

### Acknowledgements

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To my parents: Joaquin and Maria del Carmen, and my  
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## I. Introduction

Evaluation is a concept that still raises a lot of discussion but it is poorly used in today's schools.

There has been considerable development in the theoretical side of educational evaluation. Evaluation models based on the assumption that evaluation is the determination of the congruence between performance and behavioral objectives, (Metfessel & Michael, 1967; Tyler, 1942) are the most "classical" approaches. On the other hand, other authors (Scriven 1967; Stake, 1967a) propose that evaluation is the determination of the worth of something and develop another approach to evaluation. A third focus in evaluation defines it as the process of obtaining and providing information for decision makers (Alkin, 1974; Stufflebeam et al., 1971). Finally, a fourth approach considers evaluation from a systemic or holistic point of view and proposes the utilization of operations research or systems analysis as tools to carry on evaluation (Alkin, 1972; Knox, Mezirow & Darkenwald, 1973).

The development of these and other (less known) models have created the theoretical basis for the practice of evaluation. Ideally, these currently available models should offer a number of different choices for the educational evaluator.

Parallely to this theoretical development of educational

evaluation there have been many attempts to simplify or give the evaluative models a tone of practical feasibility. There are discussions for enlightened practitioners in the use of evaluation models (e.g. Gardner, 1977; Jon, 1978; McIntyre, 1970; Rose & Nyre, 1977; Thompson, 1978). Essentially, this kind of work summarizes what in the mind of the author are the most important aspects of educational evaluation. They can be seen as an attempt to marry practice with theory; however, they still remain conceptual in many ways.

Another tendency in current literature is the discussion of feasible applications of evaluation models or evaluation concepts in the assessment of an specific element or issue: (Hodapp, 1976; Krus, 1975; Lucco, 1976; McIntoch, 1973; McKenzie, 1974; Talmage & Eash, 1979; Webster, 1976). Most of the articles in this category are more practical, that is, are oriented to the solution of particular evaluation issues; nevertheless they do not present any actual application or example.

Another kind of publication is interpretation or practical examples of the use of one or more evaluation models (Braden & Walker, 1979; Findlay, 1971; Jonassen, 1978; Misanchuck, 1978; Stake, 1979; Stufflebeam, 1967). These reports have as a purpose to orient, exemplify, teach or motivate. They do need, however more concretization and generalization for leading beginners in this field to action.

Finally, there are practical guides or checklists designed to be applied in the evaluation of some product or process. Usually

these forms are drawn from evaluation models (Abu-Sayf, 1979; Constanzo, 1979; Fetter, 1978; Hug, 1973; Lewy, 1977; Shepard, 1977; Stroud, 1978; Teague, 1978). All of them are practical solutions to particular evaluation problems. However, they resolve theoretically small pieces in the large educational evaluation enterprise. They do not consider the school as a whole, nor the poor effects of partial and asystematic evaluations of educational activity.

All this information should help in some general way the practitioner. However, looking closer at the particular population of interest here, teachers in higher health education in Latin America, we find the following special problems:

- all of them are professionals in health sciences, but not in educational sciences,
- and many of them do not only teach but practice their health profession as well, so they do not have time to get involved in educational aspects.

Thus a broad knowledge of different evaluation models, their proper choice and use is unfeasible, at least in this particular case.

Higher health education community in Latin American countries possesses crucial deficiencies related to evaluation issues. The most important are:

- A narrow conception of educational evaluation.
- Microscopic approach to evaluation.
- Ignorance of current evaluation theory.

Higher health education's teachers usually consider evaluation

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as a process to measure the knowledge of the students and as an instrument to provide them with a mark.

The scope of evaluation performed in this context are limited to the individual student or classroom. When political or administrative pressures force evaluations at superordinate levels such as school programs, community programs, etc., there is a lack of appropriate evaluative frameworks, of appropriate criteria and of appropriate methodologies and techniques. As a consequence, educative programs in this area are partially evaluated or not evaluated at all.

Educational evaluation literature is generally out of the reach of these practitioners. Very few institutions offer this kind of information to educators. In sum, the problem located at higher education community in Latin America can be defined as a lack of relation between theory and practice in the educational evaluation fields.

The purpose of this work is to synthesize the essential steps to evaluate different school subsystems. This work is based upon the following assumptions:

- To be really effective, evaluation should be considered from a holistic point of view.
- Educational evaluation can be seen as a feedback for the school system whenever its main purpose is to control the effectiveness and efficiency of the system's performance.
- Evaluation should be considered as an integral part of school system with the other parameters namely, inputs, processes, and outputs.

- Any material or conceptual instrument is susceptible to being altered as a consequence of its use. A guide to evaluate school subsystems should be a dynamic and modifiable instrument.

School system comprises many elements; nevertheless, this work is focused on the analysis of these school subsystems:

- Teaching and Learning
- Curriculum
- Instructional design
- Instructional materials

The first part of this thesis will describe these components following the systems approach. The purpose underlying this part is to identify elements, processes, interrelationships that could be essential points in evaluation.

Second part, will present a review of the most important approaches in educational evaluation. Their salient weaknesses and strengths will be discussed in order to alert the evaluator in their practical application.

The third part concern the discussion of some important points for planning an evaluation.

The fourth part is the rationale for the Guide and, finally, last part (Appendix A) will offer the Guide for Educational Evaluation. This has been addressed to evaluators in higher health education in Latin America. However, due to its generalizability, it can be useful in other institutions of higher education out of the health sciences.

## II. Systems Approach

As it was pointed out in the introductory part of this work, A systems approach is used here as a conceptual framework to facilitate the analysis of Higher Health Education in Mexico. The analysis will be focused on the identification of the most important subsystems of the school system; the description of the elements of these subsystems, their processes, and their interrelationships.

Furthermore, what is called by several authors (i.e. Alkin, 1969b; Apple et al., 1974; Guba, 1969; House, 1972; Popham, 1975) Educational Evaluation, will be analyzed under the Systems approach in order to point out its importance in education.

### A. Some conceptual considerations

Specialized studies or piecemeal approaches to phenomena or problems are no longer enough if science and technology are to solve issues efficiently. A systems approach to problems demands that a piecemeal approach is replaced by an overall approach in order to cope successfully with increasingly complex phenomena. For instance, Van Gigh (1974) points out that the scientific method must be complemented with new methods that can account for the phenomena of living systems. The systems approach seeks to embody a new method of thinking that can deal with processes such as life, death, birth, evolution, adaptation, learning, motivation and interaction.

In spite of the fact that systems approach is not a formal theory



(in the sense of theory as used by Allport, 1955 or Bunge, 1971) it is a mode of thought characterized as cross-disciplinary or interdisciplinary in nature. Systems thinking then is both conceptually rich and ultimately practical (Immegart & Pilecki, 1973).

As Bertalanffy (1976) asserts, the systems concept has not remained in the theoretical sphere but became central in certain fields of applied science, such as biology, management, engineering, sociology or education.

Systems sciences as so called by Shoderbak et al., (1975), represent a change in the intellectual climate to a general frame of reference viewing physical and social phenomena as systems.

Hence, the concept "system" has come to play a critical role in contemporary sciences.

The idea of systems thinking raises the question of what we mean by the term system. Beishon and Peters (1976) point out that in spite of widespread use of the term there is, as yet, no generally agreed upon definition. There is a confusion between a system as it exists "objectively" out-there in the real world, and the idea of the system in a person's mind. The authors emphasize the difference between the subjective aspect of our perceptions of reality and the objective reality "out-there". They also propose a definition of systems:

"A system is an assembly of parts where:

1. the parts or components are connected together in an organized way,
2. the parts or components are affected by being in the system and are changed by leaving it,
3. the assembly does something,

4. the assembly has been identified by a person as being of special interest." (p. 12).

According to this definition, the term "system" can be used to refer to a vast array of things from the smallest "whole" to the total universe. A cell, a plant, a man, an institution, a city or the world, are all examples of systems. There are, in fact, living systems, physical systems, conceptual systems and theoretical systems. Kenneth Boulding (1956) provides a classification which sets forth a hierarchy of levels as follows:

- |                           |   |  |
|---------------------------|---|--|
| 1. Frameworks             | - | (static structure)                                   |
| 2. Clockworks             | - | ( simple dynamic system)                             |
| 3. Cybernetics            | - | ( thermostat )                                       |
| 4. Open system            | - | ( cell )   |
| 5. Genetic-societal       | - | (plant )   |
| 6. Animal                 | - | (mobility, teleological behavior and self-awareness) |
| 7. Human                  | - | (self-awareness, language and symbolism)             |
| 8. Social organization    | - | (communication, values, culture)                     |
| 9. Transcendental systems |   |  |

This classification identifies the diverse kinds of systems that related with physical science, biological sciences and social sciences.

#### B. Properties of organizational systems

Systems can be considered in two ways: "open" systems and "closed" systems. Open systems are those which continually exchange matter and energy with their environment. Closed systems are self-contained, and

are unaffected by other systems or their environment.

Closed systems thinking stems primarily from the physical sciences and is applicable to mechanistic and mathematical systems. A characteristic of all closed systems is that they have an inherent tendency to move toward a static equilibrium and entropy. Entropy is the tendency for any system to move toward a chaotic or random state in which there is no further potential for energy transformation or work. Entropy is the disorder, disorganization, lack of patterning, or randomness of organization of a system (Miller, 1965).

Biological and social systems are considered open systems since they are in a dynamic relationship with the environment and receive various inputs, transform these inputs in some way, and produce outputs.

Open systems combat entropy through this interaction with their environment. In addition, these systems are open not only in relation to their environment but they are also internally related in that interactions between components affect the system as a whole.

Open systems exist in a dynamic equilibrium "life state" or "steady state" typified by increasing order, differentiation, variation, and complexity. This dynamic equilibrium, then, is achieved by a continual interaction with the environment while still retaining the capacity for work or energy transformation. The survival of the system depends upon this continuous inflow, transformation and outflow (Kast & Rosenzweig, 1976). Schools are open systems since their clients are drawn from society's young population, they extract other needed resources and "process" the clients into prepared beings to serve social needs.

Another open-system property is that of equifinality; in an open system the same final state may be reached from different initial conditions due to interaction with the environment.

Systems exhibit a property called hierarchy. Systems are generally complex wholes made up of smaller subsystems. The nesting of systems within other systems is what is implied by hierarchy. The importance of this property lies primarily in the fact that system action is the result of the functional interplay of subsystems and subsystems which represent a fundamental and basic unit for systems analysis (Immegart & Pilecki, 1973). Subsystems can, in turn, be systems in their own right (Van Gigh, 1974). Hierarchy is also related with differentiation property. Complex systems possess specialized units which perform particular systemic functions. This differentiation of functions is another system's property.

Also characteristic of all system activity is energy transformation through the system's processes and structure into output or a terminal state. That is, systems embody interacting components, and the result of these actions are oriented to goal attainment. This property is known as goal-seeking (Shoderbek et al., 1975).

All systems have some limits or boundaries which separate them from the environment. Boundaries are the demarcation lines or regions for the definition of appropriate system activity and for admission of elements into system (Kast & Rosenzweig, 1976).

In order to attain its goals, the interacting components of a system must be regulated in some way so that the system objectives will ultimately be realized. Regulation, then, is another important

property of systems which is carried out partially through the process known as feedback.

Finally, there is a particular property of open systems: negatropy (the opposite of entropy) which consists of the capability that open systems have either to fight entropy, or not, in order to maximize their existence. This means that the duration and quality of life for the open system is in large measure in its own hands (Imnegart & Pilecki, 1973).

### C. Cybernetics and Systems thinking.

Cybernetics, which basically studies phenomena of control and communication is regarded as a particularized approach to systems thinking, and it is also concerned with feedback processes of all kinds; for this some authors (Shoderbek et al. 1975) consider Cybernetics as one of the generalized laws of general systems theory since it is concerned with feedback processes of all kinds.

Beer (1973) has identified two distinct criteria to classify systems: complexity and predictability. These criteria are drawn from a cybernetic point of view. There are three levels of complexity: simple, complex and exceedingly complex systems. Predictability criterion is ranged in three levels: deterministic (the interaction of the system's parts is perfectly predictable) probabilistic (the system's behavior is not predetermined, however what may likely occur can be described) and stochastic. Beer (1973) adds another characteristic to those of probability, complexity and stochastic: self-regu-

lation. This is an essential feature for the system if it is to maintain its structure. Control must operate from within, utilizing the margin of error as the means of control (Shoderbek et al., 1975). In order to carry out its self-regulation, a system requires a feedback process.

Bear's categorization is important if we are to determine the ability of the system to be controlled or to control itself (it depends whether the system is an "artificial system" or a "natural one"). For instance, simple probabilistic systems are controlled through statistical methods while complex probabilistic systems require more sophisticated methods of operations research.

### 1. Feedback

The concept of feedback is important in understanding how a system maintain a dynamic equilibrium. Through the process of feedback the system continually receives information from its environment which helps it adjust (Kast & Rosenzweig, 1976). Nonliving systems (those which are not strictly biological systems) should have a controlling mechanism which helps the system to move in the direction of a specific level of output by regulating behavior. This controlling mechanism is based on the principle of feeding back a portion of the output to control the input (Van Gigh, 1974).

Feedback is also viewed as evaluative information about system behavior or the results of system behavior. That is, feedback is the assessment of some portion of a system's past. Sources of feedback may be from within or without the system, but regardless of the source, feedback is the literal feeding back into the system, into its structure

activities, and its effects (Immegart & Pilecki, 1973).

Feedback can be both positive and negative. Positive feedback systems utilize part of their output as inputs to the same system in such a way that they are, deviation-amplifying rather than deviation-limiting systems (Shoderbek et al. 1975). That is, the multiplier between input and output is such that the output increases with increases in the input. Many growth processes involve positive feedback because the latter reinforces the systems "strengths" and areas where maximal functionality and relevance has been achieved. However, positive feedback usually leads to system instability because it blindly reinforces the system and its activity. This fact restricts change or adaptation, which ultimately may be at the expense of the system.

Negative feedback is characterized as the system's outputs decreases, its inputs increases. Negative feedback is opposing system action or direction, and it stimulates or justifies system modifications, adaptations and change; it is "critical" of the system and provides stable system control. In short, negative feedback is informational input which indicates that the system is deviating from a prescribed course and should be readjusted to a new steady state (Kast & Rosenzweig, 1976).

The concepts of positive and negative feedback are extremely useful in understanding organizational systems. Positive feedback supports the system and its activity whereas negative feedback challenges the system direction and activity.

Feedback is also divided (Hearn, 1958) into four categories:

- a) Continuous feedback - a controlled quantity of evaluative information is continuously monitored.
- b) Intermittent feedback - information is channeled at certain times which are usually, though not necessarily, defined.
- c) Proportional feedback - the quantity of information is controlled proportionate to system needs.
- d) Relay feedback - information is either solicited or not.

Analyzing these four categories, Immegart and Pilecki (1973) come to the conclusion that proportional feedback would usually appear to be most satisfactory type of feedback for social sciences.

Another classification of feedback systems is presented by Shoderbek et al. (1975) in which the system's ability to change its goals is emphasized.

1. First-order system (automatic goal attainment). The system is monitored against an external goal. It is given one particular command which it is to carry out irrespective of changes in the environment. The purpose is to maintain the system at a desired state of equilibrium. The system is not allowed any alternative action. Its operations are circular, since a recycling must take place after a comparison against the standard.
2. Second-order feedback systems (automatic goal changes). These are characterized by the inclusion of a memory unit which enables them to initiate alternative courses of action in response to changed external conditions and can choose the best alternative for the particular set of conditions. This kind of system can change its goals by changing



the behavior of the system; it is said to be autonomous.

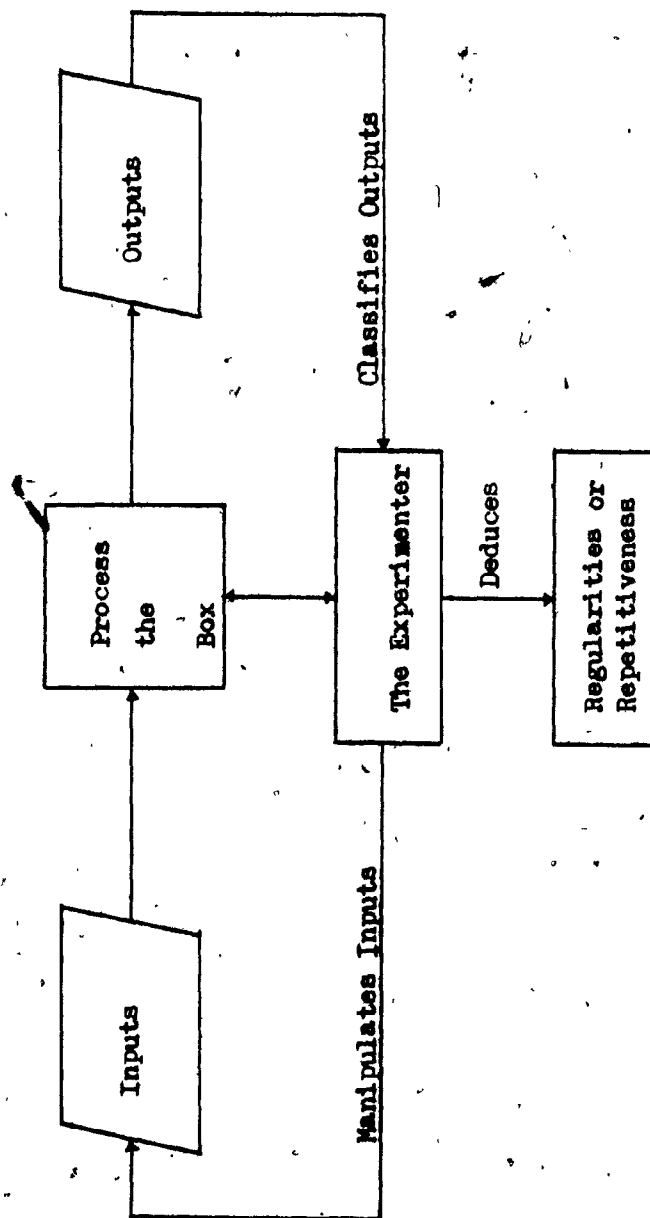
3. Third-order feedback systems (reflective goal changer). This kind of system can reflect upon its past decision making and formulate new courses of action; that is, the third-order system is not only autonomous, but it also possesses consciousness.

