	28,800	per annum
1	Sound-Recording Specialist	B$	28,800	per annum
1	Assistant to In-Service course	B$	28,800	per annum
1	Duplicating and Printing Operator	B$	20,800	per annum
1	Librarian	B$	30,800	per annum
2	Clerical Secretaries (B$ 25,000 each)	B$	50,000	per annum
2	Clerks (B$ 16,000 each)	B$	32,000	per annum
	TOTAL	B$	428,600	

Instruction, to mention only a few technologies, have taken over major instructional tasks.

Although the Health Sciences field is rapidly advancing in the use of sophisticated media (such as educational television to broadcast surgical operations from distant community hospitals to Medical Schools, or to perform remote diagnostics) the most immediate goal for the Health Sciences Faculty through the Learning Resources Centre is to start from basics, using simple audiovisual aids to support the teaching-learning process. This will be accomplished through the activities organized by the Centre's three modules. The activities developed through the module for instructional development will also help to motivate Faculty personnel to become more aware of their roles in the solution of educational problems. In the first phase, a limited amount of equipment will be needed to sustain these creative activities.

Table V presents a list of equipment required to launch the L.R.C. first phase, prices and other specifications according to the Audiovisual Equipment Directory (Herickes, 1977-78).

Furniture: Specifications and Costs

Because furniture is considered to be an integral part of any learning environment, its selection should be based on detailed study of functional and economic criteria.

TABLE V EQUIPMENT REQUIRED FOR THE LIST PLAN OF THE L.R.C.

ITEM	MAKER	MODEL	WEIGHT	PRICE PER UNIT IN $	QUAN-TITY	OVERALL COST IN BOLIVARES PLUS 30% IMPORT TAX
Motion Pictures 16MM Projector	Bell and Howell Co.	1580-C	32 lb	934	2	9,713 B$
Silent Filmstrip Projector	Singer Education System	School Master 500	7 lb	149	4	2,562 B$
Sound Filmstrip Projector	Dukane Corp.	Micromatic 28A 15C	24 lb	375	4	7,800 B$
Filmstrip Viewers	Prima Corp. Products	330 TFL	5 lb	53	2	651 B$
Slide Projector	Eastman Kodak Company	Ekta Graphic AF-2	7 lb	289	40	60,112 B$
Sound Slide Projector	Audio-visual Contractors	AVC 411 PE	9 lb	545	4	11,336 B$
Overhead Projector	Bell & Howell Co.	30 IG	15 lb	156	20	16,224 B$
Opaque Projector	American Optical Corp.	3525 HS	29 lb	639	5	16,614 B$
Front Projector Screen	Da-Lite Screen	60X60" Video-Hilo	12 lb	90	5	2,340 B$
Vido Tape Recorder & Player	Hittachi Denshi America Ltd.	Reel to Reel SV-530	4.84lb	2,295	2	23,868 B$

Continued...

TABLE VIII

LIST OF EQUIPMENT USED AT THE HEALTH SCIENCES FACULTY.

QUANTITY	
1	Color video cassette recorder system (1 color camera, 1 video cassette recorder and player, one video receiver).
1	135 MM photographic camera
1	16 MM motion picture camera
1	8 MM motion picture camera
2	16 MM film projector
1	8 MM film projector
2	Silent filmstrip projector
10	Slide projectors
15	Overhead projectors
2	Opaque projectors
1	Record player
1	OHP transparency making equipment
1	Slide making equipment
1	Photograph copier and enlarger
2	Electric typewriters
6	Projector tables for slide and film projectors and TV/VTR

L.R.C. Personnel: Responsibilities and Activities

The purpose of this section is to describe the roles and related activities of the staff of the Learning Resources Centre and to describe the administrative structure which organises their operations.

The duties of the L.R.C. personnel will be in the following areas:

1) analysis and solution of instructional problems present in the educational process of the Faculty;
2) planning of centre facilities for the use of learning;
3) budgeting and cost-effectiveness estimates in regard to the use of learning resources;
4) decision-making in relation to the effective use of learning resources available in the centre;
5) implementation of procedures for the development of the learning resources to fulfill the needs of faculty teaching personnel;
6) production of instructional materials through slides, filmstrips, films, etc. for individualized learning.

Chains of Command and Organization in the L.R.C.