## 2. Black Box Theory

Beer (1973) offers the black box theory as an approach to deal with extremely complex systems. Complex systems are considered as indefinable in detail. When a model of this kind of system is needed (the model behaves like the original system in all basic respects, nonetheless is easier to handle), the black box theory is useful. It allows a look at the situation where the system is not definable and is inaccessible to direct observation. The inputs (elements entering the "box") and outputs (elements leaving the "box") are observable. By manipulating these inputs and observing the correspondent outputs it is possible to deduce something of its contents, predict and control the system without certain knowledge of the internal mechanism which processes inputs and transforms them into outputs (Ashby, 1976).

The Black Box technique is not considered to be stimulus-response technique or a cause-effect approach. Shoderbek et al. (1975) assert that the black box theory is simply the study of the relations between the experimenter and the object as well as the study of what information comes from the object and how it is obtained. Figure 1 illustrates the black box technique.

Figure 1 The Black Box Technique



Schoderbek et al., (1975)

(p. 79)

D. Implications of Systems Approach and Cybernetics for  
Educational Evaluation

The main goal of an educational system is to develop certain capacities in individuals, to optimize them, while at the same time enhance social life. In order to accomplish this task, the educational system incorporates many components (in fact it can be considered as an extremely complex system). Each component performs particular functions, so when looking at the components in terms of various kinds of activities there are thousands of components to consider: e.g. number of teachers or man-hours spent in teaching, number of classroom available, number of students and their interactions with the rest of the system components and so forth. However, according to Churchman (1968), the scientific approach to the system consists of relating the amount of each component activity to the measure of performance, i. e. the output score. In other words, it is necessary to identify those activities that are critically important for the system in terms of its outputs.

On the other hand, complex systems cannot easily be "broken down" or simplified to study them. According to Beer (1966) to treat the system through a simplified, isolated or incomplete model places a definite and measurable limit on the knowledge of that system that can be obtained.

Therefore, the educational system, cannot be cut into pieces arbitrarily. If for instance, we are considering learning and teaching as elements in the system, then the latter cannot exist in its own right. It is closely linked (by means of its goals) to the learning

process. These components are, in fact one: the learning and teaching system whose goal is learning attainment.

Another important point is that several tools from systems approach and cybernetics because of their usefulness in dealing with complexity could be employed to describe different educational subsystems. Learning for instance, can be analyzed using "black box" model. In spite of the fact that it is impossible to know in detail how learning occurs, through observation and prediction the teaching and learning system can be handled. In this case, evaluation will be centered on the input manipulation, the accuracy of observations and quality of predictions about the system's activity.

The educational system component whose purpose is system regulation is known as educational evaluation. This component may operate in each one of the educational subsystems, regulating the subsystems performance. Through educational evaluation, the educational system assures its own attainment of goals. Feedback plays an important part in evaluation. There are diverse types of feedback (e.g. positive, negative, continuous, proportional, and so forth) which differ in nature, extent, form and purpose. The selection of the most appropriate type of a particular case should depend on the criteria of functionality and relevance.

Each subsystem of an educational system develops a distinct or particular function (e.g. transportation subsystem maintains vehicles in good conditions and provides service whenever it is demanded; teaching subsystem designs and develops learning activities in order to foster learning); thus the regulation of each subsystem will differ

slightly. Depending on the characteristics of the processes being developed, the regulation is sometimes performed through continuous feedback. At sometimes the system uses positive feedback because it needs to reinforce its action and direction (i.e. the school taken as a system usually exhibits a positive feedback when it tries to grow and develop).

At the same time, the kind of control chosen by the system to control its operations is related to the means available to analyze the output. For example, very few schools have the tools and method to follow their graduates performance in society. They cannot measure to what extent graduates success or failure is due to school's deficiencies, how the school is satisfying social demands in terms of professionals, and so forth. Usually, at this level, what schools have is an open loop control or at the best, a closed loop control with feedback on a tiny portion of the output.

Another issue to consider when talking about control is complexity. The complexity of a system depends upon the interaction of all four determinants: the number of elements of the system; the attributes of the specified elements; the interactions among the specified elements; and the degree of organization inherent in the system (Shoderbek et al., 1975). The more complex a system the more difficult to predict its behavior and control it (it possesses more variety). Thus a simple control system is unable to cope with a variety of the system. Only variety in the control mechanism can deal successfully with variety in the system being controlled.

(Schoderbek et al., 1975). Hence, educational evaluation should have the same degree of variety that an educational system has.

An evaluation system requires strategies and means and ways to carry out its functions: i.e. the planning and implementing of a conscious and effective mechanism appropriate to deal with each one of the educational subsystems. At each level, evaluation should have a different scope, instruments and techniques in order to cope with the variety of the system which is to be controlled.

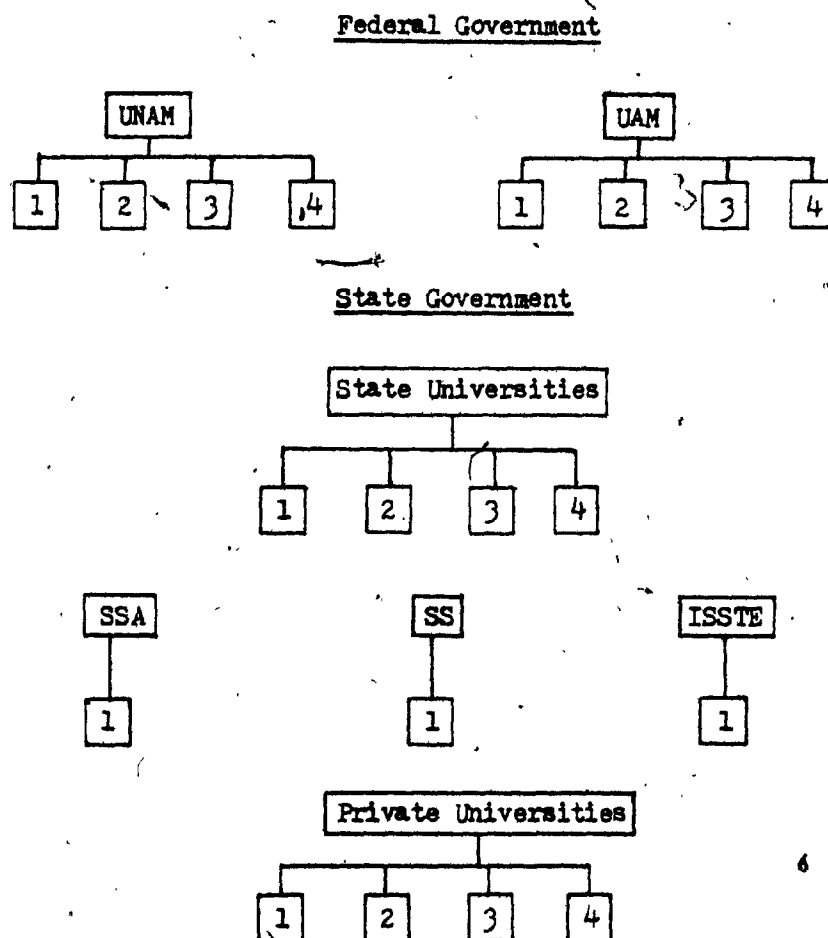
In conclusion, all open systems have the capability to fight entropy (disorder) or not, or to maximize their existence (i.e. negentropy). The kind of regulation selected for the system determines this capability. Thus the duration and quality of life for the educational system is, to a large extent, in the hands of educators.

Evaluation will be considered in this work as a component which would operate throughout the educational system, obtaining information about subsystems performance, comparing these performances with standards (drawn from the educational system goals) and making the appropriate decisions to correct mistaken actions.

#### E. Educational Subsystems Description

The national educational system of health sciences in México is developing several programs in order to train nurses, doctors, dentists and veterinarians who would enter the health system as human resources. To carry out this broad enterprise there are several educational agencies (i.e. universities and schools) which present slightly different features according to their structure, location, nature, and so forth. (See Figure 2).

Figure 2 Main Educational Agencies in the Mexican National Health System



1. Nursing school or faculty
2. Medicine Faculty
3. Dentistry Faculty
4. Veterinary Medicine Faculty

UNAM: Universidad Nacional Autónoma de México

UAM: Universidad Autónoma Metropolitana

SSA: Secretaría de Salubridad y Asistencia

SS: Seguro Social

ISSTE: Instituto de Servicios de Seguridad Social para Trabajadores del Estado

Each one of these faculties or schools could be evaluated as a system. Obviously, the National Educational System of Health could also be evaluated in spite of its complexity, but since this guide is intended for local use, the highest level of systems evaluation will be "school system".

This section will describe the school as a system and consideration of its goal, inputs, outputs, conversion process, environment, purpose and function, attributes, programs, decision makers and structure will be described.

The following descriptions are generalizations of the principal features which characterize the school system. The reader then should be aware of these considerations:

- the description is not exhaustive, that is, there are several particular elements or processes that a school system could exhibit in addition to or instead of the elements and processes mentioned.
- Goal statement is considered the most important and general aim in each subsystem of the school system; each subsystem includes other goals and objectives established accordingly particular criteria (e.g. quantity, quality).
- Objectives are not stated due to the infinite number of possible goal hierarchy arrangements that could take place in different subsystems; the evaluator should look for a goal hierarchy which may be or not explicitly stated.
- The structure of a program usually cuts across organizational boundaries when organizational units outside statutory or legal boundaries contribute to the same objectives (Van Gigch, 1974). This



could occur within the school system ( a program could cut across subsystem boundaries) or outside the school system (between one subsystem and other agencies outside school).

### 1. School System

The school as a system is comprised of many elements and processes which are in continuous interrelationships. As an open system, schools are confronted by the challenge of growth and development and must respond in order that they overcome the systematic tendency toward death. This growth and development from an initial state to a state of maturity is a function of increasing order, differentiation, variation and complexity.

Schools of higher education, as large social systems, are inherently complex; evaluation requires the understanding of the entire system in its full complexity. Hence, evaluation involves the analysis of more than the surface characteristics that are immediately apparent. Systems approach alerts the evaluator to school complexity and, probing more deeply, it will become apparent that systems concepts can contribute to the detailed comprehension of the school. In other words, a systems approach facilitates the comprehension of the parts and the understanding of the whole (Immegart & Pilecki, 1973).

A school system is settled in a large context called here the macro-system or system's environment (see Figure 3 ), composed of other systems such as social, political, economic, etc., which are outside of the school. Obviously, there are more systems outside school affecting its activity, but it is possible to assert that social, political and

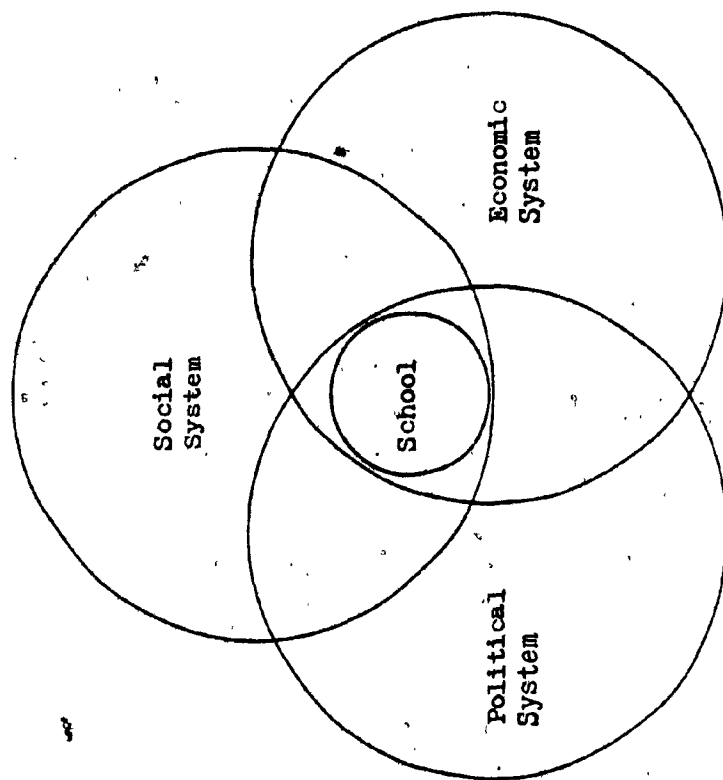


Figure 3 Macro-System or School's Environment

economic systems have special repercussion upon a school. These systems have impact upon school system and are in turn modified by the outputs of the school.

The existence of this macro-system and its interactions with a school system has an effect upon the system outputs (e.g. graduates, drop-out students, costs, etc.) and in many instances, it is difficult to determine the degree of that influence on the school environment.

One of the main goals of a school is to prepare professionals in health sciences (e.g. nurses, dentists, doctors, etc.). A school can be viewed as a goal-seeking system; it has been established to produce transformations in students. These transformations are observable through student's behavior. The student enters the system with certain characteristics (call them X) and through series of transformation processes the system and the student interact until these processes are completed and the student leaves the system in two possible states: as a graduate or as a drop-out student (see Figure 4).

At entry (X), each student possesses certain abilities, attitudes, skills, knowledge, etc. Some of these characteristics are observable through the student's behavior; while other student characteristics, such as personality traits or intellectual and attitudinal characteristics, can only be approximately described. However, selection of students for the system is usually contingent upon the extent to which applicants possess these attributes in the judgment of administration officers. When the student enters the

system, the process begins. The student takes an active role in this process, shaping his own growth and development. At the end point (Y) of the transformation process the student should supposedly exhibit certain characteristics which define him as a graduate in some aspect of health sciences.

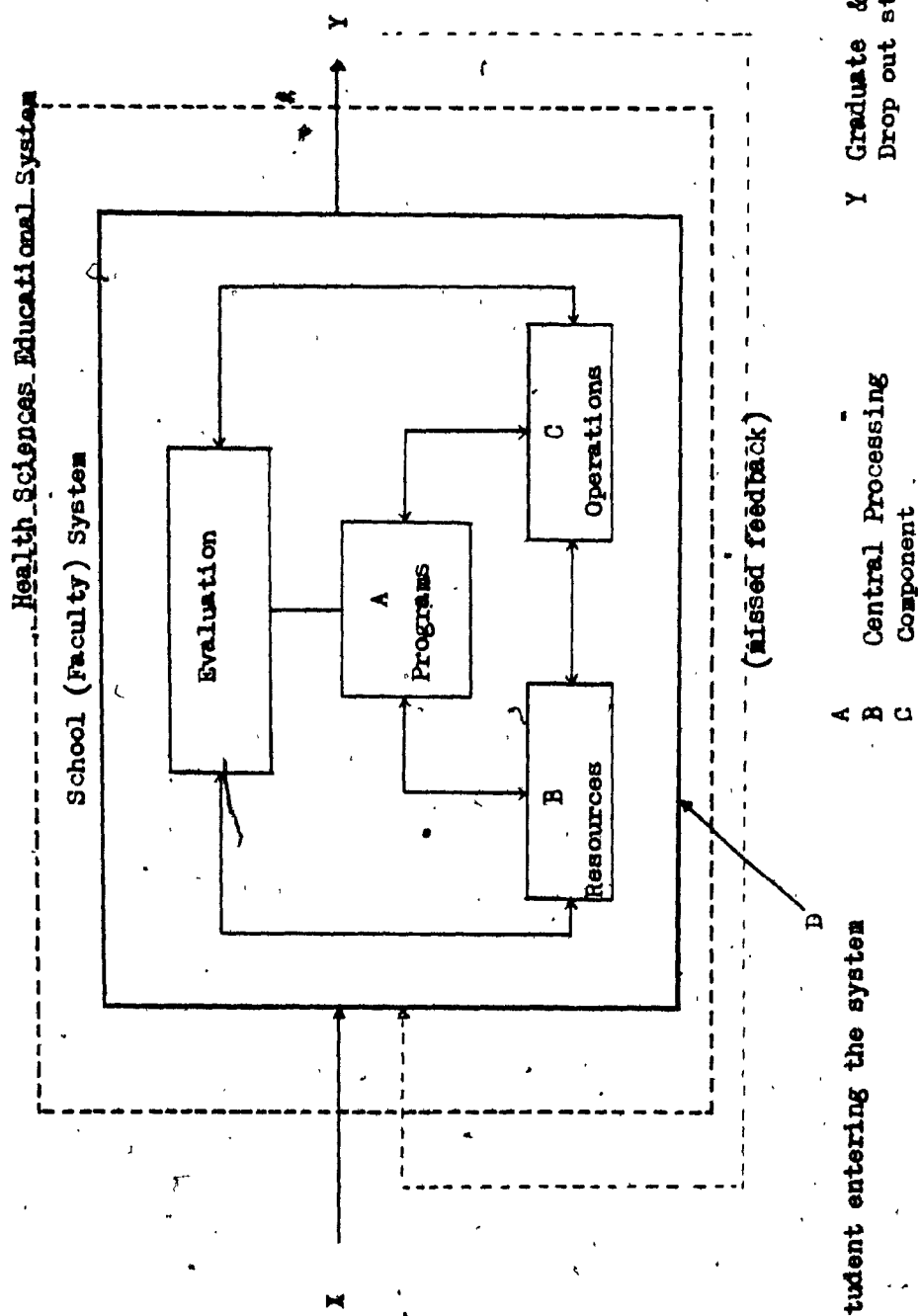
However development is difficult to assess for several expected changes to be produced in each student, specially in affective attributes. As well, there are a number of drop-out students who leave the system without having finished the educational transformation process.

The central processing component of a professional school consists of: human, material and financial resources (i.e. teachers, equipment, libraries, ancillary personnel, etc.); formal operations (such as courses of study, clinical practice, administrative procedures, etc.) and informal operations considered as casual interactions with fellow students and faculty members (Sheehan, 1967).

The function of these resources and formal operations is defined through several programs (i.e. curricula, management program, research programs, community services programs, etc.) The intended outcomes of all those programs is to attain the main goal of a school system, that is, to form professionals in health sciences.

The purpose of evaluation is to monitor the system and to insure quality control. The intermediate results of transformations are fed back into this component for judgment and the consequent evaluation data are fed back to the central processing part for appropriate action. However, evaluation does not work far from the school boundaries in the real world; the dotted line in Figure 4 points out a missing feedback from Y (graduate students and drop-outs) to the system. In other words,

Figure 4  
School System Structure



X Student entering the system

A Central Processing Component

Y Graduate & Drop out students

D Philosophical and political values

Adapted from Sheehan, 1967.

the school system pays special attention to the number of students demanding entrance into the system, but is not concerned with how graduates affect the macro-system (i.e. health sciences field, or society at large). In this sense, a school system presents a positive feedback which ensures its growth and development; but at the same time, it could lead to system instability, because positive feedback produces change, ultimately at the expense of the system.

Equally, this particular school system feature classifies it as a first-order feedback system or automatic goal attainment system.

Looking closely at the central processing component, it is possible to further break down its components and analyze them as subsystems. In this way, the administrative subsystem, instructional subsystem, supervising subsystem, etc. can be identified. In addition to the elements presented in Figure 4 it is possible to identify next components.

#### Inputs

Social, psychological and academical needs, goals, objectives, purposes and expectations, curricula, educative methods, philosophical and political values, human resources, material resources, financial resources, policies, extra school regulations, student demands, time, organizational and management methods and techniques, inter-institutional contracts for health assistance.

#### Outputs

Teaching abilities developed, social, psychological and academical needs response to, new goals and expectations, curricula developed, instructional material produced, adopted or adapted, decision transmis-

sion, information transmission, enforcements of ministerial or extra-school policies and rules, and costs.

### General Goal

Formation of professionals (in Health sciences).

### Conversion process

Planning, implementing and evaluating educational and administrative programs, business management process, internal and external negotiations, social needs assessments, communication processes, organizational procedures.

### Environment

Educational system, social system, economic system, political system, scientific and technological systems, national and international health systems, government system.

### Attributes

Measure of effectiveness: school goal's attainment.

### Programs

Research program, educational programs (curricula), administrative programs, community services programs, human resources development programs.

### Decision maker

Director of the school, subdirector of the school, general secretary and general administration chief.

A system's environment or macro-system has been defined as one which comprises all the systems over which a decision maker does not exercise control (Van Gigh, 1974). However, in some cases, it is necessary to "push back" the boundaries of a system in order to

consider a particular issue. In health sciences, educational programs are usually developed both inside the physical school and in hospitals, clinics or laboratories which do not actually pertain to the school system. However, in order to evaluate the educational program (curriculum) in its totality, the conventional boundaries between school and other systems have to be ignored.

Evaluators should not forget the importance that communication processes play in the system's activity. Communication has been defined as the process or sequence of activities that are used to transfer information from one place to another (Immegart & Pilecki, 1973). The efficiency of the school system activity depends in great measure upon its communication system.

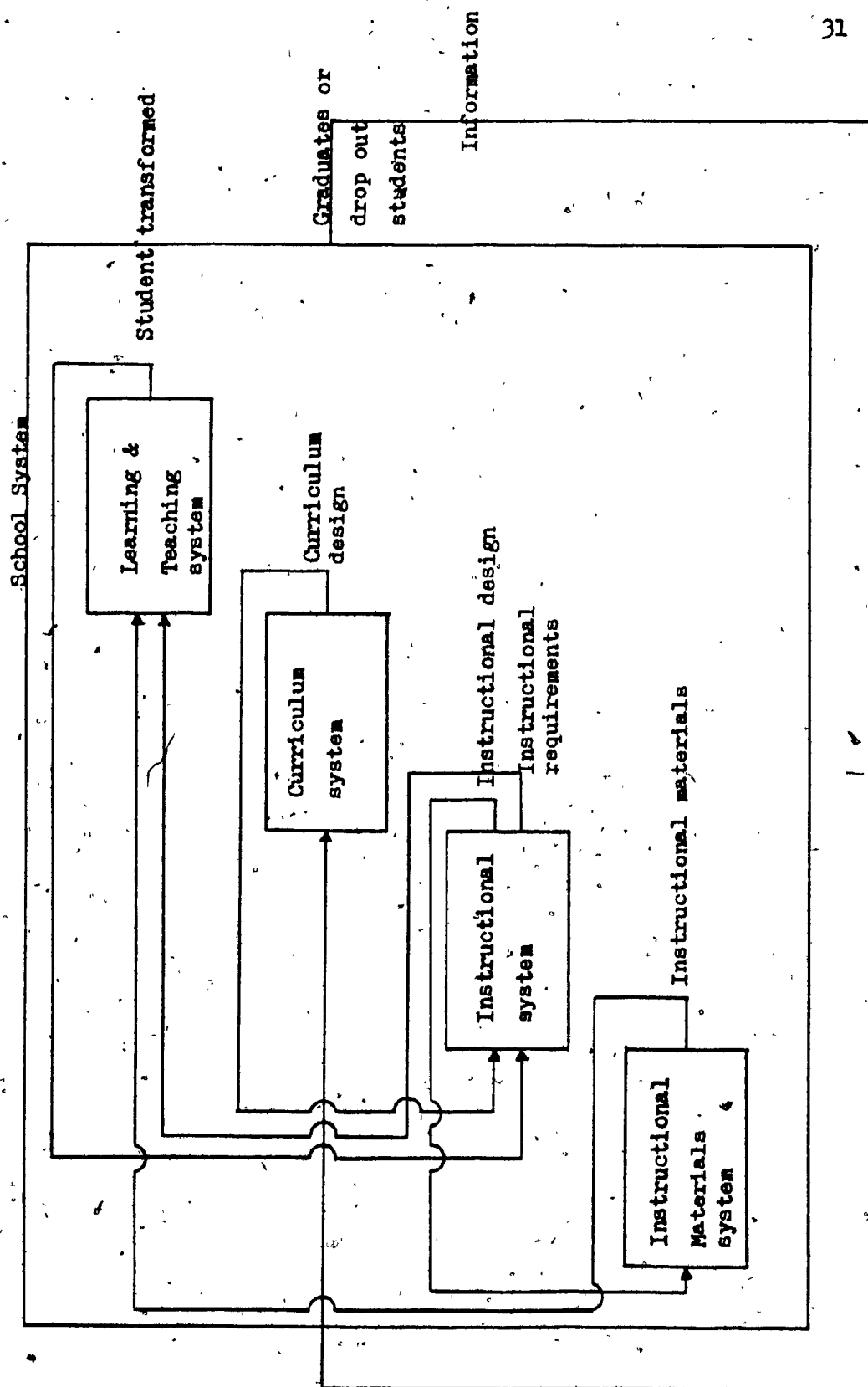
Churchman et al. (1957) have proposed a communication model for use in analyzing activities in business organizations ; this model also be applied in the study of educational organizations.

Finally, subsystems can be justified only by serving the purposes of the total system. That is as subsystem grow larger, it tend to become self-directed, pursuing its own ends without concern for the system goals for which it was constituted. One of the objectives of evaluation is to control this tendency in order to lead the whole system to the achievement of its real goals.

As it was pointed out before, all the school subsystems are interrelated in such a way that the outputs of one subsystem are inputs of another subsystem. Figure 5 represents graphically these series of loops inside school system. It is important to emphasize that this is an idealized representation of how the school system operate.



Figure 5 School System Loops



This representation takes into account only the more important outputs of each subsystem; there are, however, many other outputs which obviously affect subsystems as well.

On the other hand, the reader must be aware of the fact that, actually, many schools do not possess well developed subsystems working in this fashion and many activities of different subsystems are overlapped.

## 2. Teaching and Learning System

As was mentioned before, subsystems can be systems in their own right. School subsystems, will be treated as systems in this description.

The teaching and learning system is obviously one of the most important elements of the educational system, since learning is one of the pillars upon which the educational system is built. However, many people in education seem to forget this important fact and they pay more attention to other issues such as the acquisition of technological devices, the activity of scholar unions, or the accountability of the school shop.

Instructional materials, installations, teachers, teaching activities and so forth can justify their existence only through the achievement of individuals' learning.

Teaching comprises a wide range of activities designed and developed in order to bring about learning. Hirst (1973) points out that teaching activity is the activity of a person, A (the teacher) the intention of which is to bring about an activity, (learning) by

a person B (the pupil) the intention of which is to achieve some end state, whose object is X.

Figure 6 depicts the teaching and learning system structure. The main goal of this system is to change student's behavior. The communication process which consists of series of interactions in which alternatively or simultaneously the teacher and learner can play the role of transmitter or receptor, is most central to the total system. In order to consider those interactions as real learning experiences, they should not be left to incidental or chance encounters. The really important changes in student's behavior should be carefully identified in a plan, i.e. curriculum and directly linked to particular operations designed specifically to produce these changes (instructional design and development).

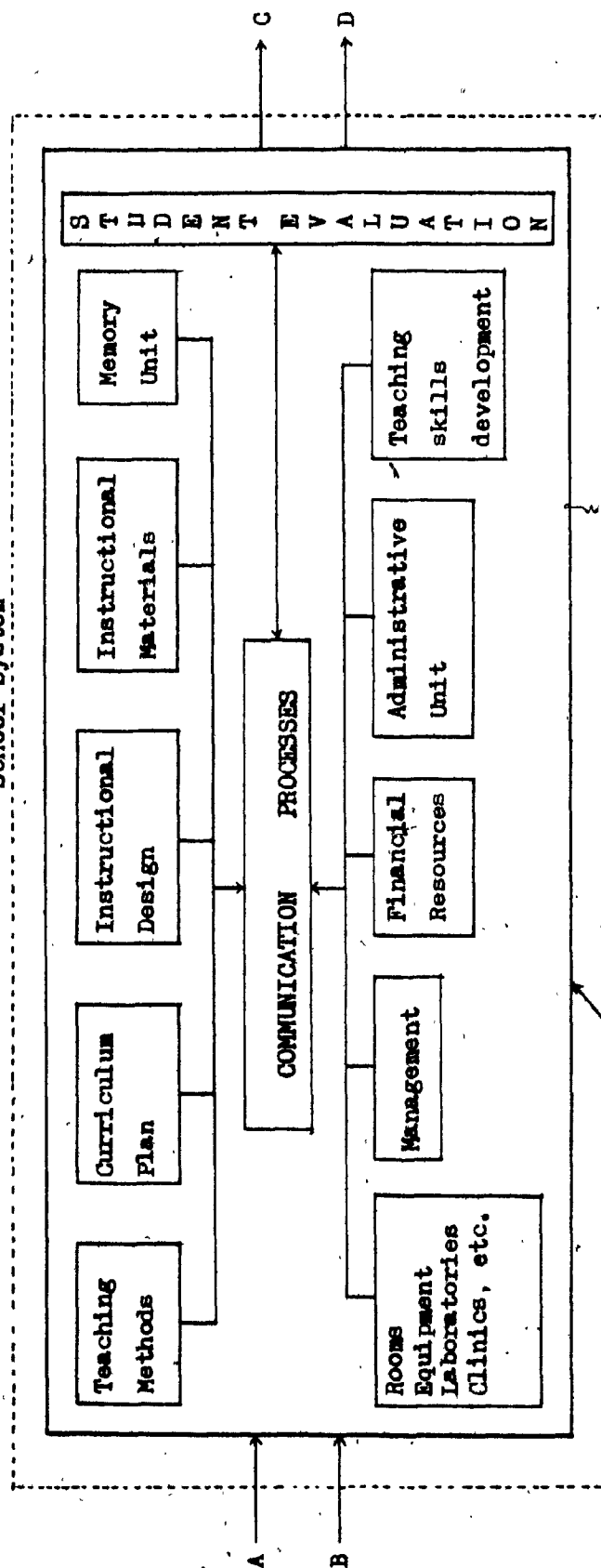
The past experiences attained through course development subject matter content, current academic propositions and other such issues are organized in a memory unit. This can be considered as information stored in texts: e.g. books, documents, paperbacks, files, etc. or can be students' and teachers' experiences in previous courses which obviously affect the communication process in this system.

Usually, teaching methods are based on the philosophical conception of learning and teaching that the school fosters and on the special characteristics of the subject matter. For instance, biochemistry is taught in classroom sessions in which the teacher informs students about the subject matter, whereas obstetrics, as a clinical subject matter is taught in hospital with actual patients.

All the elements represented under the block called "Communication

Figure 6

Teaching and Learning System Structure School System



A) Entering students' characteristics

B Entering teachers' characteristics

F Philosophical conception of education

C Student transformation

D Teacher transformation

processes" in Figure 6 , are considered to be the elements which support the process in a tangible way.

The teaching skills development component can be a formal or informal process. That is, the system can develop special activities in order to improve teachers' abilities. These activities should be organized in a program and obviously the program should be evaluated. In the second case, the system does not formally foster teacher skills development; rather, teachers gain teaching competence throughout course development or by attending conferences, lectures, short courses of teaching enhancement (e.g. Educational technology, pedagogy and so forth).

Finally, the main output is student transformation and teacher transformation; that is, the student is transformed in some way through the system and exhibits a different behavior than one in the beginning. At the same time, a teacher is also affected by the system and exhibits some sort of transformation. It cannot be overemphasized that student transformation always means goal or educational objectives attainment. Sometimes, the outcome of this system can be stated as "negative" that is, instead of achieving the educational goals, students learn to hate a subject matter. Obviously, teacher and learners antecedents and environment have a great importance for teacher and students relations. Riley and Riley (1960) illustrates these relationships (see Figure 7 ).

The next part describes other elements not represented in Figure 6 .

#### Inputs

Information (about students, staff, teachers, methods, techniques,

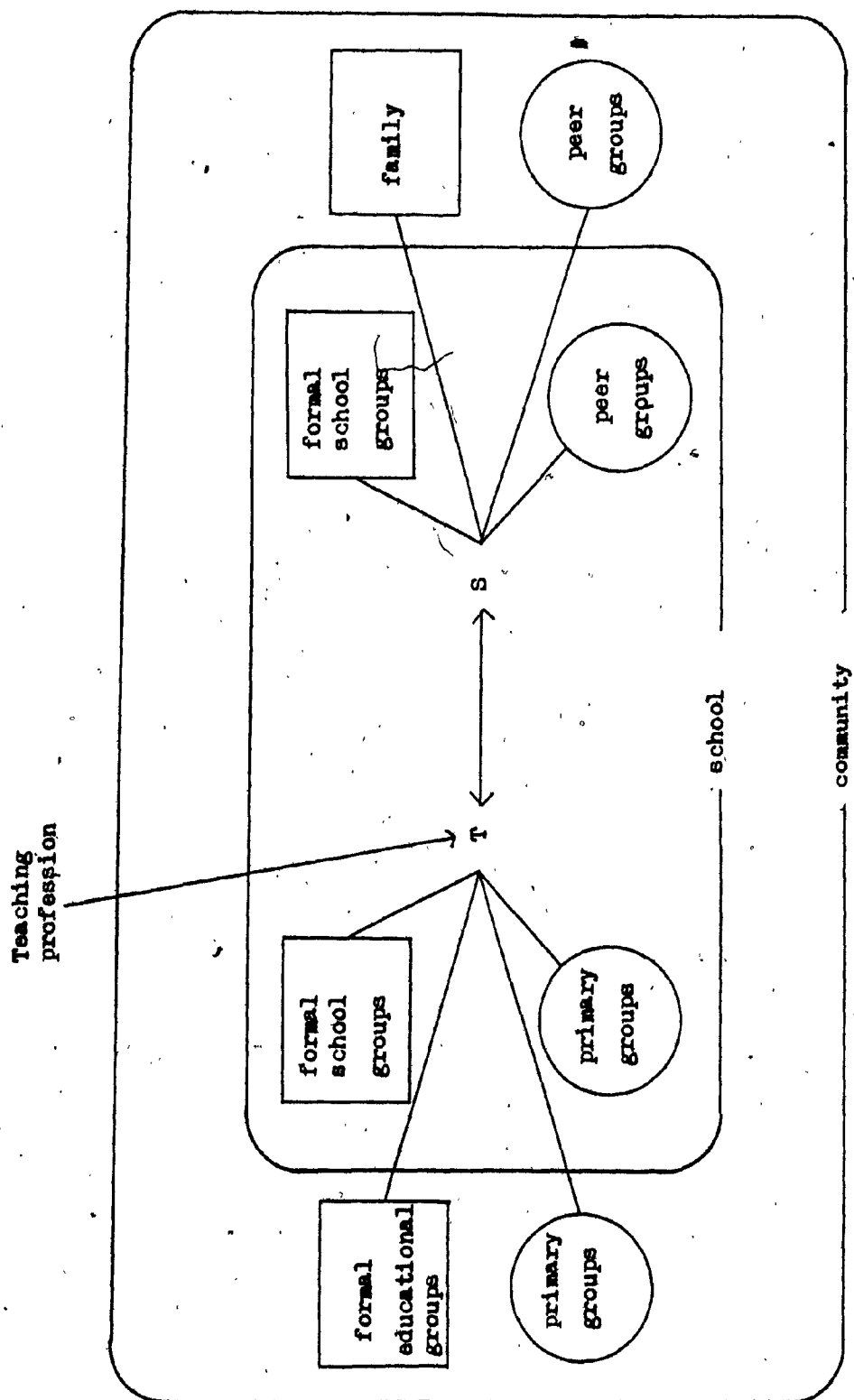


Figure 7 Teacher and Student relationship (Riley & Riley, 1960)

etc.). Material resources (instructional materials); installations (rooms, laboratories, clinical fields); financial resources; goals, objectives, purposes and expectations; institutional policies and regulations; curriculum and instructional plans, human resources (new faculty members, managerial staff, etc); time.

#### Outputs

Records, policies enforcements, rules enforcement, decision transmission, information transmission.

#### Goal

Change student's behavior (educate students)

#### Conversion Process

Student's behavior modification by: Instructional processes: a) information, b) practice, c) feedback.

#### Environment

Curriculum system, administrative system, philosophical and value system, students' association and extracurricular activities system.

#### Purpose and function

Purpose; student's behavior modification regarding curriculum goals. Function: provide students with adequate conditions (information practice and feedback) in order to achieve students' learning.

#### Attributes

Measure of effectiveness: Curriculum's goals student achievement.

#### Programs:

Instructional programs.

#### Decision maker

Teachers and/or faculty committee.