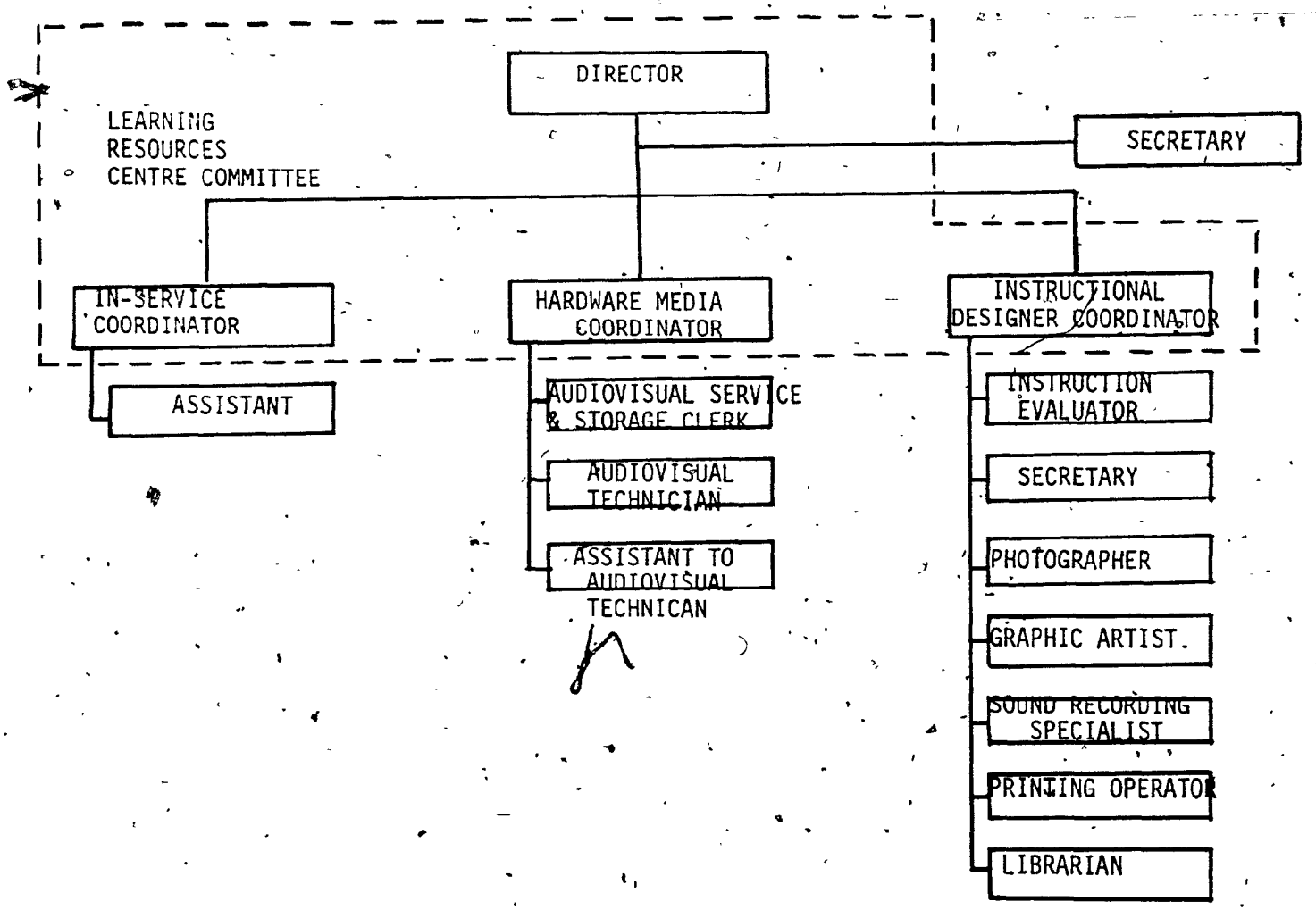
Figure IX presents the functional organization of the L.R.C. and the way different positions fit in the system. The chain of command depicts the level and relation of the personnel in the three modules.

It is important to point out that the learning resources centre is hypothetically divided into two main areas: technical services and educational services. Some of the technical services may be found mixed within the units to more efficiently employ the staff and equipment through the development of the project's first phase. In this way, the system as a whole, utilizes a simple design which eliminates excessive bureaucracy and waste of resources.

Director

Operations of the Learning Resources Centre will be the responsibility of the Director, who must: 1) manage the day-to-day functions of the Centre through its staff; 2) evaluate the centre's performance in view of both short and long range goals, and correct the manner of operation as necessary; 3) analyze instructional needs of the Faculty which the learning centre might help to satisfy; 4) study financial requirements and set up an annual budget for the L.R.C.; 5) control expenditures in relation to budget restriction; 6) set up and maintain liaison with Faculty departments; 7) prepare periodical reports concerning the L.R.C. activities.

FIGURE IX FUNCTIONAL ORGANIZATION OF THE LEARNING RESOURCES CENTRE



The L.R.C. director must be a professional with solid foundations in the field of Educational Technology, a capable individual fully aware of the educational problems of the Health Sciences Faculty and cognisant of its evolution over the past five years. He or she must have at least a Masters Degree in Educational Technology and a minimum of three years working experience as a practitioner in the field. The success of the L.R.C. first phase will largely hinge on the Director's performance.

L.R.C. Secretary

The L.R.C. will have two clerical secretaries, the executive secretary attached to the Director and another attached to the instructional design module.

The executive secretary of the LR.C. will serve as a receptionist/ and a liaison between the Director and the modules coordinators. Although his/her work will be more specifically dedicated to processing-orientation from the centre to other branches in the Faculty and vice-versa, he/she will also take care of matters concerning the less-heavily loaded modules, the instructional development and audivisual services. He/she will maintain centre's personnel records and provide necessary documents for committee members' use in their regular meetings.

Module Co-ordinators

Each module coordinator will serve as a team-leader for his/her module, as an advisor for Faculty members and students in their daily work. The coordinator is responsible to the Centre's Director for the module's activities and plans.

Each coordinator will be a specialist in his/her own field (instructional development, hardware media services or instructional design) in order to cope with their specific tasks presented by Faculty members and students. The three module coordinators will constitute, jointly with the Director, the L.R.C. committee.

Coordinator for In-service Courses

A single module will be dedicated entirely to the organization of in-service courses and permanent counselling in the curriculum development area for faculty. The coordinator of the instructional development module will be responsible for the development and operation of those services. He or she must have at least a B.A. in Educational Technology, Education or Instructional Psychology and a minimum of three years of experience.

Global Task

Organize in-service courses and facilitate counselling for Faculty in the area of curriculum development.

Sub-tasks

1) survey the Faculty to determine interests and needs in the instructional development field; 2) organize an instructional development team of Faculty volunteers with experience in curriculum development in medical education; 3) seek voluntary collaboration from instructors in the Faculty of Education of Carabobo University to participate in the instructional development team; 4) seek advice from different universities abroad and in Venezuela and from international organizations to delineate priorities for the organization of training courses; 5) select the most important areas in the Faculty curriculum for which in-service courses would be developed; 6) set up schedules for the development of in-service courses throughout the academic year. 7) select the instructors that will teach in the different courses; 8) process plans and programs of module activities through the L.R.C. committee.