As has been previously pointed out, the central focus of this system is the student's behavior modification.

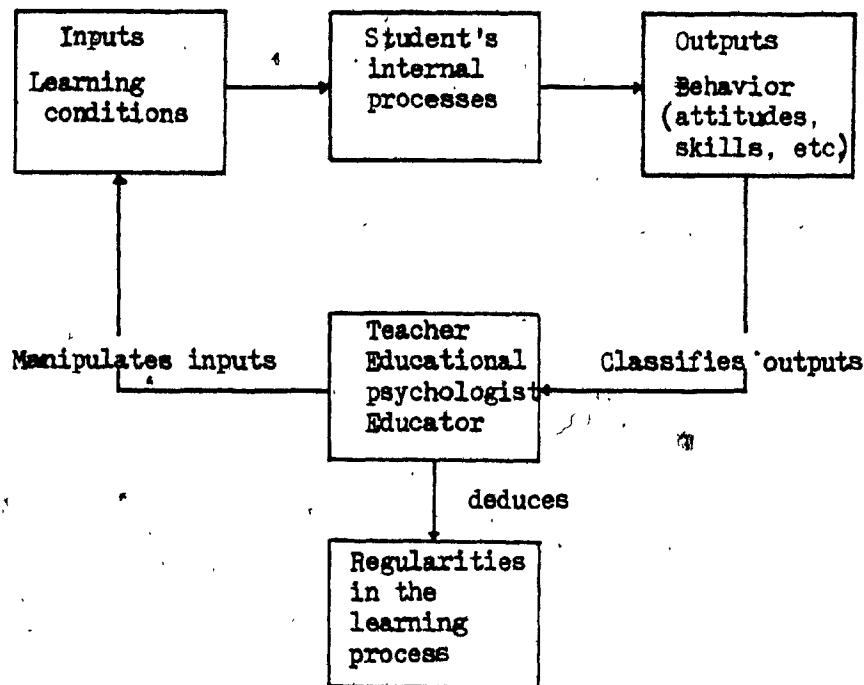
Learning has been defined in several ways: Learning is the act of gaining knowledge, comprehension, or mastery through experience or study (American Heritage Dictionary). Learning is to understand certainly means, to know some facts, the ability to perform certain kinds of acts in accordance with the norms that define the correct performance of those acts (Magge, 1971).

However, it is almost impossible to give an exact definition of learning that will be generally acceptable to psychologist and educators (Hill, 1977). If learning phenomenon cannot be totally explained yet, one way to control it is through the black box analysis. That is, when a system is very complex and as consequence is undefinable in detail, the system can be treated as a black box. As

the black box theory was discussed previously, Shoderbek's (1975) model can be used to understand learning phenomena as illustrated in Figure 8.

In the educational system, student's learning can be considered as a black box component because what really happens in a learning process is almost unknown. However, it is possible to have an idea of the student's initial behavior (his/her knowledge, attitude or ability about something) and the student's final behavior after an instructional process. A student's behavior is observable and in many instances measurable; that is, the main input, output and goals of this system are stated as student's behavior and behavior modification respectively.





Adapted from Shoderbek et al.,  
(1975).

The evaluation of student's learning may be one of the most developed activities in the educational system, most particularly in what is known as measurement techniques. However, measurement cannot be equated with evaluation since the former is just a part of the latter. Learning evaluation is a vital part of the teaching and learning system. Since algorithms do not exist to describe all kinds of learning, and because student learning processes are still unknown, learning attainment is a matter of heuristics. The knowledge of the outputs or results of any learning condition manipulation is essential to the system activity.

Finally, teaching performance evaluation is a matter of controversy; whereas some authors strongly support teachers evaluation (Correa, 1969) others (Stephens, 1967; Solomon, 1969) reject the idea arguing that

teaching is not a unique variable affecting learning.

So long as the system activity as a whole is affected by the performance of each one of its elements, the quality of teaching can be considered as a factor in learning achievement. Teaching activities evaluation could be seen as a means to identify and remedy those educational failures which have been attributed to teaching.

### 3. Curriculum System

Essentially curriculum responds to the question "What is going to be learned?" (or from another point of view, "what is going to be taught?"). Curriculum is defined as a plan for the education of pupils during their enrollment in a given school. It is the overall plan that is intended to be used by teachers as a point of departure for developing teaching strategies to be used with specific classroom groups of pupils (Beauchamp, 1975).

Curriculum is usually seen both as a product (written plan of what is going to be taught and learned) and as a process (the implementation and development of that plan). For instance, Hass (1977) asserts that a curriculum consists of all the experiences that individual learners have in a program of education whose purpose it is to achieve broad goals and related specific objectives, which is planned in terms of a framework of theory and research or past and present professional practice. Saylor and Alexander (1966) point out that a curriculum encompasses all learning opportunities provided by the school. Johnson (1977) and Unrich (1975), simply consider curriculum as a set of intended learning outcomes.

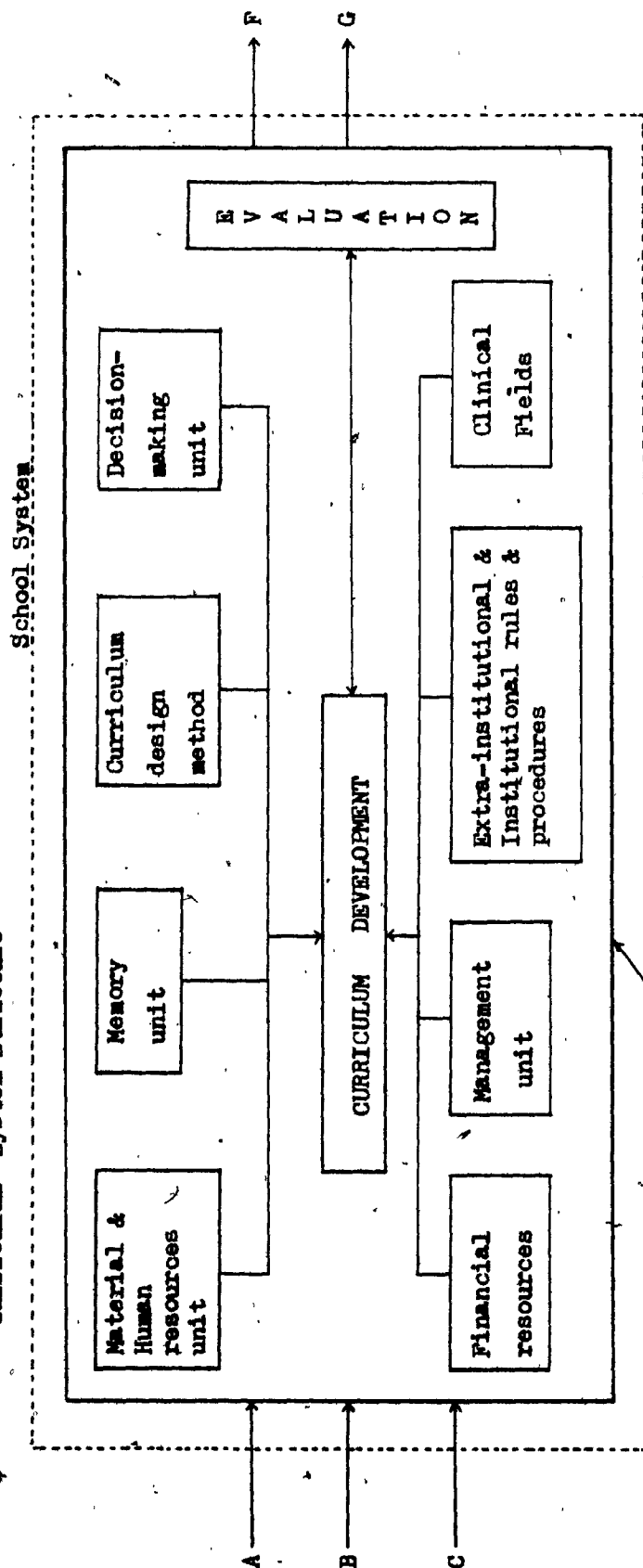
This section will deal with Johnson's (1977) conception of curriculum. Curriculum will be regarded therefore as a product or plan; that is, an organized body of goals and general objectives aimed to form a professional. Curriculum development will be seen as the process by which the curriculum is produced. Curriculum implementation corresponds to instruction.

Figure 9 represents the curriculum system. Essentially what enters this system is data. The system transforms these inputs into a curriculum and sometimes also provides an implementation strategy. The main process is curriculum development; this process requires human resources that are usually organized into committees. Memory unit provides information about the subject matter or academical knowledge, skills, abilities, attitudes considered desirables in the discipline, criteria for organizing curriculum content, data about other curricula trials, etc.

Generally, the curriculum design method is selected by consideration of issues contained in the memory unit and according to the demands and values of the system. The elements depicted under the curriculum development in Figure 9 are considered to support the process.

The decision making unit decides the final curriculum design after considering the curriculum committee's propositions. Usually the decision is made through several sessions in which some negotiation among the curriculum committee (higher decision makers of the school and representatives of national health sciences educational system) take place.

Figure 9  
Curriculum System Structure



A Social needs and professional practice demands

B Psychological (pedagogical needs)

C Academic (content)

(D)

F Curriculum design

D Political and Philosophical values

G Curriculum implementation plan

The output of the system, the curriculum design, is a broad structure containing a hierarchy of goals and objectives (which are usually organized in the form of courses) the length of time required to cover the curriculum, student prerequisites, periods which would be spent largely on campus and periods which would be spent largely in hospitals, clinics or communities, etc.

A curriculum does not attempt to specify particular learning experiences, such as lectures, class activities, seminars, and so forth. The evaluation unit usually operates in conjunction with the decision making unit.

The next part will describe the curriculum system elements not presented in Figure 9 .

#### Inputs

Curriculum organizational methods and techniques, philosophical and values framework additions; human resources (curriculum committee, faculty, curriculum design specialists); financial resources; institutional or/and governmental policies and regulations; goals, purposes and expectations; time.

#### Outputs

Curriculum social effects; educational philosophy and values enforcement; decision transmission; information transmission; curriculum planning costs; policies enforcement; rules enforcement.

#### Goal

Develop a curriculum which can meet the social, psychological and academical needs.

#### Conversion Processes

Curriculum design methodology; need analysis; curriculum implementation methodology; curriculum improvement methodology; administrative procedures; feedback processes.

#### Environment

Learning and teaching system; administrative system; philosophical and value system; business management system; social system (and Health system); students associations and extracurricular activities system.

#### Attributes

Measure of effectiveness; social, psychological and academic expectations satisfaction.

#### Programs

Curriculum design and curriculum implementation plan.

#### Decision maker

Curriculum committee; faculty, director; education ministry representant; health ministry representant.

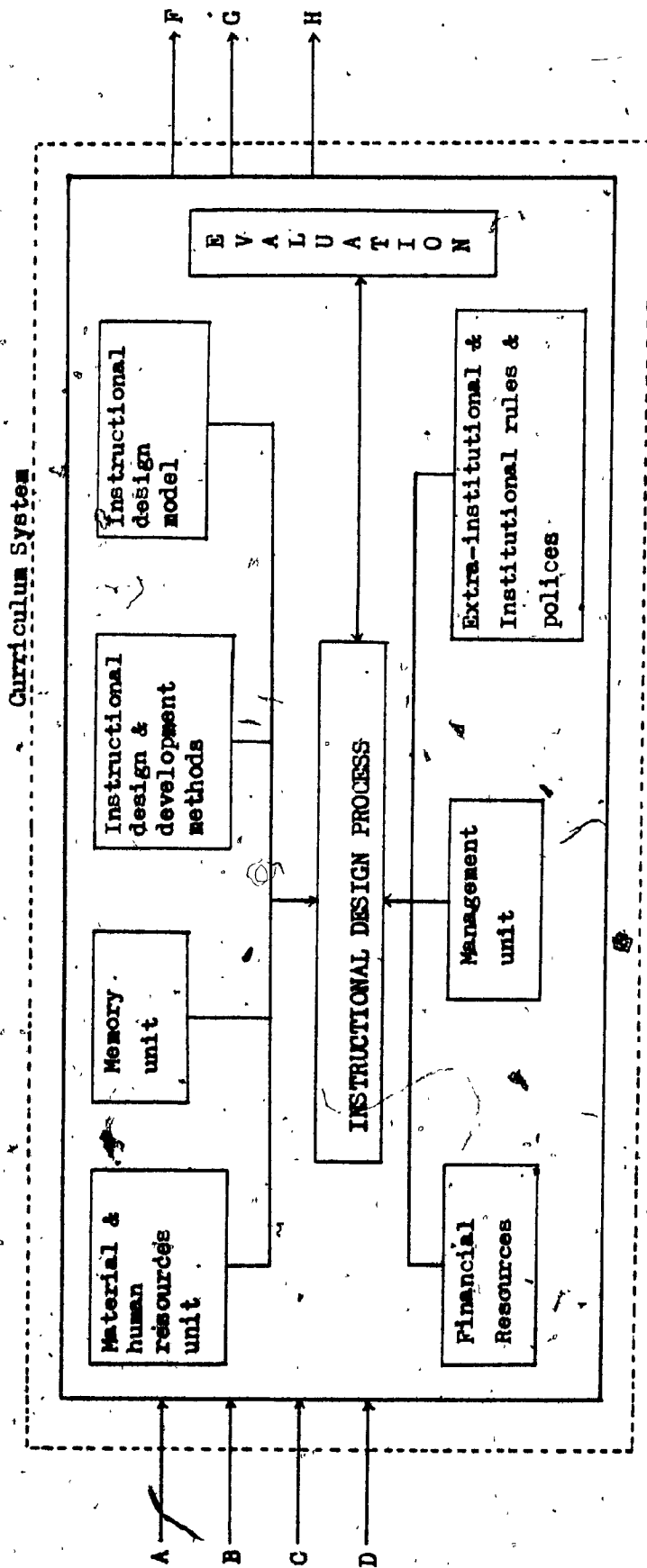
### 4. Instructional System

Instruction has been regarded as the implementation of what was planned in the curriculum design (Johnson, 1977). In fact, instruction is a matter of planning, development and evaluation. The important thing is that instruction is the operative part of the curriculum; that is, it concretizes what is established in the curriculum in order to reach final goals and objectives.

The main input to the instructional system structure depicted in Figure 10 is the curriculum system outputs (i.e. curriculum design

Figure 10

# Instructional System Structure



A Curriculum design and implementation plan

B Information about; number of students, age, sex and other characteristics; about school facilities such as libraries, clinical fields, instructional materials, etc.

C Curriculum content

D Time schedule

F Instructional design (per course or unit)

G Human and material resources required for developing instruction

H Instructional implementation strategy

and the implementation strategy or plan). The time schedule is usually determined by the administrative system or by extra-school policies. Another important input is the information about student characteristics and school facilities. This input goes into the memory unit to be used in the instructional design process. Generally human resources in this system are teachers or department chiefs who direct and work with teachers. They follow a specific method in the design which is determined by the instructional design model\* and the philosophical values fostered by the school.

The main output of the system (instructional design) describes what is going to be taught and learned in what sequence, and where these activities are going to be developed, how long the activities will take, what instructional materials are going to be used and so forth. This is then a detailed description of what is going to be developed in a course in order to attain one or more curriculum goals.

The instructional design is evaluated according to several criteria such as psychological and logical principles, consistency regarding curriculum goals, feasibility, etc.

Finally, the instructional development becomes a part of the teaching and learning system, as a main ingredient of the educational communication process.

The next part describes the elements which are not present in figure 10.

\*Joyce and Weil (1972), identify three models: training psychology, cybernetic psychology and system analysis.



Inputs

Human resources such as new teachers or faculty members;  
instructional policies and rules; financial resources.

Outputs

Decision transmission; information transmission.

Goal

Develop instructional designs which can lead toward curriculum's  
goal achievement.

Conversion Processes

Instructional design; administrative procedures; feedback  
processes; remedial learning activities plan.

Environment

Curriculum system; administrative system; business management  
system; instructional materials system.

Attributes

Measure of effectiveness; Curricular and course's goals  
achievement.

Program

Instructional design

Decision maker

Teacher, faculty committee, department's chief.

Evaluators in this system should be aware of the following:

- a good instructional design is not a guarantee of a good instruction;
- instructional design is usually changed in some way during its  
implementation.

Even the best instructional design can fail because of

administrative problems, teaching mistakes, time pressure or political or social disturbances. On the other hand, instructional design is often modified because of unforeseen internal and external factors such as communication failures, students differences or administrative or political pressures.

Finally, evaluators should be conscious of the fact that instructional design is a product of curriculum and it is closely related to the teaching and learning system as well; that is, the quality of instruction is reflected by the student's success in attaining learning goals, the optimization of resources or by the number of changes or remedial activities structured by the teacher and so forth.

#### 5. Instructional Materials System

Instructional materials are devices which, when used within an instructional plan, serve to facilitate student's learning.

Instructional materials vary widely from the classical text to the most sophisticated multimedia programs, to programmed instruction packages and computer-assisted learning programs. Instructional materials are, in fact, the product of design and production processes; that is, instructional materials are designed considering instructional needs and are produced following technical and esthetical criteria.

This system is closely related to the instructional design, and teaching and learning systems. From the instructional system it receives its main inputs (e.g. instructional materials requirement) and with its outputs (e.g. instructional materials) supports teaching.

Some institutions in health sciences have very organized and developed instructional material systems which not only reproduce or project instructional materials but also design and produce them. In view of the fact that these kinds of systems are the most complicated, they were selected as the prototype described here.

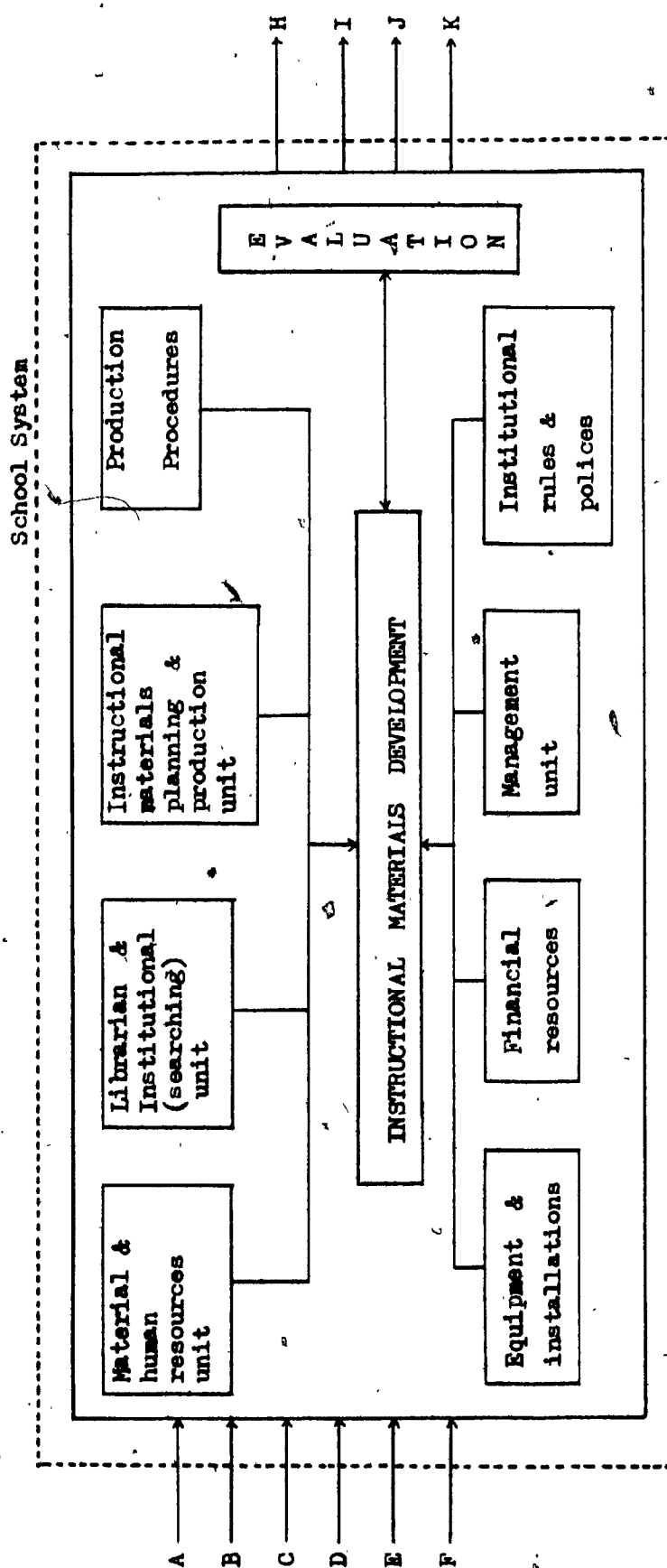
The system receives not only instructional material requirements, but raw material to be processed, information about different instructional materials system in other schools, time and priorities. Its human resources are teachers who help in the instructional material planning, AV designers, subject matter content specialists, librarians, etc. (see Figure 11 ). The system also features a unit which searches for instructional materials available in other schools or institutions. These materials (if found) are evaluated in order to determine if they satisfy the instructional materials requirement. If not, they have to be adapted or modified. If there is no instructional material available to satisfy the instructional materials requirement the material has to be created. The material, then, is planned and produced. In these activities several departments within the school are involved such as the AV department, library, administrative department, etc. Evaluation has to be present at every stage of the above mentioned process.

Other elements in the Instructional Materials system are:

Inputs

Instructional design methods and techniques; instructional materials evaluation procedures; information about: material, human and financial resources, student's characteristics (such as number,

Figure 11 Instructional Materials System



- A Instructional materials requirements
- B Raw material
- C Time schedule
- D Additional or extra-school personnel
- E Requirement satisfaction policies
- F Information about: similar systems, materials produced, procedures in design and production, findings relating learning and media, etc.
- H Instructional materials found
- I Instructional materials found and adapted
- J Instructional materials produced
- K Costs

age, sex, general background); human resources (teachers, AV designers, technicians, subject matter experts, etc.); academic content; institutional and administrative policies and rules; financial resources; time schedule.

#### Outputs

Decision transmission; information transmission; policies and rules enforcement; costs.

#### Goal

Provide the instructional materials required to support teaching and learning.

#### Conversion Process

Instructional materials need analysis; instructional materials design; instructional materials adaptation; instructional materials production; instructional materials evaluation; instructional materials classification; administrative procedures.

#### Environment

Instructional design system; teaching and learning system; administrative system; business management system.

#### Attributes

Measures of effectiveness; Instructional requirements satisfaction  
Learning improvement; learning goals attainment.

#### Programs

Instructional materials development program.

#### Decision maker

Audiovisual and printing department's chief, content experts.

Evaluation in this system is a means to control the quality of

the instructional materials design and production. Evaluation as well is to decide if the instructional materials can be used in a particular instructional practice.

#### 6. Conclusions

Evaluation process starts with a clear identification of what is going to be evaluated and with a concrete purpose for that evaluation as well.

This description of the main school subsystems hopefully may clarify the way in which the school's elements relate and operate. This information should facilitate the identification of what has to be evaluated and why. On the other hand, all school subsystems described were given an "evaluation unit" which supposedly should evaluate the system's activities and outcomes. However, this evaluative unit does not exist nor operate exactly in this fashion in all schools. Most of them do possess some kind of evaluative activities hardly performed, or still worse, do not have any kind of evaluation.

Hence, if a single or several subsystems are not functioning as expected all the school system will be badly affected. We may say that school subsystems should be evaluated with the purpose of controlling their activity and assuring the attainment of school goals. "Evaluation units", should be reinforced using current evaluation approaches.

Next part is concerned with the main theoretical advances in educational evaluation. These different approaches can be used totally or partially in the evaluation of the described subsystems.

### III. Models of Evaluation

#### A. Overview

According to Stake (1967b) there is a difference between the theory of evaluation which identifies what is to be observed and judged and the methodology of evaluation which specifies the manner in which these observations and judgments will be made.

The last section was intended to specify in figures and words the nature of what should be observed and judged in the educational system. Next step is to find the most appropriate frameworks of evaluation for the subsystems described.

Educational evaluation has been evolving rapidly from 1950s and 1960s. It was during this time that evaluation was equated with research methodology to such an extent that sometimes the terms measurement and evaluation were treated interchangeably (Guba, 1989). In the late 1960s an influx of new programs and new demands for evaluation gave as a result new ideas and frameworks in the field of evaluation. Several evaluators have developed new or modified evaluation models which promise to resolve the perennial problems of methodology, application and implementation, relevance, impact, values and policies.

As a consequence, there is considerable divergence in those approaches; most of them are still in the trial-and-testing stage and none of them can be considered the main route. In fact, almost all the

present models were designed to meet specific needs of the various programs to which they were initially applied. Thus, much of the development in evaluation appears to be a result of the failure of one model or another to meet the evaluation needs program when applied inappropriately to that program, and the subsequent refinement of the model or the emergence of another one to meet the unique needs of the situation (Sirois & Iwanicki, 1978).

No one evaluation model can serve all evaluation needs. Rather the needs of each situation must be analyzed and a specific evaluation plan must be developed. This plan can draw from key ideas and evaluation models.

The body of literature in educational evaluation contains innumerable approaches which are called models. Some are preliminary sketches whereas others are extensively developed. Some are adapted from processes that were used whereas others are designed as general ways of conceptualizing evaluation.

Alkin (1972) defines a model as a simplistic statement or representation of sets of complex interrelationships. Such representation is intended to help the modelers or users in structuring or understanding the universe, or that segment of the universe being considered.

I.T. Kirby (1965) proposes a set of criteria to identify a model as a general purpose model:

1. The model should assist the evaluator in anticipating all information needed for the decision process.
2. The model should be internally logical and complete.



3. The model should be of sufficient clarity so as to allow implementation by a trained evaluator without external interpretation.
4. The model should relate elements in a way in which they have not previously been related.
5. The model should be heuristic.
6. The model should be capable of being extended by empirical study.
7. The model should be efficient.

Strictly speaking, very few approaches in evaluation could be considered as general purpose models after the application of the criteria mentioned; rather they all are frameworks which provide ideas to the practitioner in helping him set evaluation strategy. However, in the current literature the terms "approach", "model" and "framework" are used interchangeably. In order to avoid confusions, this work will continue using the term model when referring to approaches in evaluation.

House (1978a) asserts that one way of understanding evaluation is to compare the numerous evaluation models with one another; he suggests the use of theoretical assumptions on which the models are based as a parameter of comparison. He offers a taxonomy of major evaluation models and a scheme relating them to the philosophy of Liberalism. There are also several notable attempts at categorizing and defining the array of evaluation approaches that has emerged (Anderson et al., 1975; Carter, 1973; Gardner, 1977; Popham, 1975; Steele, 1973; Stufflebeam et al., 1971; Willis, 1978; Worthen & Sanders, 1973). Nevertheless, these taxonomies are generally unfamiliar to individuals outside the ranks of the "expert"

evaluator. Unfortunately, it is most often "non expert" evaluators - higher health education teachers and administrators- who are ultimately responsible for the implementation of evaluation studies and their consequences. This audience rather requires a simple guide drawn from the analysis of several evaluation approaches. This proposition follows the idea of having a framework for the cooperative use of evaluation models or parts of these models. In order to accomplish this task the major evaluation models were categorized into four general groups based on some aspect they have in common that set them apart from other models. The groups are:

1. Goal-Attainment Models
2. Judgmental Models
3. Decision-Facilitation Models
4. System Approach Models

Because in the higher health educational system there are rarely evaluations coming from external agencies, models of the type "Accreditation evaluation" are excluded in this work.

There are some approaches that could have been placed in more than one category, although they were grouped according to their primary focus.

It is important to note that this classification is tentative, general and in some aspects has an arbitrary ordering.

Each category is analyzed according to seven dimensions of comparison: evaluation definition and purpose; evaluators role and decision maker identification; methodology; type of evaluation; outcome; and advantages and disadvantages.

This categorization is summarized in a multi-page matrix (see Table 1 ) and represents a combination of considerations suggested by Popham (1975), Steele (1973), and Worthen and Sanders (1973).

#### B. Goal-Attainment Models

Theories or methodologies that fall in this category basically define evaluation as the comparison of performances with stated objectives. This category comprises the most common and well developed of all evaluation models (Steele, 1973). This kind of model assumes that the most important decision regarding the thing to be evaluated are contingent on its objectives and the criteria established for judging relative success or failure in the attainment of those objectives.

##### 1. Tyler's Model

The original Tyler model stated that evaluation should improve curriculum by finding out how far the learning experiences as developed or organized are actually producing the desired goals; at the same time this process should identify strengths and weaknesses of teaching plans.

The evaluation process includes:

1. Analyzing objectives to identify basic dimensions,
2. Identifying situations that will give the student a chance to express the behavior related to the content.

Table 1. Comparative Characteristics of Evaluation Models.

	Goal-Attainment Models	Judgmental Models	Decision-Facilitation Models	Systems Approach Models
Evaluation Definition and Purpose	<p>Evaluation is the determination of the degree to which an instructional program's goal were achieved.</p> <p>The purpose is to determine the extent to which goals and/or objectives of a learning activity are actually being realized. Best evaluation is based on an examination of achievement in light of goals or objectives.</p>	<p>Evaluation is the description and judgment of actual outcomes; an assessment of merit.</p> <p>The purpose of evaluation is to describe and judge educational programs (justify merit of worth) based on a formal inquiry.</p>	<p>Evaluation is the process of defining, obtaining, and using information for judging decision alternatives.</p> <p>Purpose: Provide relevant information to decision-makers in selecting among alternatives.</p>	<p>Evaluation is the process of 1) identifying 2) quantifying or measuring, the relationships between educational inputs &amp; outputs &amp; determining the combination of mediating factors which maximizes the educational outputs given a constraint financial input &amp; controlling for the effects of external systems.</p> <p>Purpose: Increase the efficiency of managing programs</p>
Examples	<p>Tyler (1949); McFerrall and Michael (1967); Bassett (1969)</p> <p>Boyle and Johns (1970); Poplan and Baker (1971); Bloom (1971); Morgan (1970).</p>	<p>Stake (1967); Scriven (1967); Forstrand (1971); Knox (1969).</p>	<p>Stufflebeam et al. (1971); Provus (1971); Tripodi, Fellin &amp; Synetals (1971); Alkin (1969); Lindvall &amp; Cox (1970); Lasrock, Saito &amp; Warren (1971); Clark &amp; Olsen (1977).</p>	<p>Alkin (1971); Knox, Mesifrow &amp; Darkenwald (1973); Young (1971); Van Giech &amp; Hill (1971); Yost &amp; Hounin (1969); Paper (1973).</p>
Evaluators role and Decision maker Identification	<p>Evaluator should manage measured methodology relative to the performance of the thing to be evaluated, analysis of the performance data and formulation of meaningful descriptive reports.</p> <p>Decision maker are teachers and curriculum committee representatives.</p>	<p>Evaluator expected to be an information collector, synthesizer and judge.</p> <p>Decision makers are various audiences, teacher, administrator or consumer.</p>	<p>Evaluator should be an information system specialist who provides information to decision-makers.</p> <p>Decision-makers are usually identified as administrators.</p>	<p>Evaluators role is the identification and control for as many of the factors as possible thought to be significant to the educational outputs of the system.</p> <p>Decision makers are to be managers responsible of educational programs.</p>
Methodology	<ol style="list-style-type: none"> <li>1. Isolation of the current educational issues to be evaluated</li> <li>2. Definition of relevant variables and/or involvement of members of the total community</li> <li>3. Identification of statements of goals and specific objectives and standards.</li> <li>4. Assessment of the behavior described in the objectives.</li> <li>5. Development of criterion measures &amp; instruments.</li> <li>6. Provide students with various learning alternatives.</li> <li>7. Measure the program's progress toward goal attainment.</li> <li>8. Analyze and interpret data.</li> <li>9. Adjust the instructional program and formulate recommendations for program change.</li> </ol>	<ol style="list-style-type: none"> <li>1. Describing curricular objectives.</li> <li>2. Searching of the rationales of the educational program.</li> <li>3. Gathering information through observations direct &amp; personal &amp; instrumental.</li> <li>4. Organize information.</li> <li>5. Processing descriptive data.</li> <li>6. Comparing &amp; judging.</li> <li>7. Recommendations for future actions.</li> </ol>	<p>Collection, organization, analysis &amp; reporting of information in each one of the types of evaluation, namely, context evaluation or design evaluation, input evaluation or installation, process evaluation &amp; product evaluation or certification.</p>	<ol style="list-style-type: none"> <li>1. State the system's objectives</li> <li>2. Establish a criterion measure. The objective should be measurable or quantifiable to some extent.</li> <li>3. Define the relevant variables. They are usually categorized as uncontrollable (constraints) &amp; controllable (decision) variables.</li> <li>4. Explicate the interactions between variables.</li> <li>5. Analyze the interrelated variables in some technical model and enter the values each variable can assume.</li> <li>6. Evaluate the solution or the objective function the input/output ratios, the extent of goal attainment or simply the logic of the flow chart through the use of some decision rule.</li> </ol>

Table 1 (continue)

Type of evaluation	Goal-Attainment Models	Judgmental Models	Decision-Facilitation Models	Systems Approach Models
	<p>Pre-post measurement of performance</p> <p>Attitudinal dimension.</p> <p>Institutional dimension.</p> <p>Behavioral dimension.</p>	<p>Formal vs. informal evaluation</p> <p>Formative &amp; summative</p> <p>Comparative, non comparative</p> <p>Internal - Pay-off</p> <p>Mediated evaluation</p> <p>Goal free evaluation</p> <p>Meta-evaluation</p>	<p>Context evaluation; Design.</p> <p>Input evaluation; Installation; Planning.</p> <p>Process evaluation; Implementation.</p> <p>Product evaluation; Improvement.</p> <p>Program certification; Cont.</p>	<p>Operations research and/or</p> <p>Systems analysis (PSES; linear programming, cost-benefit analysis PERT, CPM, planned variation, etc.)</p>
Outcomes	<p>Productivity</p> <p>Accountability</p>	<p>Judgment of the worth of any educational issue.</p> <p>Consumer choice.</p> <p>Social utility</p>	<p>Effectiveness, quality control.</p> <p>Continuous, timely &amp; relevant information for decision-makers to assist in judging decision alternatives.</p>	<p>Efficiency (make better systems)</p> <p>Productivity or effect of a system improvement.</p> <p>Systems growth &amp; development.</p> <p>Providing a basis for systems accountability.</p>
Advantages or Contributions	<p>Judgment criteria pre-established by objectives vs. performance measures selected.</p> <p>Believable to current societal concerns.</p> <p>Makes use of local personnel who can carry on evaluation process.</p> <p>Is easy to accept; whether behavioral objectives are being achieved.</p> <p>Provides feedback on program development &amp; revisions; stresses self-evaluation.</p> <p>Is easy to design evaluative studies.</p>	<p>Provides a systematic method to relate descriptive &amp; judgmental data.</p> <p>Focus on worth and values.</p> <p>Considers both absolute &amp; relative judgment.</p> <p>Flexible, adaptive to many different contexts.</p> <p>Provides formative &amp; summative evaluations.</p> <p>Evaluation of objectives.</p>	<p>Encourages analysis of all factors affecting important decisions.</p> <p>Focus on decisions information needs assures relevance of data.</p> <p>Provides continuous communication through feedback loops (between staff, evaluators &amp; decision makers.)</p> <p>Allows for program assessment &amp; improvement either at early stages or at end.</p> <p>Forces explicit statement of criteria &amp; standards.</p> <p>Wholistic.</p>	<p>A holistic approach in which all contributive elements are considered as they relate to each other.</p> <p>Systems study before-the fact analysis (as opposed to the prevalent after-the fact evaluations).</p> <p>Facilitates administrative practice.</p> <p>Multidisciplinary approach to evaluation.</p> <p>Deals with key elements in the system &amp; their relationships.</p>
Limitations or Disadvantages.	<p>Focus may be too limited - not all worthy goals easily identified.</p> <p>Important side-effects may be overlooked.</p> <p>Difficulty of quantifying data involving several dimensions &amp; variables.</p> <p>Tendency toward overemphasis on end-product evaluation.</p> <p>Tendency to focus directly &amp; narrowly on objectives, with little attention to worth of the objectives.</p> <p>Motivation problem in local personnel.</p>	<p>Problematic problems with an extensive range of results if resources are limited.</p> <p>Methodological problems if equating performance on different criteria &amp; assigning relative weights to criteria.</p> <p>Some components of the model are not clear enough.</p> <p>No methodology for assessing validity of judgments.</p> <p>Concepts overlapping.</p>	<p>Methodologies for establishing standards &amp; for decision-making process are not well developed.</p> <p>Could be costly &amp; complex.</p> <p>Would require large, expert &amp; well articulate staff.</p> <p>Not all activities are clearly evaluative.</p> <p>Partial evaluation is not considered in some cases.</p> <p>In practice, frequent inability to cope with changing decision information needs.</p>	<p>The practitioner would generalize from the study of the parts to the whole (total efficiency).</p> <p>Requires knowledge about cause &amp; effect.</p> <p>Emphasis on quantified variables.</p> <p>Goals &amp; objectives are not evaluated or questioned.</p>

3. Selecting or developing instruments that will record the behaviors.
4. Analyzing the amount of change that is taking place in students.
5. Analyzing the strengths and weaknesses of the program in helping students achieve the objectives.