During the first phase of the development of the project there will be only one other person attached to this module, the assistant to the instructional development coordinator.

Assitant to Instructional Development Coordinator

The assistant to instructional development reports to the coordinator, the different plans and programs for the training-courses, seeking instruction specialists for the different courses and assisting Faculty in curriculum development. This assistant must have a B.A. in Educational Technology, Education or Instructional Psychology and a minimum of one year experience.

Hardware Services Coordinator

The second module will provide audiovisual aids services for classroom support to all Faculty members who require them, for repair and maintenance of hardware used in the centre and for its storage in a secure and accessible place. Finally, the module will also be responsible for purchasing new equipment needed in the centre. This module will operate under the direction of a hardware expert who must hold a B.A. in Educational Technology or Audiovisual Aids and have three years of experience. He/she will perform the following tasks.

Global Task

Coordinate purchasing, maintenance, repair and storage of all the L.R.C.'s equipment and plan strategies for their effective use.

Sub-tasks

The Coordinator of the hardware service module will perform the following sub-tasks: 1) take inventory of all equipment available in the Health Sciences Faculty to be incorporated into the L.R.C. in order to provide effective service to the entire Faculty; 2) determine what equipment is vital to lectures as teaching aids so as to assure the the L.R.C. has sufficient stock; 3) submit request for the purchase of new equipment; 4) coordinate the delivery of audiovisual aids for classroom teaching support 5) coordinate maintenance and repair activities of learning resources equipment; 6) maintain security in storage place to prevent loss or damage of equipment; 7) participate as a member in the L.R.C committee's meeting and process through it, all plans and programs of the module.

Specialized Staff

Audiovisual Technician

The audiovisual technician will be an expert in maintaining and repairing simple media equipment. He will be responsible for the proper functioning of all the L.R.C. equipment including that which is installed. He will also be responsible for the installation of newly purchased quipment. He/she must have a technician diploma and a minimum of three years of experience.

Clerks

The hardware media and services module will have two persons to carry out activities in two separate units: the audiovisual service delivery and storage unit and in the repair and maintenance unit.

In the repair and maintenance unit, an assistant will assist the AV technician in his/her daily work. However, the assistant can also serve in other areas when it is required. For example, in the case that more than one professor requests aid at the same time, the assistant must be available to fulfill these urgent needs.

The other person will act as a delivery clerk and operator of equipment when required for teaching support in classroom teaching. This person will be responsible for the storage of the audiovisual equipment when not in use.

Coordinator of the Instructional Design Module

The instructional design module will be considered to be the heart of the L.R.C., in that it will be charged with the preparation and adaptation of instructional materials.

The work developed in this module will need staff specialized in different areas; their activites will have to be highly coordinated. He/she must have a B.A. in Educational Technology and a minimum of three years of experience. This coordinator will be responsible for the following tasks and subtasks.

Global Tasks

Adapt and produce instructional materials for student and faculty use in the L.R.C. as well as for classroom teaching support.

Sub-tasks

1) analyze and provide solutions to the problems resulting from lack of instructional resources within the Faculty educational process;
2) evaluate Faculty human resources which can be integrated into the module's activities;
3) request the employment of new specialized personnel as required to develop top quality learning resources;
4) purchase instructional materials from reputable sources to be adapted according to the requirements of the Health Sciences Faculty;
5) produce instructional materials based on the needs of the Health Sciences curriculum;
6) coordinate the activities of all the module units;
7) evaluate instructional materials adapted and produced by the module;
8) participate in the L.R.C. committee's delineations as a voting member.

Instruction Evaluator

The Instructional Design module will have a specialist in evaluation of instructional materials who will work in close contact with the Coordinator of the module.

The instruction evaluator will be responsible for the coordinated production of materials which he will assemble in an instructional package to be evaluated. He/she must have a B.A. in Educational Technology and a minimum of two years of experience.

Clerical Secretary

This person will be fully dedicated to the work in the Instructional Design module.

He/she will perform secretarial related work for the entire module; thus, he/she will take and transcribe dictations, type reports, stencils and other related forms from rough drafts, corrected copies, etc. He/she will be required to have initiative and judgement to plan, organize and set up in proper form.

Photographer

This professional will be responsible for routine photographic activities including the preparation of film-processing and development solutions.

He/she will be concentrated in photography of patients, anatomical structures, records, etc., and the preparation of enlargements, and of charts, graphics and other types of prints.

The photographer and the graphic artist will cooperate closely under the supervision of the module coordinator. The photographer and graphic artist together will develop two areas that can function in the same physical space, thus economizing time in the design of instructional materials. This professional must have an Academic diploma and a minimum of three years experience.

Graphic Artist

The graphic artist will be responsible for the preparation of all medical drawings, sketches and charts to be used in the centre's production of slides, overhead transparencies, filmstrips, photography and motion pictures as well as in programmed texts. Moreover, he/she will also be mounting and laminating materials for exibits, displays and classroom teaching, preparation of titles for slides, films etc. and other materials for Faculty papers and publications. He/she must have an Academic diploma and two years of experience.

Sound-Recording Specialist

This specialist will be responsible for the sound recording unit. This unit will ensure proper sound recording in all instructional productions.

The sound recording specialist will also arrange public address and recording facilities for classes, conferences, seminars, and other events sponsored by the L.R.C. This specialist must have approximately three years experience.

Printing and Duplicating Operator

The Instructional Design module will have a unit responsible for the printing of all materials necessary for instructional development and dissemination. There will be an experienced printer operating small ink and alcohol duplicators and a xerox copying machine.

Librarian

Within the instructional design module there will be a specialized educational technology library.

All of the activities developed in this unit will be coordinated by a full-time librarian who will index and catalogue all the incoming materials, and assist students and faculty when using the services.