## 2. Metfessel and Michael's Model

Metfessel and Michael (1967) following Tyler's approach developed a paradigm in which eight major steps in the evaluation are considered:

1. Involve both indirectly or directly of members of the total school community.
2. Construct a cohesive paradigm of broad goals and specific objectives arranged in a hierarchical order from general to specific outcomes.
3. Translate those behavioral objectives into a form that is both communicable and applicable to facilitating learning in the school's environment.
4. Develop the instrumentation necessary for furnish criterion measures from which inferences can be formulated concerning program effectiveness in terms of the objectives set forth.
5. Carry out periodic observations through use of the tests scales, and other indices of behavioral change that are considered valid with respect to the objectives sampled.
6. Analyze data furnished by the status and change measures through use of appropriate statistical methods.
7. Interpret the data in terms of certain judgmental standards and values concerning what are considered desirable levels of performance of the totally collected measures.

3. Formulate recommendations that furnish a basis for further implementation for modifications and for revisions in the broad goals and specific objectives.

Metfessel and Michael presented also a list of instruments with potential relevance for data collection in evaluation.

### 3. Evaluation at the Local Level

Hammond's (1969) model is oriented to facilitate the assessment of goals achievement. He identifies some dimensions and variables which operate in a three-dimensional structure. These elements are interacting and their combinations of variables are described as factors to be considered in the evaluation of a given program. The three dimensions are: Behavior, Instruction and Institution. These three dimensions are represented in a cube and have the next variables:

#### Behavior dimension:

- Psychomotor domain
- Affective domain
- Cognitive domain

#### Instructional dimension:

- Organization
- Content
- Method
- Facilities
- Costs

#### Institutional dimension:

- Student

- Teacher
- Administrator
- Educational specialist
- Family
- Community

His methodology of evaluation is stated in five steps:

1. Define the program in terms of what is to be evaluated
2. Define the descriptive variables in the instructional and institutional dimensions
3. State objectives in behavioral terms
4. Assess the behavior described in the objectives
5. Analyze the results within factors and the relationships between factors to arrive at conclusions based on actual behavior. Once the outcomes have been defined, there is a feedback process to the terminal behavior defined through objectives to determine the effectiveness of a given program in reaching the desired outcomes.

#### 4. Boyle and Jahns Model

Boyle and Jahns (1970) see evaluation as being primarily concerned with assessing the ends that were attained and not directly concerned with assessments about other aspects of the program such as the means used to attain objectives.

According to these authors, effective evaluation requires: 1) clear, concise objectives or statements of intended educational ends to be attained; 2) bench mark or pre-program measures of the behavior(s) or behavioral patterns of the learner before his exposure



to the educational program and 3) measures after completion of the educational program.

#### 5. Popham Model

Popham and Baker (1971) propose a simple model which contains four main parts:

1. Specification of objectives
2. Preassessment
3. Instruction
4. Evaluation

The techniques used to judge the degree to which the learner has attained the instructional objective are: 1) observation of behavior and 2) examination of products that the learner will produce.

In this model, Popham and Baker (1971) propose an assessment which cannot be considered exactly as evaluation; Anderson et al. (1975) point out that assessment has a narrower meaning than evaluation, but a broader meaning than measurement. The authors suggest the use of the term just for the process of gathering the data and fashioning them into an interpretable form; judgments can then be made on the basis of this assessment. On the other hand, evaluation at the end of the teaching sequence consists of securing evidence either of the behavior of students or of examining products of that behavior.

Popham (1972) suggest two major roles of evaluation:

- Educational Needs Assessment - Determining the desired ends of the educational system.
- Treatment Adequacy Assessment - Judging the worth of educational

means.

Popham also proposes the use of formative and summative conceptions in this kind of models.

#### 6. Bloom Model

Bloom et al. (1971) proposes the use of evaluation of instruction and the evaluation of learning to improve learning as a result.

The authors' model relates: analysis of the learners, instructional decisions and evaluation with student, instructional process and objectives. The three stages of evaluation are:

- Initial evaluation
- Formative evaluation
- Summative evaluation

Each stage contains several activities, the most relevant are:

- gathering data
- analysis and diagnosis
- prescriptions or recommendations according to the degree of which the outcomes (at each stage) were attained.

#### 7. Morgan Model

Morgan (1970) developed the Apex Evaluation model to evaluate the North Carolina Exemplary Program.

The model is based on 1) the intent of legislation; 2) the program objectives (desired outcomes); 3) the process objectives (desired process); 4) the observed process (operational procedures and resources); 5) the output of the program along with the static interrelationships between these components.

Comments

The most important models in this group are perhaps those of Tyler, Hammond, and Popham and Baker. Metfessel and Michael's approach is quite similar to that offered by Tyler, except that the latter includes the participation of school community members in the establishment of goals.

Hammond's framework displays the elements already identified by Tyler in a more comprehensive three-dimensional structure. However, the general approach to evaluation is similar to that of Tyler.

In his paper of 1972, Popham adds several points to his previous proposition (that of 1971). The issues offered in his document are Educational need assessment in which he related goals with needs. That is, goals should be established to meet educational needs. In the same document, Popham introduces the use of formative and summative evaluation concepts taken from Scriven's (1967) approach. Other models, such as Morgan's Apex Model, Boyle and Jahns' model are variations to the same approach.

Goal-attainment models have had an enormous impact in planning and conducting educational evaluation. Without any doubt, goals are a very important element in evaluation. Attained goals would reflect a success in educational programs; however, unattained goals indicating the program was ineffectual might also result from an inappropriate selection of goals in the first place. On the other hand, goals-attainment could produce effectiveness as an output, but what about efficiency?. It is important to emphasize that educational evaluation is more than examining the attainment of objectives.

### C. Judgmental Models

Approaches in this category are judgmental schemes in which primary attention is given to extrinsic criteria. These models emphasize kind of data, types of activities and effects of programs.

#### 1. The Countenance of Evaluation

Stake (1967a) categorizes data as being either descriptive (intents and observations) or judgmental. Both kind of data are essential; according to Stake they are the two basic elements of evaluation.

In order to evaluate, the author suggest that the data gathered from different sources should be organized under three bodies of information: antecedent, transaction and outcome data.

Antecedents are conditions existing prior to teaching and learning which may relate to outcomes. Some programmed instruction specialists call some antecedents "entry behaviors". But there are more antecedents which an evaluator should describe.

Transactions are the countless encounters of students with teacher, student with student, author with reader and so forth: the succession of engagements which comprise the process of education.

Outcomes are evidence of the impact of instruction on students, teachers, and others: change in abilities, achievement, attitudes and aspirations of students; wear on the equipment; effect on the school; costs. Outcomes are the consequences of educating: immediate and long range, cognitive and connotative, person and community wide.

Antecedents, transactions and outcomes are the elements of evaluation statements. The evaluator will collect data of both types descriptive and judgmental regarding these evaluation statements.

Descriptive data include:

- a) Intents, that are descriptions of the planned-for environmental conditions, the planned-for teaching methods and content coverage and intended student behavior. The collective descriptions should provide a priority listing of all the things that are intended to happen.
- b) Observations, are descriptions of what actually did occur related to the antecedent, transaction and outcome.

There are two basic ways of using descriptive data: 1) looking for contingencies among antecedents, transactions, and outcomes and 2) looking for congruency between the intended and the observed.

Judgmental data includes:

- 1) absolute standards as reflected by personal judgments and 2) relative standards as reflected by characteristics of alternative programs.

The judging act is deciding which set of standards to heed. Judging is assigning a weight, an importance to each of standards.

According to the type of standards, there are relative or absolute judgment. Thus from relative judgment of a program, as well as from absolute judgment one can obtain an overall or composite rating of merit, which is used in making an educational decision. From this final act of judgment a recommendation can be composed.

After devising his 1967 Countenance Model, Stake began to pay more attention to what evaluator's clients actually want.

The evaluator should collect samples of the judgments of many people in the program -the clients, staff, community and others. Stake believes that insensitivity to the perceived needs of those individuals for whom an evaluation is being conducted will lead to an unresponsive, hence futile evaluation.

## 2. "The Methodology of Evaluation"

Scriven (1967) defines evaluation as an assessment of merit. He stresses therefore the necessity to assess the merit of goals themselves. But this was not his unique contribution to educational evaluation; he also proposes a series of insights and clarifications regarding varied aspects of educational evaluation. Popham (1975) points out that summing his concepts and explanations, it is possible to have a cohesive framework.

Formative and Summative evaluation. There is a distinction in roles served by evaluators who formatively try to improve an instructional sequence which is developing and evaluators who summatively assess the merits of already-completed instructional sequences. This formative-summative distinction is widely used in many evaluation approaches.

Pay-off evaluation. Scriven describes an evaluation approach that focuses on extrinsic criteria ( or the effects of a program ) as pay-off evaluation. However, he does not reject "intrinsic evaluations" rather he suggests the realization of hybrid evaluations which combine attention to intrinsic and extrinsic criteria (Popham, 1975).

Goal-free evaluation. This kind of evaluation originated by Scriven (1972 a) starts without referring to the objectives of the

program. If they are used, they are used after the data are in to see which results that emerged actually were intended. The base for determining what data to collect is a profile of identified needs. Actual effects are then compared with these needs rather than with the objectives.

Evaluation is viewed primarily as an activity of condensation that includes two major stages: compression and credentialing. A mass of data and observations about a program are condensed through various means (compression) until judgments as to the value and worth of the program can be made (credentialing).

Modus Operandi method. This method suggested by Scriven (1974) is an alternative when experimental or quasi-experimental designs cannot be used. Under this approach, a program is investigated to see if it was the cause of certain set of effects.

Certain effects are assumed to be caused by one or more factors, which Scriven calls a "quasi-exhaustive casual list". The presence of each of these factors is checked, and if only one is present, the investigator checks for a "causal chain" -the configuration of characteristic events, processes or properties that may connect the cause with the effect. If one causal chain is present, that chain is the cause. If more than one complete chain is present, the possible causes associated with it are considered causes.

Meta-evaluation. Scriven (1972b) asserts that meta-evaluation is second-order evaluation, i.e. evaluation of evaluation.

Evaluation of educational products or processes is seen as a

case of applied evaluation. According to Scriven (1972 b) evaluation does not begin at the point when the client announces the values he wishes to be used as bench marks, except in a chronological sense. Evaluation absolutely requires that the evaluator investigate the justification for these "initial" criteria. This is because the initially announced criteria turn out -when the consequences are realized- not to be the "true" criteria of the client.

His recommendation, namely, that evaluations bring considerable attention to appraising the quality of goals as well as whether the goals have been achieved, has alerted evaluators not to accept passively any goals proffered by program designers. A rigorous evaluation is recommended, and if it were necessary the repudiation of the goals themselves as a result of the evaluation.

### 3. Institutional Evaluation

Institutional evaluation, according with its author (Forehand, 1971) is focused to questions raised by administrators, suppliers of funds, accrediting committees and internal and external critics. The approach searches to respond the question: is the program acceptable to the institution?

In another level, project evaluation takes place within the process of curriculum design and deals with questions posed by the originating professor or design team. Project evaluation is concerned with student performance in terms of the objectives of the course while institutional evaluation is concerned with performance in terms of general standards for the particular type of student.



According to this author, institutional evaluation uses two major kinds of data: information on achievement of standards of student performance and information about attitudes toward the program. Standards are set by committees and should be used periodically to check the performance of the courses. Attitudes toward program are reactions of students and faculty members which serve to indicate the degree of a program's acceptance.

Evaluation is seen as ongoing activity designed to provide answers to questions that arise from a number of sources and perspectives. The criterion applied to this information is its usefulness to contribute in the institution's appraisal of its own effectiveness. So, judgment by responsible organizational members is required.

#### 4. System Role Model

Knox (1969) proposes that the general purpose of evaluation is to improve the educational program by facilitating judgments about its effectiveness based on evidence.

Eight points should be considered by programmers and administrators in designing evaluation systems: Evidence, benefits, frequency, feedback, objectivity, standards, relevance and values.

Five related activities include examining the setting (context in which the program takes place and the influence of that setting on the program), deciding on the most important evaluation emphasis selecting evaluation models and procedures and identifying

the context in which the evaluation will occur.

1. Inputs - Include both what was intended and what actually occurred. Participants, teachers, materials all are inputs into the program.
2. Process - Description of the intended and the achieved transactions that bring together inputs to produce outcomes. The teaching-learning process is considered to be the heart of the program.
3. Activity - A process can be analyzed assessing how well it transforms resources to maintain stability and stimulate change. What can be analyzed include: goals and policy, program development, teacher performance, etc.
4. Outcomes - Include several categories of results, vary from immediate stages, such as changes in learner's knowledge to more remote stages as where outcomes are stated in terms of benefits to the community. Comparison of the descriptions of intended outcomes and achieved outcomes provides information for make adjustments.
5. Judgments. - Judgments about the extent the intended was achieved in terms of inputs process and outcomes have been made earlier as a part of analyzing the logical soundness of the program plan. Conclusions about needed changes in activities or expectations or both should have been formed.

Judgments of results involves internal and external comparison. Internal judgments involve the extent to which the actual inputs and processes contributed to the achievement of the outcomes and whether the outcomes (benefits) compare well with the inputs (costs). External comparisons analyze the results of the specific program against external standards.

Judgmental models were developed immediately after goal-attainment model's conception of evaluation was offered. Thus, Scriven (1967) emphasized two roles of evaluation: formative and summative and questioned the worth or value of goals and objectives. Stake (1967a) also followed the points proposed by Scriven, developing the Countenance model which proposes the full description and full judgment of the program. However, his methodology for obtaining information to fill in his model's matrix is inadequate. In general the approach is unfeasible to be used in large programs, but could have success in the evaluation of little courses for example. Knox (1969) offers as a novelty another criterion in addition to that of effectiveness. He takes into account costs and benefits in the program.

#### D. Decision-Facilitation Models

Several evaluation frameworks, in addition to having many features borne by other models (such as to determine whether goals are attained) are focused on decision-making activity.

Essentially evaluators are thought to provide information about the effectiveness of a program for decision makers.

Probably the most known paradigm in this group is the CIPP model developed by Stufflebeam et al. (1971); however, many other approaches to evaluation have followed the general structure and methodology of CIPP model with slight variations. Broadly the models in this category: 1) pattern types of decision that have to be made;

- 2) identify program sequences that should be evaluated; 3) outline evaluation questions that need to be answered, or 4) identify criteria that should be applied.

### 1. CIPP Model

CIPP is an acronym representing the four strategies of evaluation. This model identifies:

- C Context evaluation Serves planning decisions
- I Input evaluation Serves decisions about designs and resources
- P Process evaluation Serves decisions that control operations
- P Product evaluation Serves decisions about results and recycling

The four types of evaluation can be used independently or in combination. They can be used in either formative or summative evaluation (e.g. to facilitate decisions as the program progress or in retrospective analysis of the quality of decisions that were made and implemented).

According to Stufflebeam et al. (1971), evaluation designs should satisfy criteria of scientific adequacy (internal and external validity, reliability, and objectivity) of practical use (timeliness, pervasiveness and credibility).

The rationale of the CIPP model is summarized by Stufflebeam (1968) as follows:

- 1) the quality of programs depends upon the quality of decisions in and about the programs.
- 2) The quality of decisions depends upon decision-makers' abilities to identify the alternatives which comprise decision situations and

to make sound judgments of these alternatives.

- 3) Making sound judgments requires timely access to valid and reliable information pertaining to the alternatives.
- 4) The availability of such information requires systematic means to provide it.
- 5) The process necessary for providing this information for decision-making collectively comprise the concept of evaluation.

Thus, evaluation is defined as the process of: defining, obtaining and using information for decision-making.

Context evaluation defines the environment where change is to occur, the environment's unmet needs, problems underlying those needs, and opportunities for change. Information from context evaluation leads ultimately to the establishment of program goals and objectives.

Input evaluation identifies and assesses relevant capabilities of the proposing agency, strategies which may be appropriate for meeting program goals and designs which may be appropriate for achieving objectives associated with each program goal. The end product of input evaluation is an analysis of alternative procedural designs in terms of potential costs and benefits.

Process evaluation provides periodic feedback to project managers and others responsible for continuous control and refinement of plans and procedures. The objective of process evaluation is to detect or predict during implementation stages, defects in the procedural design or its implementation. This strategy allows to identify the potential sources of failure in a project.

These include interpersonal relationships among staff and students; communication channels; logistics, etc.

Product evaluation is used to determine the effectiveness of the project after it has run full cycle. Its objective is to relate outcomes to objectives and to context, input and process, i.e. to measure and interpret outcomes.

## 2. Discrepancy Model

The discrepancy evaluation model developed by Provus (1971) emphasizes the obtaining of information that can be used to make judgments about the program while it is in its dynamic stages of growth.

The purposes of evaluation are: 1) to ensure the quality of the product, 2) to ensure this quality at minimal cost, and 3) to help management make decisions about what should be produced and how.

Quality control requires systematic monitoring and programs' modification to meet acceptable standards. Cost-benefit analysis compares the program's cost and the value of its product with the cost of other products of similar value. Decision making improvement is achieved with new sources of information about either benefits, costs, program quality or program operations.