The library will stack specialized literature, instructional material adapted, produced and acquired from other institutions.

The open reading area will be equipped with open tables and approximately 8 to 10 (dry) carrels to provide reading space for approximately 15 persons.

The specialized library will have in an annex, 16 individual carrels equipped with electronic equipment to be used for individualized learning. The librarian will provide learning packages to be viewed in the carrels, as required by the users. The librarian must have a minimum of three years experience.

CHAPTER VII

ESTABLISHING THE LEARNING RESOURCES CENTRE

The establishment of the L.R.C. at Carabobo University will be achieved in four stages of development. The author is aware of the delays and obstacles that may be encountered and for that reason, the entire process will be completed over the period of one and a half years. At the end of this period, the L.R.C. is expected to be fully functional and provide all the services conceived of for the different modules.

The flowchart in Figure X depicts in detail, the different steps to be taken in the process of installing the L.R.C. in four stages.

First Stage

The first stage is a preparatory stage. It comprises the translation of the L.R.C. plan into Spanish so that it may be submitted to the Medical Education Committee of the Health Sciences Faculty which is reponsible for the improvement of the Faculty's educational scheme. After its approval, the plan will then be forwarded to the Faculty Council for final study. Once the plan is approved, the Faculty Council will establish a provisional committee for the development of the project.

It is assumed that this project Development Committee would subsequently engage itself in the organization of the L.R.C. until its administrative personnel is officially nominated by the Faculty Council.

In this respect, the project Development Committee will act temporarily, organizing basic procedures such as the structuring of

PLEMENT LEARNING RESOURCES CENTRE AT THE HEALTH SCIENCES FACULTY

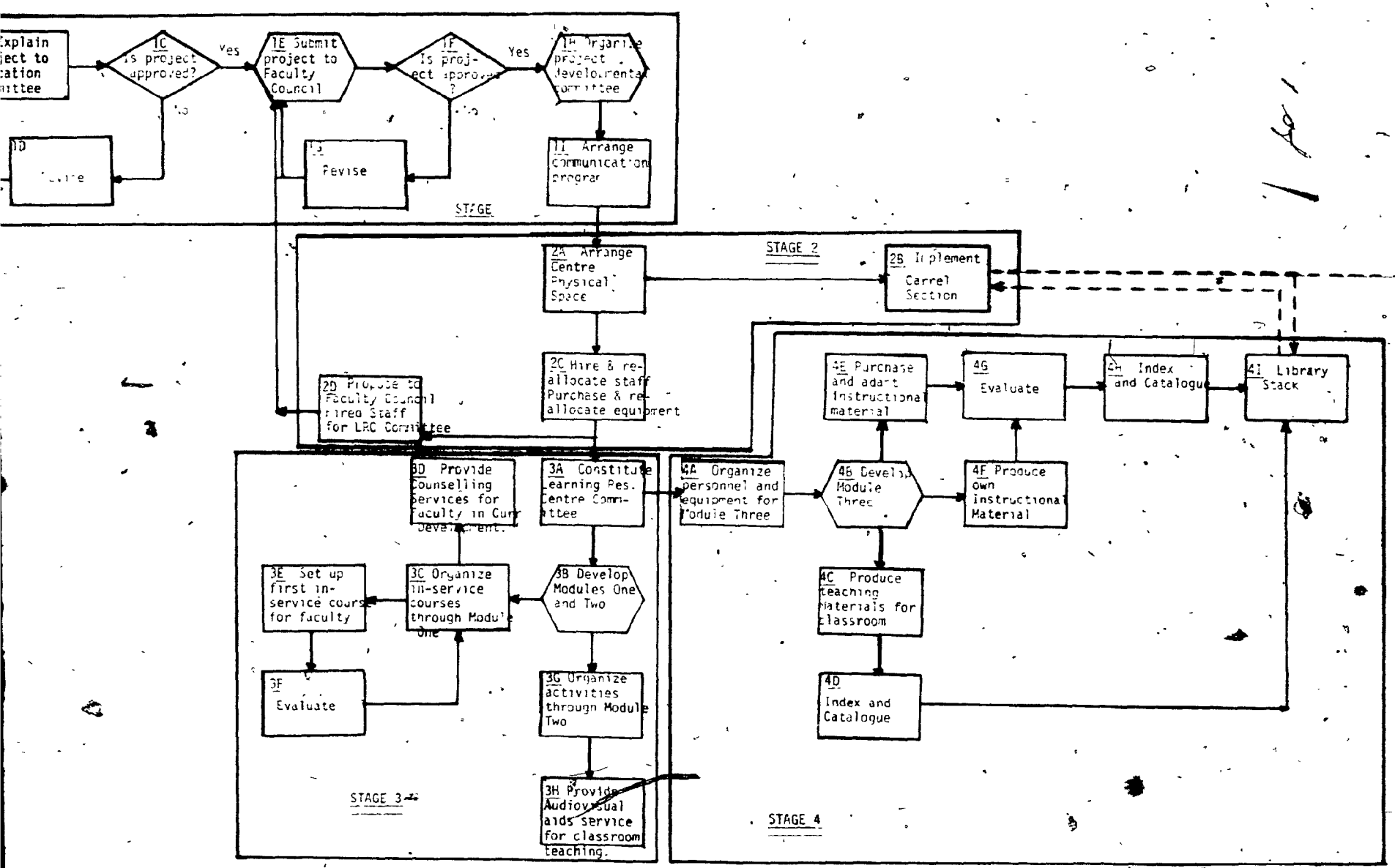
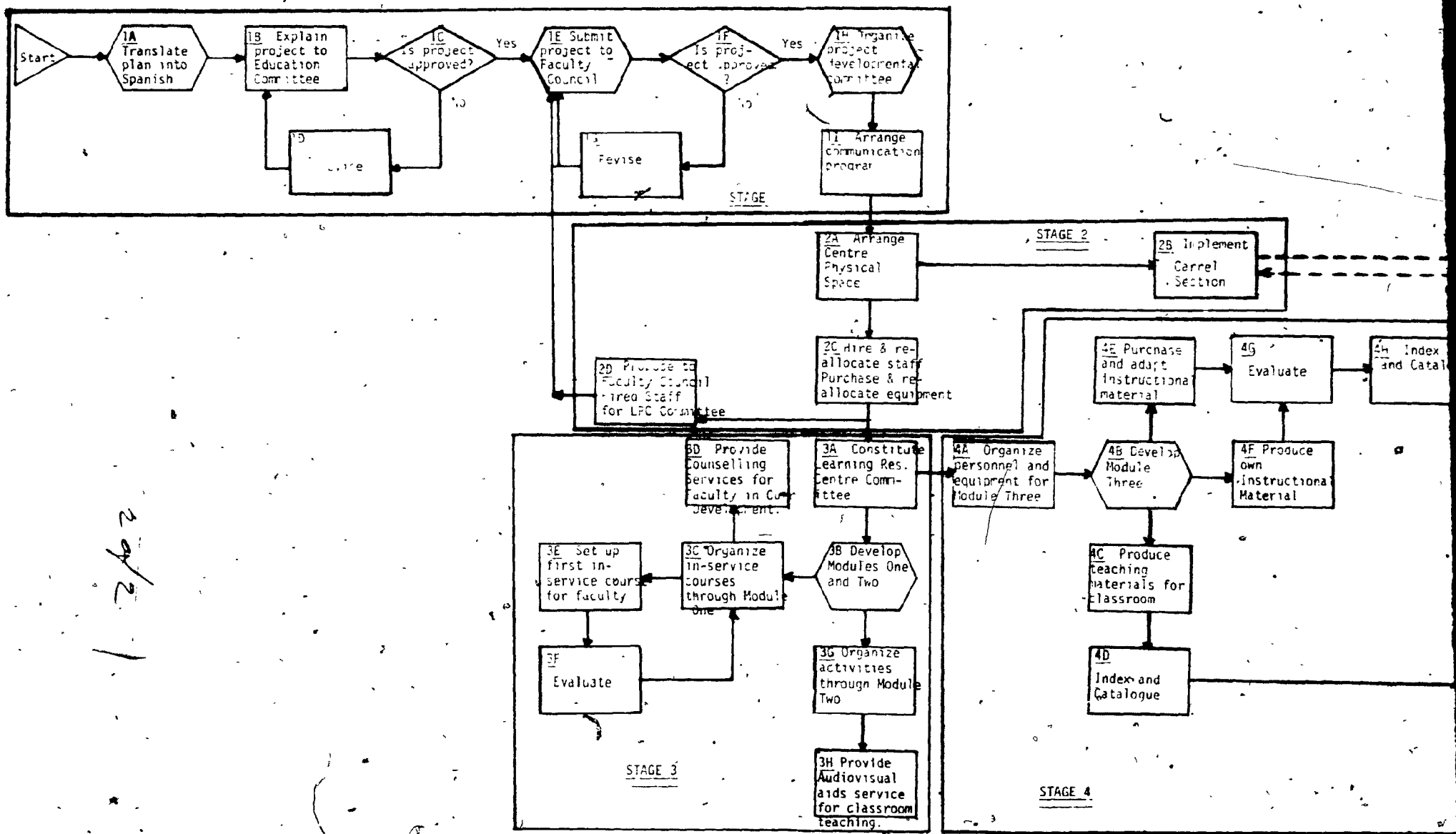


FIGURE X FLOW OF ACTIVITIES TO IMPLEMENT LEARNING RESOURCES CENTRE AT THE HEALTH SCIENCES FACULTY



2 of 2

a communication program for informing community members of the project's scope while organizing conferences, seminars and conducting surveys and questionnaires. By collecting data from Faculty and students, this program would enrich the project's development both by providing new ideas and by helping to minimize resistance to innovations. This stage is expected to last for at least three months.

Second Stage

Concurrent with the first stage, the Development Committee will commence the allocation of physical facilities for the L.R.C., especially those which will require more time for set-up, for example, the carrel area.

At the same time, the committee will conduct surveys of the Faculty's educational resources and materials in order to determine their nature, quality and quantity. This will be necessary because most of the information on which this plan has been based relates to the year 1976, and presumably, some changes will have taken place in the environment, personnel or equipment. Where necessary, the committe will have to take action to repair, replace or acquire educational resources, whether human or electronic, that are essential for the initial operation of the different modules.

After determining and reallocating personnel and equipment, the committe will submit requests to hire additional specialized personnel and acquire the necessary new equipment. This stage will

-take approximately four to five months.

Third Stage

Upon completion of the first two stages, including the hiring of additional personnel for the L.R.C., the committee will nominate to the Faculty Council, a L.R.C. Director and coordinators of the different modules. In approving these nominations, the Faculty Council will officially create the L.R.C. Committee. At this point, it is expected that the Development Committee will cease its functions.

The third stage hopefully, will cover at least a four month period in order to provide enough time for the L.R.C. Committee to re-analyze the Faculty's educational environment and consider its most urgent needs; each coordinator will develop his/her own plans for the respective module's major activities.

Through this period of time, modules one and two (In-service courses and Audiovisual Services) will be developed under the L.R.C. Committee's direction. Training courses might be used in a two-fold approach: providing organized knowledge to Faculty with regard to important pedagogic areas and increasing their awareness of the on-going development of the L.R.C.

Up to this stage, approximately one year of work will have been completed and a first short range evaluation will be conducted by the L.R.C. Committee in order to keep the system on course.