The Discrepancy model points out five stages of evaluation.

- 1) Design
- 2) Installation
- 3) Process
- 4) Product

### 5) Cost

At each of these stages a comparison is made between reality and some standard or standards. The comparison often shows differences between standard and reality; this difference is called discrepancy. On the basis of the comparisons made at each stage, discrepancy information is provided to the program staff, giving them a rational basis on which to make adjustments in their programs.

At each stage of evaluation the program unit has four alternatives for further program activities: 1) go on to the next stage, 2) recycle the stage after there has been change in the program's standards or operations 3) recycle to the first stage, or 4) terminate the project. The evaluation, thus, helps identify gaps or problems, but the program staff must decide what to do about them.

### 3. Differential Evaluation

Tripodi, Fellin and Epstein (1971) propose a model based on the assumption that it is necessary to have an accumulation of facts about program achievement in terms of efforts, effectiveness and efficiency within any of the stages of development: initiation, contact and implementation.

This approach is useful as a mean by which administrators and program personnel can decide where evaluation investments will be apt to give the greatest payoff in program improvement.

Evaluation is seen as a management technique for the systematic feedback of information to be used to improve social programs.

Usually the development of a program is object of a variety of pressures,

coming from different sources. Programmers require the right information at the right moment to make the best decision.

The process of evaluation involves getting systematic information within a context of social relationships. Obtaining useful evaluations is conditioned by the way in which evaluators can deal with different values, ideologies, interests, political realities, etc.

The three program development stages are:

**Program Initiation** This stage involves the planning activities and also the necessary resources are secured.

**Program Contact** Contact is made with target clients; this stage also includes delivery system and analysis of obstacles and establishing relationships with other programs in the community.

**Program Implementation** This stage involves the application of energy toward the goals of the program. It is concerned with results. The criteria for following up activities and possible program termination should be specified.

The most common information-gathering techniques used in this approach can be categorized as follows:

**Monitoring techniques** - Procedures that are used for direct review of program operations (accountability audit, time and motion studies,



administrative audit.)

Social research techniques - Procedures used for developing, modifying and expanding knowledge about program (experiment, survey and case study).

Cost analytic techniques - Procedures used to appraise the relative value of program benefits in relation to program costs (costs accounting, cost-benefit analysis, cost-outcome analysis, and operations research).

#### 4. CSE Model

The Center for Study of Evaluation (CSE), University of California Los Angeles developed a model of evaluation. This is described by the Center's director, M. Alkin (1969a) as similar to the CIPP Model except that what Stufflebeam refers to as process evaluation has been substantially reconceptualized. CSE model encourages evaluators to attend to the enroute products as well as process of the program being evaluated, whereas the CIPP model evaluator only focuses on procedural considerations during process evaluation.

Alkin (1969b) defines evaluation as the process of ascertaining the decision areas of concern, selecting appropriate information, and collecting and analyzing information in order to report summary data useful to decision-makers in selecting among alternatives.

This definition is closely tied to the decision-making process, which in turn leads to a consideration of what kinds of educational decisions require evaluation information.

The model identifies five kinds of need areas of evaluation; each one is designed to provide and report information useful to a decision-maker in making judgments relative to decision categories.

The need areas are:

Systems Assessment - It is a means of determining the range and specificity of educational objectives appropriate for a particular situation. Needs are considered to be a gap between the goal and the present state of affairs. The evaluative problem is the assessment of the needs of students, of the community, and of the society in relation to the existing situation. Assessment, therefore, is a statement of the status of the system as it presently exist in comparison to desired outputs or stated needs of the system.

Program planning - It is concerned with providing information which will enable the decision-maker to make planning decisions; to select between alternative processes in order to make a judgment as to which of them should be introduced into the system in order to fill most efficiently the critical needs previously determined.

Program Implementation - Determines the extent to which the implemented program meets the description formulated in the program planning decision. In the case of an existing program where no known changes have been implemented, the evaluation task at this stage is to determine the degree to which planning descriptions of the program coincide with the implemented program.

Program Improvement - In this stage, evaluators play an important role by providing as much information as possible about the relative success of the parts of the program. Evaluators should identify problems and collect and analyze related information while the program is in operation, data relating to possible changes that could be executed within the system to improve the program will be

presented to the decision-maker immediately.

Program Certification - The decision-maker is provided with information that will enable him to make decisions about the program as a whole and its potential generalizability to other situations. The evaluator should provide information which will enable the decision-maker to determine whether the program should be eliminated, modified retained or introduced more widely.

The kind of information collected for program certification decisions is in large part dependent upon who is the intended decision-maker. Thus, different information will be required if the potential decision-maker is the teacher, the director or the administrator. Evaluations in certification area will be concerned with examining the extent to which the objectives have been achieved, as well as with the impact on the outcomes of other programs.

#### 5. Developmental Evaluation

Original designs of educational programs and the design as implemented should be evaluated with immediate feedback into the design. This assumption underlines IPI Formative Evaluation Model (IPI Individually Prescribed Instruction) proposed by Lindvall and Cox (1970).

Formative evaluation is the continual evaluation of all elements of a developing educational program as an aid to the development process.

IPI model identifies four steps in planning and developing a program:

-Goals

- Plan of the program
- Program Operation
- Assessment of results

In each step there are a set of key questions which are concerned with the basic and general question: How can every element and operation in the program be examined so it contributes to its improvement?

Formative evaluation ensures that each step in program development is done with care and assesses the quality at each step weaknesses discovered at any step have implication for modifying the preceding level. Feedback is seen as an essential procedure in formative evaluation.

IFI model is concerned to the development of curriculum packages and prototype programs, that is why the model also includes Individual pupil monitoring and summative evaluation. This is used in the evaluation of the results produced by an educational program.

#### 6. Newstart Evaluation System

Lamrock, Smith and Warren (1971) are the authors of the Newstart model. They assert that the purposes for developing an evaluation system are:

- 1) to get information required so that course developers can make appropriate decisions to accept, modify or reject developed components and concepts (formative evaluation)
- 2) to get information that is required for dissemination activities (summative evaluation)
- and 3) to get information that will help the users in the installation of developed and tested course packages.

This information was based on the topic areas where decisions are made (policy level; types of intervention; dissemination, and organizational structure; methods and systems of evaluation and measurement; the models and theory of training practices; student progress; ability, style, personality and training tutors; and curriculum content), the type of data bases used in the decision (data from the implementers of interventions such as objectives of agencies, professional judgments, priorities, standards and data from people receiving the intervention including such things as attitude measurement, statistical results and so forth); the source of the data for the decision (which involves detail data about the people on which the data are gathered and sometimes even abstract, logical and rational considerations); and the timeliness of the decision (this can range from very early policy decisions through the various stages of development of an intervention or program decisions about where to implement programs).

Formative and summative evaluations integrate different methods, to obtain data, into a total research study: direct observations, surveys and standardized tests, case studies and experiment.

#### 7. Cost-Benefit Evaluation

Clark and Olsen (1977) assert that an evaluation should identify the benefits and costs of any given program. The decision-maker should have evidence about the achievement of certain benefits and also about what is being traded off for them. Only then can alternative programs with unique benefits be compared for the purpose of making selections

in terms of their combination of costs and benefits.

Benefit is defined as any valued outcome of a program and a cost is defined as an outcome which results from trading off one benefit for another.

Cost-benefit evaluation should estimate benefits prior to data gathering, that is, all formal predefined objectives as well as any suspected incidental outcomes that might subsequently emerge from the program should be estimated. At the same time costs are also estimated prior to the data gathering stage.

These benefits and costs are "prioritized" by audiences connected with the program. This activity has to be performed because the resources for an evaluation are usually limited and because the list of estimated costs and benefits is inclusive.

Evaluation focuses initially on the highest priority costs and benefits and moves on down to lower priorities as resources permit.

The proposed approach follows next sequence:

Stage 1 - Audiences (people involved in the program) list the cost and benefits they would expect to see as a result of the program and prioritize the list according to the most important benefits and crucial costs. This list will be pulled out and placed on a master list and ranked according to the average ranking. The purpose is to find and evaluate the costs and benefits which are most common to the greatest number of audiences.

Stage 2 - The major purpose of this data gathering stage is to confirm or disprove estimated costs and benefits appearing on the master list.

A second purpose is to obtain impact information about each cost and

The author suggests the use of design criteria which are rules for the evaluation of the acceptability of designs. The most widely used are measurability, feasibility, optimality, reliability and stability.

#### 4. Systems Approach to Goal Setting

This framework was developed to help administrators better relate the systems approach to program budgeting. The model, proposed by Van Gigh and Hill (1971) has the following parts:

1. Systems definition, structure and design.
2. Systems design process.
3. Defining the boundaries of the system and identifying how those within the system judge the performance of that system.
4. Need for goal integration and method to obtain it.
5. Goal-setting process.

The authors identify as elements of school system: philosophy, goals, objectives, input and/or resources; outputs; the environment, the programs; the agents, decision makers, and management; and measures of effectiveness. Programs are defined as the processes by which inputs are converted into outputs. Programs can also be broken down into activities, projects, components, and/or elements.

System design is seen as a problem-solving process starting with the needs of the client. Needs are translated into specific goals and objectives, that are expressed in terms of measures of effectiveness. These measures serve as standards of achievement against which the results of alternative courses of action can be compared.

Defining the boundaries of the system is an important step as long

as the decisions are affected by how administrators set boundaries for inclusion or exclusion of people with concerns about the systems.

Need for goal integration and method to obtain it emphasizes the integration of the demands or broad goals from all the groups in the system: teachers, parents, government, etc. These goals should agree with the general philosophy of the institution, without such agreement the goals cannot be obtained. The procedure assures groups participation

Goal-setting process starts with a statement of general philosophy or mission, then moves through general goals, subgoals and objectives.

#### 5. A Systems Approach to the Development of an Evaluation System

This framework was developed by Yost and Monnin (1969) to provide a specific model for the evaluation of programs funded under Title III of the Elementary and Secondary Education Act of 1965.

The model was constructed to include delineation, collection, interpretation, and distribution of activities at each of three stages namely, baseline, process and product.

Evaluation as a system is divided into three parts:

- 1) Baseline evaluation describes conditions as before project treatment
- 2) Process evaluation helps the decision-making in day-to-day operation
- 3) Product evaluation measures the extent to the degree of project objectives has been met.

#### 6. The Ontological Model of Evaluation

Peper (1973) points out the need to develop an evaluation model which makes the organization its focus and not a single program or



part within an organization.

The Ontological model is proposed for the purpose of providing a conceptual framework through which evaluation can occur in and about developing organizations. Ontological development is stressed as a point of view which encourages a purposeful system of analyzing the dynamic state of an organization, versus program or curricula.

The ontological position is advocated in order to promote the dynamic search for endogenous variables. The author suggests that the emphasis on the developing organization is more important than the position of the evaluator inside or outside of an organization. But acknowledgment is also made of the fact that position does influence perspective and client-evaluator interaction.

For representing the ontological model the author uses a three dimensional figure which contains these elements:

Organizational Characteristics:

- Morphology (structure)
- Systems
- Kinesthesia (thrusters)
- Kinship linkages

Evaluation functions:

- Client consultation
- Planning
- Observation
- Data collection
- Data edit (reduction)
- Data analysis

- Data synthesis
- Report preparation
- Report presentation

Developmental phases;

- Preemergent
- Emergent
- Familial dependent
- Familial independent
- Independent

Evaluators' activities are characterized by a careful search for intrinsic variables. They should try to design their observation system and reporting system to place them in a position to make recommendations about the future.

Comments

Alkin's proposal has the advantage to consider some factors outside school system (macro-system) which are affected by the school outputs and affect the school inputs. This framework, however, lacks of methodology and instruments to be used in evaluation. It can be employed as a part of other framework to extend its scope.

Whereas Alkin's proposal is focused upon "academic" concerns, Young (1971) proposes a managerial approach as a key element to control the total efficiency of the educational program. Van Gigh and Hill's (1971) approach instead, is focused on goal-setting process to facilitate program budgeting.

The Ontological model stresses the analysis of the dynamic state of an organization. The model offers a framework to identify the

main characteristics and functions to evaluate. However, the approach lacks of a methodology for dealing with particular issues within an institution.

#### F. Some other Evaluation Approaches and Conclusions

The models presented in these four categories (Goal-attainment models, Judgmental models, Decision-Facilitation models, and Systems Approach models ) do not conform the total number of frameworks in each category . For instance Bruce (1972) developed a model which stresses a continuous monitoring evaluation; McGowan (1974) prepared a paper which discusses evaluating and observing teacher performance; Novick (1965) developed a model which concerns with budgeting, projected outcomes and evidence of past results. These three approaches, apparently different, have as common feature the comparison of performances with stated objectives. Hence, they can be added to the Goal-attainment models' category.

Harris (1947) proposed the "Appraisal Model" emphasizing the "professional judgment". In 1970 Steele developed the "Natural Process Approach" model which can be adjusted to evaluative needs and emphasizes three elements of evaluation: criteria, evidence, and judgment. Both models pertain to the Judgmental category.

Lewis (1972) developed the "Motivation Model" with the purpose of helping in the human behavior explanation. His model groups several elements from the educational system and are analyzed in terms of motivational processes. The model also identifies evaluation criteria

for those processes.

Loomis (1960) designed a model for analyzing social systems which can be a good framework to evaluate educational programs. These two approaches can be classified into the Decision-Facilitation Models.

Finally some authors like Cook (1966), Roman (1969) and Ryden (1967) discussed PERT technique which is particularly useful in more efficiently managing programs. These approaches can be added to the Systems Approach Models.

One can conclude that all the models categorized into these four types provide useful frameworks and/or procedures to evaluate school system at different levels, regardless to which category they correspond. In fact, their classification was performed to facilitate their handling and as a means to compare one type of approach against others as can be seen in Table 1 .

On the other hand, the categories of models presented can be seen as a manifestation of the educational evaluation evolution. Each category adds something else to the previous one. Hence, the evaluation conception, scope, methodology, instrumentation are each time more rich and complete. This does not mean that the last category (Systems approach models) is the most complete and perfect approach; rather it means that presently the evaluator is provided with more tools and insights to perform a better job, and according to the subject or object of evaluation, the evaluation purposes and focus, the practitioner is able to develop his own eclectic model.

#### IV. Preliminary Considerations when Planning an Evaluation

Evaluators usually are educational administrators, decision makers or any other professional consumer with the world of evaluation. The Guide prepared in this work must be of practical help to evaluators not by telling them what they must do (House, (1973) is right when he asserts that nobody knows enough to tell them that), but by presenting them some alternative actions in the evaluation field.

Planning is an important phase in evaluation. However, very few practitioners take care about it; the results of this lack of planning is failure in evaluation practices.

This part will discuss some important points that concern directly the evaluator. First point: The study of the Nature of evaluation illuminates the relation between evaluation as a means to control and improve educational systems and evaluation as a political practice. Second point refers to the importance of identify (in the evaluation planning stage) the object(s) or subject(s) of evaluation. Third point discusses the possibility of evaluating the educational system's effects. Forth point discusses the role of the decision maker in evaluation. The fifth point is focused on the recent incorporation of Operations Research tools into the field of educational evaluation.

##### A. The Nature of Evaluation

Evaluation has a political nature. Evaluation is not totally objective and neither is accepted as the final judgment. House (1973) asserts that "when someone wants to defend something or to attack something, he often evaluates it. Evaluation is a motivated behavior. Likewise the way in which the results of an evaluation are accepted depends on whether they help or hinder the person receiving them. Evaluation is an integral part of the political processes of our society." (p. 3)

On the other hand, analyzing evaluation more deeply, it is evident that it affects the allocation of resources. Evaluation is affected by politics and in turn affects politics. Under this context, evaluation is intimately involved with negotiations and relationships between people. In many instances, evaluation becomes a way in which a group (institution) justifies its activity to other groups (institutions). Evaluation becomes a weapon to be used within powers fight; but, according to House (1973), it cannot be seen as a dishonest activity because in a pluralistic society that function is important.

The other face or nature of evaluation (probably the less accepted as important) is that of improving educational programs. The value of evaluation here depends on its ability to discover failures, to identify their causes and to make the adequate decision to remedy these shortcomings. May be evaluators should pay more attention to this face of evaluation if they want a educational system to continue.

#### 1. What is to be evaluated?

Looking at the structure of the school system (Figure 4 ), the central element by which the system transforms its inputs into outputs is a set of programs or processes, that are devised to achieve the school objectives and goals.

Goals and objectives of the school system's programs are out of the evaluator's concern in Latinamerican universities. Goals are constantly negotiated among different power groups or, in other cases, goals are stated as a monocratic expression of one group's authority. In both cases, program's evaluator starts under the assumption that there is a general consensus on goals. However, there are exceptions and in some cases goals and objectives are subjects of evaluation. It depends on the purpose of evaluation; who demands the evaluation to be performed; what is going to be evaluated and where the evaluation is going to take place. For example, a new program can be evaluated to determine its effectiveness and its impact and larger results. Probably a goal-free evaluation, in this instance, would be a success. But, if the curriculum of medicine faculty of an established and ancient university is the object of an evaluation, the evaluator better should use an approach which does not question program goals, specially if the client does not demand that information.

## 2. Evaluation of System Effects

Evaluation has been oriented to be attentive to a wider range of program outcomes and/or to the effects of those outcomes in the school's macro-system ( Alkin, 1972; Hayes, 1959; Kaufman, 1972;

Paulson, 1972; Scriven, 1972a). Theoretically, there should be a feedback to provide the school system with information about the effects of its outputs. This information should be used to reorient school system activity towards the achievement of its goals. This is what is called negative feedback."

However, accurate information about social effects of the school system outcomes does not exist yet and, on the other hand, many education results of this sort are used only when they are favorable for the institution (Jarter, 1973).

In this context, educational decisions appear to be made in an intuitive, prudential manner. Adoption of new programs or the rejection of others are based on what is called "self-evidence". Miles (1967) asserts that no hard data have been collected and many decisions in education to terminate or continue with a program are founded on sand.

Negative results of evaluation should be valuable for the institution if evaluation is seen as a means to conduct the system towards its goals. Data should bear the next qualities: validity, reliability, timeliness, pervasiveness and credibility in order to be useful in evaluation process.