Fourth Stage

This last stage is concerned with the development of module number 3 (Design of Instructional materials). Although this stage will take approximately six months before full scale production of own instructional materials in large quantities begins, personnel will be gradually incorporated to a "training on the job" process producing simple teaching materials for classroom support at the beginning.

Most of the specialized staff required in this module will have been working in different Faculty Departments as indicated in Chapter VI, and additional personnel will have been previously hired in stage two. All these personnel will be gradually incorporated to the L.R.C. undergoing "training on the job" experience in adapting and producing simple instructional materials.

The adaptation of instructional materials produced elsewhere by commercial firms and universities, could also be used as "on the job training" of this module's personnel. This work is expected to substantially contribute to the experience and skills of staff before they engage in the production of the L.R.C.'s own instructional materials.

After the completion of this final stage, a long range evaluation of the functioning of the entire system should be conducted by the Faculty Council through specialized contracted personnel in order to study the activities of each module, analyze the quality and quantity of the materials produced and determine if they are meeting the L.R.C.'s

goals as well as fulfilling the needs of the Faculty. In this way it can be determined if the L.R.C. is performing efficiently, the tasks accomplished during its first phase. Thereafter, adjustments and changes could be made in order to orientate the overall system towards the optimal achievement of its goals.

Discussion

Analysis of the Plan Through Different Phases

In order to give a wide view of the present plan for the L.R.C. and to analyze the weaknesses and strengths, the author has divided it into four major phases, which are: planning, developing, programming and establishing. The overall procedures have involved systems analysis, systems design, systems management, systems evaluation and systems establishment. These five operations were carried out during the development of the plan.

Systems approach, as utilized in this plan, is performed through a basic set of steps that help to clarify the educational process of the Health Sciences Faculty in order to effect improvement within the entire process.

Systematic decision-making approaches were developed to sort out different relevant variables that affect the educational process. This was done in order to set up the foundations of the L.R.C.

Planning Phase

Through this phase different steps were taken to develop an informational process to structure the initial plan. Thus, the Health Sciences Faculty was studied in detail, described and analyzed in all its essential features to provide a basic foundation for further phases. This was accomplished with the aid of the author's experience as a member, for five years, of the Health Sciences Faculty and the aid of recent literature obtained from authorized sources of Carabobo University, including official Faculty data specifying its needs and objectives.

The idea, then, was to provide a realistic and accurate view of the Faculty environment and the different variables affecting its internal life and educational activites with special attention given to the teaching-learning process.

Limitations and environmental constraints were described in detail and contrasted with the Faculty system's attributes as well as its boundaries and external influences.

When the goals of the Faculty were described, special emphasis was placed on its commitment to educate health professionals capable of meeting the nation's requirements.For this reason goals were more precisely specified in terms of a set of terminal objectives describing expectations of students and their performance throughout the curriculum. Therefore the Faculty's needs were coupled with the goals themselves in an attempt to discern the role of learning resources.

Through the same planning phase, certain areas such as number of Faculty personnel, student enrollment, etc. were surveyed in order to enhance analysis of the plan since a system approach must include different elements that enrich the procedures contributing to the design of a L.R.C. This is the reason why Faculty resources, whether human or electronic, were described in detail in an attempt to analyze the organization involved, staff responsibilities, and budget scope. In this manner, it was then possible to suggest a set of alternative solutions to the Faculty educational problems.

Development Phase

In the developmental phase, the author studied the different possible alternatives (AV independent units, CCTV system or centralized L.R.C.) in light of Faculty needs, goals and resources as well as the main existing constraints. It must be stressed that in selecting one, the other alternatives were not discarded completely. The educational process of Carabobo University, despite all its limitations, is dynamic and expanding, thus it is possible to consider the partial inclusion of any of the described alternatives(e.g. join implementation of the C.C.T.V. system with the Engineering Faculty) in support of the one selected.

At this level, an evaluation was undertaken by the author to determine the propriety of the decision. "Pros" and "cons" were once more weighed in order to prove that the selection was, indeed, the

appropriate one. This necessitated adjustments in the selected scheme to compensate for possible anomalies which, in the long range, would conflict with the situation at the Health Sciences Faculty.

Programming Phase

In this phase, two important factors were considered as they constitute essential aspects of the systems approach: the design and management operation.

The design of the learning resources system included at this level or phase was based to a large extent on the review of the literature and the author's personal experience with the learning systems functioning in Europe and in North America. Much of the system design was created in accordance with current specific characteristics of the Health Sciences Faculty at Carabobo University.

The design of the learning resources system was also guided by Faculty needs described in a previous section. Needs that the learning resources system must fill are, in brief: more Faculty participation in problem-solving and better organization of learning resources. The system's needs and constraints coupled with those of the larger system delineated specific boundaries within which the learning resources system could be developed.

In order to design the learning resources system realistically, an entire set of operations was carried out. All possible interactions of the stated objectives as defined for the system were taken into consideration. Data gathering pertaining to the Faculty's

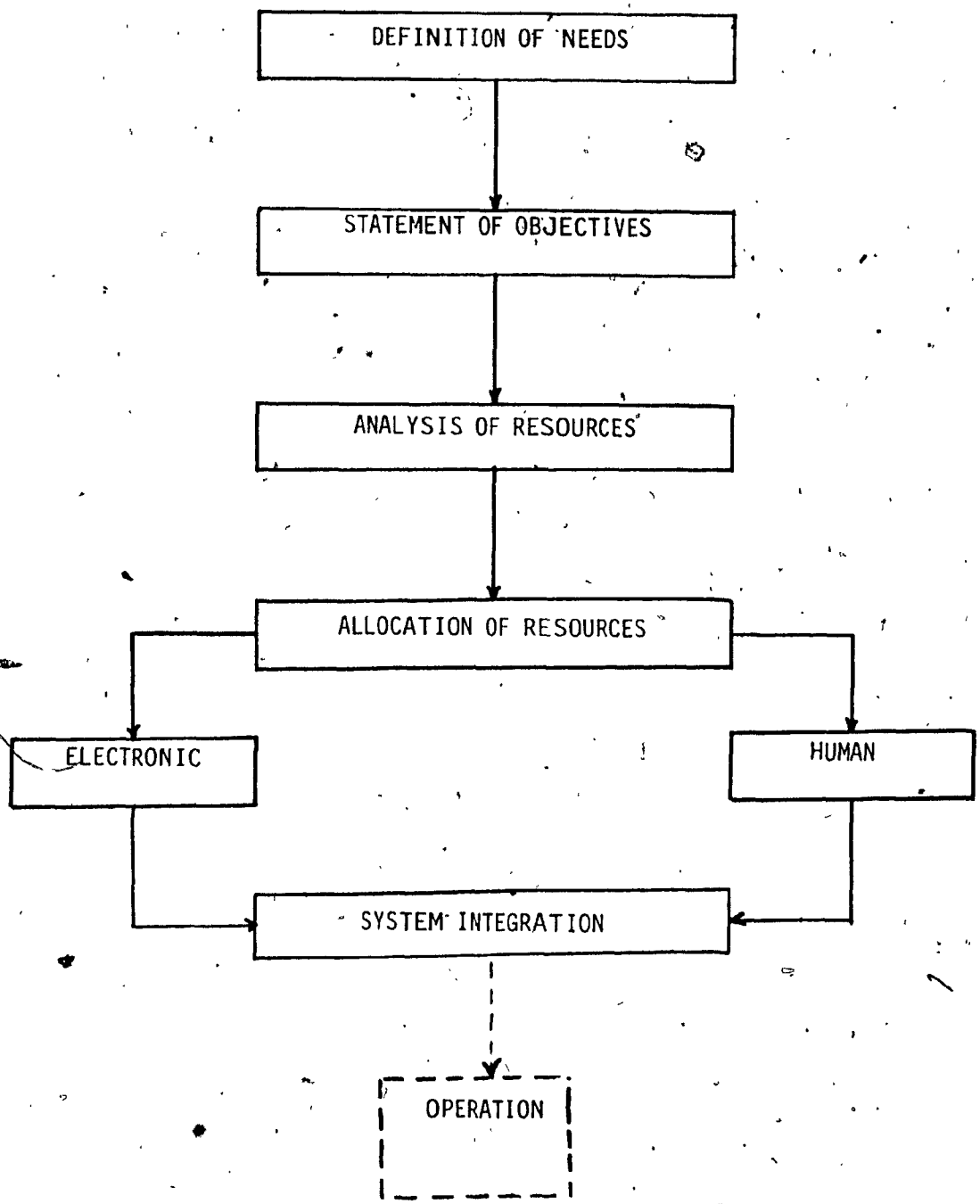
environment was required once more for specification of available resources and the description of the various constraints affecting the larger system. This required the establishment of a set of minimum priorities to be programmed to fulfill the Faculty's most urgent needs and yet restrict the alternative chosen to a realistic scope.

Figure XI shows the different steps which were taken to design the learning resources sytem within the delimited context of the Health Sciences Faculty.

Since no system has unlimited resources, management has to specify the different constraints that affect it during its planning phase. In this respect, some constraints were identified that might limit the system development: budget restriction, physical space limitation, high student enrollment, etc. almost the same constraints that affect the larger university system.

Management was taken into account to aim at the efficient operation of the system as a whole. A simple organizational scheme incorporating specialized personnel will manage the learning resources system to guarantee a high level of efficiency. Through management control, the system itself may evaluate its achievement through a formative evaluation over the short run. Therefore the main function of the system management in this case, is to place qualified administrative personnel in control positions to effectively coordinate the programmed activities.

FIGURE XI STEPS TAKEN TO DESIGN LEARNING RESOURCES SYSTEM FOR THE HEALTH SCIENCES FACULTY



Evaluation Phase

In Chapter IV, procedures to evaluate the learning resources system over the short and long run were discussed. Different approaches were suggested to carry out formative and summative evaluation. However, at this point the author is more concerned with determining if the system planned is feasible at the Health Sciences Faculty environment.

In regard to system implementation there are three important aspects of feasibility to be considered ; Technical, operational and economic (Vickery, 1973).

The author examined the technical feasibility in the evaluation phase of the plan, whether the system's components could carry out the stated objectives: training courses for Faculty personnel, audio-visual aids services and production of instructional materials. Despite the constraints present at the Faculty, the system planned did not seem to conflict with the reality of Carabobo University, therefore the components were arranged so that each module can develop specific activities through the different units to fulfill the most urgent needs of the institution.

Operational feasibility dealt with the human participation in the system, determining what level of qualification should personnel have in order to operate the learning resources system effectively. In this regard the author believes that the system might encounter some difficulties due to the fact that transfer of the personnel from one place of work to another may cause dissatisfaction. Similarly,

adjusting staff to new techniques in production of instructional materials which require more skills and discipline could take time. This is why the author sees it necessary to develop the entire L.R.C. project over one year and a half, so that sufficient time is provided for the four stages explained at the beginning of this chapter. On the other hand, the L.R.C. has been structured with a top committee that will coordinate the communication flow to speed up decisions and make the system fairly dynamic.

In regard to the third feasibility, the economic, the author believes that despite budgetary constraints present at the Faculty, estimates can be worked out to assure that the system's implementation is feasible over the specified time span.

The economic operation of the system can be projected on the basis to seek high performance level at a relatively low cost to fulfill the most urgent needs of the Faculty with regard to the educational process.

System Cost-Effectiveness

The efficiency of the learning resources system for the Health Sciences Faculty will be determined by costs incurred in obtaining a high level of effectiveness. Thus, the question to answer is whether the cost to implement the system is warranted by its utility.

The teaching environment in which the learning resources system will operate is best characterized by the excessive numbers of hours that each lecturer must now spend on his/her job. For instance, professors currently must teach an assigned number of hours during the week, according to their job classification; professors must allocate additional time for research and class preparation and still more time for production of teaching materials (See Table IX). The following statistics will demonstrate the learning resources system's capability for conserving Faculty time.

The academic year at Carabobo University lasts for 39 weeks and the Health Sciences Faculty is divided into two semesters according to the new curriculum. The different lecturers, according to their job classification complete the work schedule shown in Table IX.

In order to estimate the cost of one working hour per professor at the Health Sciences Faculty, it is necessary to apply the following formula :

$$\frac{\text{Teaching budget}}{\text{no. of working hours}} = \text{cost of working hour}$$

As explained in Chapter III, the 1976 Faculty budget was 25 million bolivares from which B^{s} 16,176,000 was allocated for teaching, plugged into the formula this yields:

$$\frac{16{,}176{,}000 \text{ (Chapter III)}}{331{,}656 \text{ (Table IX)}} = 49 \text{ bolivares}$$

This means that the cost of each working hour for a professor at the Health Sciences Faculty is 49 Bolivares. According to Table IX, professors spent a total of 82,914 hours of their yearly working time

TABLE IX JOB CLASSIFICATION AND TEACHER WORKLOAD FOR THE HEALTH SCIENCES FACULTY OF CARABOBO UNIVERSITY. (CIENCIAS DE LA SALUD, 1976).

JOB CLASSIFICATION	TEACHING HOUR PER WEEK	RESEARCH HOURS PER WEEK	CLASS PREPARATION PER WEEK	TEACHING MATERIALS PREPARATION PER WEEK	TOTAL OF WORKING HOURS PER TEACHER WEEKLY	TOTAL WORKING HOURS PER TEACHER ANNUALLY	TOTAL NUMBER OF TEACHING FACULTY	TOTAL NO. OF WORKING HOURS OF TEACHING FACULTY ANNUALLY	TOTAL OF HOURS OF MATERIAL PREPARATION OF TEACHING FACULTY ANNUALLY
FULL-TIME	10	10	10	10	40	1,560	154	240,240	60,060
PART-TIME	5	5	5	5	20	780	62	48,360	12,090
UNDER CONTRACT	3	3	3	3	12	468	92	43,056	10,764
TOTAL							308	331,656	82,914

in producing teaching materials. In order to determine the overall cost for these specific hours, we find that:

Annual hours preparing materials X cost in B$ of each hour =

82,914 X 49 = 4,062,786 B$

This means that the Health Sciences Faculty is spending B$ 4,062,786 for production of teaching materials, the equivalent payment for (53) full-time professors during one year. It is suggested, then, that this work could be better accomplished through the L.R.C. at a lower cost.

In order to estimate with accuracy the overall cost of the installation of the L.R.C., let us return to the recurring and non-recurring costs explained in Chapter V. The operations explained in Table X deal with recurring and non-recurring costs that the L.R.C. will encounter in its program over one year. Amortization, however, will occur over five years for equipment and furniture purchased. The calculations also deal with the costs of salaries of personnel to be hired for the L.R.C., deducting the costs of those already working at the Faculty who will be incorporated into the learning centre. Interest is not estimated due to the fact that Carabobo University funds are provided directly by the Venezuelen government.

Assuming that the annual Learning Resources Centre costs to the Faculty will amount to Bolivares 269,567 (Table X), and deducting this amount from the overall expenditures for preparation of teaching materials, we have:

4,062,786 B$ - 268,360 B$ = 3,794,426 B$

TABLE X OVERALL COSTS OF THE L.R.C.

Total of overall non-recurring costs	B$ 340,688			
Minus cost of existing equipment	B$ 140,385			
Total of real non-recurring costs	B$ 200,303	amortized in 5 years	B$	40,060
Total of overall recurring costs in one year	B$ 543,500			
Minus costs of salaries of existing personnel	B$ 315,200			
Total of real recurring costs	B$ 228,300		B$	228,300
Overall total of non-recurring and recurring costs of L.R.C. program in one year			B$	268,360

Thus, if all audiovisual preparation work were to be processed through the L.R.C., the Health Sciences Facutly would save an estimated 3,794,426 Bolivares annually. It is also important to note that the hours formerly spent by the professors in preparing teaching materials could then be re-directed into research work, class preparation or student counselling.

Apart from the preparation of teaching materials for classroom support, the L.R.C. will also provide audiovisual service for classrooms, seminars and conferences; organization of in-service courses and counselling and curriculum development for Faculty; production and adaptation of instructional materials for individualized learning; and, of course, improved use of equipment and learning space in support of student learning.

Great hopes and expectations for educational improvements have been nurtured by Faculty members in recent years. The main expectation has been focussed upon the metamorphosis of the Faculty's pilot program into a rational approach to integrating the multidisciplinary curriculum, a unique program in Venezuela and perhaps in Latin America.

Another prospect is the occupancy of new facilities more adequately accomodating the Health Sciences Faculty according to the modern educational standards. This undoubtedly will also alleviate overcrowding in classrooms. Both expectations, however, will take time to be fully realized.

The final expectation is perhaps the most important because it deals with the improvement of the educational process and it has not yet begun in any systematic way. Nevertheless, hope rests on the implementation of the L.R.C. plan, a plan which will have to overcome some of the Faculty constraints outlined herein. But despite the limitations, there is a strong possibility that efforts will be made, especially through the different developmental stages.

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