Finally, the only way to provide educational decisions with solidity is through a formal evaluation that is concerned with the overall effectiveness of educational programs. That is, an evaluation which not only is concerned with results in terms of behavioral changes in people, but also with the proportion of the potential clientele that is reached and the extent to which the results deal

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with urgent and continual need.

### 3. Decision-maker and Evaluation

Because its political nature, evaluation will inevitably be carried on by many people in and around the school. The typical evaluation will be informal, implicit and covert. On the other hand, evaluation could be formal, explicit and overt with the altruistic purpose of provide positive direction for school programs. Thus the evaluation of a program should not merely tell users whether accept or reject the program but also should provide information about how to use the program, when to use it and what parts of it to use (Erlandson, 1973).

The decision maker has to decide whether to maintain a central role in the school organization, or not. If he choses the first alternative, he must maintain a central role in the evaluative process. There are three questions that decision makers should answer before directing an evaluation. First question is what should be evaluated? This point was discussed previously, but it is necessary to add that it is impossible to evaluate everything because two reasons: the range of potential objects for evaluation is nearly infinite and because resources are scarce. Thus, choices must be made and priorities must be assigned. Another important point, according to Erlandson (1973) is that the decision maker should focus his evaluation on programs, not on people. This means the avoidance of pressure on individuals in order to reduce interpersonal tension. Thus, it increases the likelihood that the evaluation will produce the intended results.

Second question concerns with the reason to evaluate. This point

could seem tautological until one considers that most evaluations in school produce results that are never used. An honest answer to the question "why do I want to evaluate?" will lead to vastly different types of evaluations. The selection of the best type according to the purposes of the decision maker will facilitate the evaluation plan and as a consequence will save time, resources and energy.

Third question implies a consideration about what to do with the results of the evaluation. It is extremely important that evaluation leads to some action or at least to a conscious explicit decision not to take any action. If there is no purposive action as a result of the evaluation, the evaluation can be regarded as a waste of resources.

#### B. Systems Analysis and Evaluation

Finally, there are some considerations about systems analysis or operation research tools applied to educational evaluation. They are considered as valuable aids to the evaluator. Burnham (1973) points out that some of these tools are input/output analysis, cost-benefit, and cost-effectiveness. These are analytic schemes for investigating relationships of means and ends. The author considers that the most useful of the cost-benefit approaches is linear programming which is a mathematical technique for finding the best or optimal solution to a given specific problem. Linear programming is considered as an efficiency test.

There are other efficiency tests available as systems approaches; they are Program Evaluation Review Techniques (PERT) and Critical

Path Method (CPM). These provide the decision maker with a planning and evaluation tool. These efficiency tests are valuable aids to the evaluator, whenever the determination of the best outcomes is based on assumptions of specific objectives, known cause and effect relations and quantified variables. However, where these conditions are not obtained, the efficiency test is of little use.

Planning Programming and Budgeting System (PPBS), another popular technique drawn from Operations Research is used to help relate the resource requirements of an organization to its goals (Shroeder & Adams, 1976). Theoretically, PPBS does this by presenting financial, budgeting, and other resource information by programs that are defined according to the outputs of the organization. Nevertheless, Schroeder and Adams (1976) report that the advantages of PPBS have not realized to date in actual practice; they question the basic utility of a PPBS approach and emphasizes the need to explore other management science methods for improving management at schools.

These shortcomings in the use of operational research techniques in the educational field are not due precisely to the techniques themselves. Sisson (1969) asserts that operational analysis has not made any impact on education yet, because two kinds of difficulties. They have prevented education from obtaining the benefits from Operational research which the military and the industrial fields enjoy. First, Sisson (1969) argues, educational research and analysis have received a very small financial support in comparison with other problem areas, e.g. health. Second difficulty is in the relationship between operational analysis and theory. The author

asserts that the more complete the theory, the better the system design resulting from analysis. For Education, there is almost no theory and there have been few efforts to develop such a theory.

The lack of theory means that the system design proceeds with more uncertainty. Large "safety factors" must be built in; and this means that educational systems have to be expensive.

In conclusion, Operational research techniques have recently been introduced into educational fields. They are in the phase of trial-test. Many shortcomings in their application are due more to the lack of acquaintance with those techniques than to their inability to cope with some quantitative educational problems.

Both evaluators and decision makers should be aware that Operational research tools are not a panacea. They will not eliminate shortcomings in planning or developing programs; rather, used wisely, they will help to identify those failures. The rest of the evaluation process, that is, decision making for an alternative action, is on the hands of the decision maker.

## V. An Educational Evaluation Guide, its Rationale and its Evaluation

### A. Rationale of the Educational Evaluation Guide

#### 1. Systems Approach

The application of the systems approach to educational evaluation is an attempt to facilitate the understanding of the school as a system, hence, systems thinking provides a great value as an analytic framework. Some systems notions such as feedback and control are applicable to the practice of evaluation as well. These concepts offer a different view of evaluation, thus, under systems thinking, educational evaluation can be seen as a means to control the school system and as a means to insure the school system effectiveness and efficiency.

In short, systems approach as a tool permits an easy and complete identification and understanding of the school's components and at the same time, provides a theoretical framework for the practice of evaluation.

The part I of this thesis essentially has described some school subsystems considered as having special importance for the evaluation in Latin American universities. The purpose of this description has been:

- a) the identification of the critical elements of the school system,
- b) and the understanding of the interrelations of these elements within the school system.

Hence, the answer to the question "what is going to be evaluated?" can be formulated more easily.

This school system description has been also included in the Guide however, it has been simplified.

On the other hand, the educational evaluation guide is designed on the assumption that the main purpose of educational evaluation is to control the school system activity and thus insuring its effectiveness and efficiency. This conception was setted againts the common belief in Latin American universities that evaluation is only an administrative policy which is developed through the application of learning tests. The Guide emphasizes the idea that school system has several components that need to be evaluated and thus controlled.

## 2. The Educational Evaluation Models

The educational evaluation models conform the theoretical part of evaluation. There are hundred of different models emphasizing different issues in the practice of evaluation. The second part of this thesis presented a review of the most remarkable evaluation frameworks, categorizing them in four groups and discussing their advantages and disadvantages when are applied.

The practice of evaluation is characterized as a complex activity. The evaluator almost always faces different situations and the application of a precise, specific, verifiable and unique evaluation model for all those situations is unfeasible.

As it was discussed elsewhere, there is not a "perfect" category

of models nor a single "best" model. For instance, it is not possible to recommend the use of Goal-attainment models whenever the evaluator tries to evaluate student's learning or assert that the Systems approach models should be applied when school programs are to be evaluated.

The evaluator has to be able to identify and understand the evaluation problems he faces, and then select the best model(s) to deal with it.

A model is considered as a methodological tool used to guide and focus inquiry (Borich, 1974); however, generally the evaluation models are focused on a limited set of educational aspects or are based on a particular conception of evaluation. When the evaluator tries to apply them to real situations, he finds that they do not satisfy his evaluative needs.

On the other hand, many models are unknown for the practitioners and, in addition, it is not easy to revise all the evaluative literature each time some model is needed.

The educational evaluation guide does not recommend a particular category of evaluation models, nor a particular model. Rather, it proposes the selection of evaluation model(s) according to the objectives of the evaluation, and the element(s) of the school system that is (are) going to be evaluated.

### 3. Evaluation Planning

Evaluation in Latin American universities is commonly performed without any plan. Evaluators usually use some instrument to measure

or observe whatever could be the subject or object of "evaluation", and then they give a result (e.g. a mark). When the unit of evaluation is small (i.e. student's learning) the effects of a lack of an evaluation plan are not very significant; but, when the unit of evaluation is bigger (i.e. an educational program) then the whole evaluation could fail because a lack of planning. Evaluation is considered in this thesis as a systematic activity. As such, it should be developed following a general procedure which forcibly must include a planning phase.

Planning the evaluation is then another important point emphasized in the educational evaluation guide. It involves mainly the identification of what is going to be evaluated, the purpose for that evaluation, and the identification of the decision maker.

#### 4. Summary

The educational evaluation guide was designed based upon the concepts and principles discussed in the previous four parts of the thesis. It is addressed to educators in higher education in Latin American countries who have not acquaintance with current theoretical developments in evaluation.

The Guide was thought to be a practical tool to develop an evaluation, thus many information was reduced or avoided in the Guide. However, it contains some cues to foster the search of additional information from different sources.

The Guide has as a main purpose to facilitate the development of an evaluation inside the school system. It is not a check-list nor a step-by-step manual. It was designed having in mind that evaluation,



as many other issues in education, has an heuristic nature. That is, in practice, not all the evaluators face the same issues and not always the purposes, scope, or subjects of evaluation are the same.

The Guide provides the reader with the explanation of some aspects and concepts considered as having a great importance in the practice of evaluation. The introduction deals with this content and also presents the purposes of the Guide.

The Guide offers as well a brief description of some elements of the school system using the system approach. This section has the purpose of helping evaluators in the identification of what or who has to be evaluated in the school, and at the same time, to alert them about possible effects of that evaluation over the rest of the school components.

Finally, the Guide presents a general flow chart pointing out the major steps in planning and developing an evaluation. The planning section includes some guidelines toward the selection or integration of an evaluation framework. This framework can be utilized as an alternative path to continue with the next phase, namely conducting evaluation. In fact, after selecting an evaluation model, the Guide's user could manage the rest of the Guide's steps as points of comparison between his model and the Guide. Obviously, the Guide does not intend to compete with the evaluation models; rather it can enlighten some procedures or steps missed in any evaluation model. Hence this last section could be: 1) a guideline to assist in the selection of a framework, 2) a comparative tool for the frameworks once one model has been selected, 3) a complementary help in following a model.

## B. Plan for the Evaluation of the Guide

The evaluation of the Guide for Educational Evaluation will follow five phases:

- a) Planning
- b) Gathering data
- c) Analyzing data
- d) Reporting results
- e) Making decisions

a) Planning the evaluation will comprise the specification of the operational objectives of the guide and standards. The audience to whom the Guide is addressed will be identified as well as the kind of instruments used to obtain information about the effectiveness of the Guide.

From the audience identified it will be determined the number and position of the participants in the guide testing. A previous contact and agreement with these people will be necessary.

Finally, a tentative budgeting for the formal evaluation of the guide will be made. This budgeting will accompany the plan for the evaluation guide.

b) Gathering data. If the plan for the evaluation of the guide is accepted, the second phase will consist in: 1) designing the instruments for this evaluation. This activity will be carry out by the personnel of the Educational Technology Department of CLATES.\* The instruments will have validity and reliability as a requisite for their usage. In order to guarantee the achievement of these two qualities, the

\*CLATES Centro Latinoamericano de Tecnologia Educacional para la Salud.

instruments will be tested in several pilot studies using clients of the same Center. 2) The selected participants will be provided with the Guide and the instruments of evaluation. The collection of information will be organized as follows:

Group	Subject of Evaluation	Report
A	Student's learning	Effectiveness of the Guide to evaluate learning.
B	Teaching	Effectiveness of the Guide to evaluate teaching
C	Curriculum (design)	Effectiveness of the Guide to evaluate curriculum design.
D	Instructional design	Effectiveness of the Guide to evaluate instructional design
E	Instructional materials	Effectiveness of the Guide to evaluate instructional materials.

The reports will state the degree of which the Guide achieved its objectives in the evaluation of each subject or object of evaluation.

c) Analysing data. The analysis of the provided information will show the major and minor deficiencies of the Guide, through the comparison of the actual outcomes of its application and its intended outcomes.

d) Reporting results. On the basis of the previous analysis a report will be formulated. This will be addressed to the decision-maker in CLATES and it will be accompanied with comments and opinions from the audience who would use the Guide ( in this case represented by the participants who report their experiences in using and testing the Guide).

e) Making-decisions. Based upon the report of results, the decision-maker will probably determine any of the next alternatives;

- stop the use of the Guide;
- revise the Guide and correct weak points;
- continue the use of the Guide as is.

In the first possible alternative, the suppression of the Guide would implicate the development of other kind of procedures or devices in order to provide evaluation guidance to the clients of CLATES. For example the implementation of other courses, or a program of systematic counseling in evaluation, or packages of printed material or otherwise to provide practitioners with up-to-date information about educational evaluation.

The second possible alternative would comprise the organization of a committee who would look for different approaches to improve the Guide. This committee would be responsible for the second evaluation of the Guide as well.

The third possible alternative would mean that the Guide is almost 100 per cent effective. However, may be in terms of efficiency, it would require the addition of some devices, for instance an appendix to save the practitioners' time in the library.

Activities and tentative Calendar for the Evaluation  
of the Guide ( see figure 13 ).

1- Obtaining permission to plan the evaluation

Planning:

Activities	Time and human resources
2- Setting operational objectives	16 hours (2 days), 2 people.
3- Determining participants	16 hours (2 days), 2 people.
4- Getting contact and agreement.	40 hours (5 days), 4 people.
5- Identifying instruments	16 hours (2 days), 2 people.
6- Making tentative budgeting	16 hours (2 days), 2 people.
7- Writting the plan	24 hours (3 days), 2 people.

Gathering data:

8- Designing instruments	84 hours (3 weeks) 4 people.
9- Organizing groups	5 hours (1 day) 2 people.
10- Instructing groups about the use of the Guide and its evaluation.	3 hours ( 1 day) 2 people.

Analyzing data:

11- Decodifying information	96 hours (2 weeks) 3 people.
12- Analyzing data	40 hours (1 week ) 2 people.
13- Summarizing data	24 hours (3 days ) 1 people.

Reporting results:

14- Summarizing comments and	3 hours (1 day ) 1 people.
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## Activities

## Time and human resources

15- Writting the report

24 hours (3 days) 2 people.

## Making-Decisions

16- Analyzing report

3 hours (1 day) 1 people.

17- Looking for additional\*  
information

24 hours (1 week) 2 people.

18- Setting possible alternatives

24 hours (1 week) 2 people.

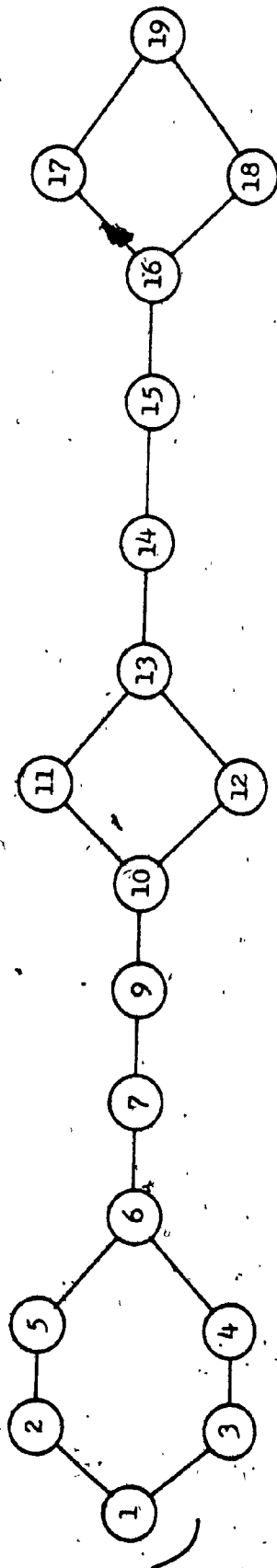
19- Making final decision

2 hours (1 day) 1 people.

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\* This activity is optional.

Figure 13 Tentative Calendar of activities for the Evaluation of the Guide



Total time estimation 54 days ( 2 months and 2 weeks.)

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## APPENDIX A

## GUIDE FOR EDUCATIONAL EVALUATION

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## Guide for Educational Evaluation

### A. Introduction

#### What is evaluation?

Educational Evaluation has been related to several other terms going from measurement to disciplined inquiry.

The equation of evaluation with measurement goes back to the Twenties and Thirties when the measurement movement in social sciences had an important development. The use of measurement devices resulted in scores and other indices that were capable of mathematical and statistical manipulation. The handling of masses of data and comparisons were possible. However, as a result of this approach, evaluation was given an instrumental focus. Guba (1969) asserts that at this time, evaluation was viewed as the science of instrument and interpretation. Another consequence drawn from this orientation was the neglect of value judgments as an important element in evaluation. Finally, evaluation, considered as measurement had a narrow meaning because it was limited to those variables for which the science of measurement had successfully evolved instruments. Other variables known as "intangibles" could not be measured and hence they were considered as useless and ultimately without importance.

Evaluation has been equated with the term assessment as well. Anderson et al. (1975) explain that assessment has a narrower meaning than evaluation but a broader meaning than measurement. They point out that assess means to "assist the judge" and suggest that assessment may be limited to the process of gathering the data and

fashioning them into an interpretable form; judgments can then be made on the basis of this assessment. Assessment, according to this definition, precedes the final decision-making step in evaluation.

On the other hand, Worthen and Sanders (1973) assert that evaluation is an inquiry activity because it uses systematic inquiry techniques in order to judge worth or social utility. Even research and evaluation have a great deal in common (both are inquiry disciplines) there are salient differences between them. Popham (1975) offers the next table in which the differences between educational evaluation and educational research are set out.

Inquiry characteristics	Educational Evaluation	Educational Research
Focus:	Decisions	Conclusions
Generalizability:	Low	High
Value emphasis:	Worth	Truth

Evaluation being an "inquiry" activity cannot be equated with research. It is possible to assert that the difference between these two disciplines is based mainly in their purposes.

In this context, Evaluation is defined as the determination of the worth of a thing. It includes obtaining information for use in judging the worth of a program, product, or objective, or the potential utility of alternative approaches designed to attain specific objectives.

Nevertheless, Educational evaluation have many other definitions. Rose and Nyre (1977) propose that all those definitions conform few orientations and that these categories of definitions of

evaluation are the bases for the building of evaluation models.

In fact there are three categories of evaluation:

- a) evaluation defined as an assessment of outcomes, intended or otherwise;
- b) evaluation defined as the determination of the worth of a thing;
- c) evaluation defined as the process of obtaining and providing information for decision making.

The first category of educational evaluation definition focuses on the determination of the degree to which an instructional program's goals were achieved.

The second category focuses on the evaluator's description and judgment about the subject of evaluation. The role of the evaluators is to judge and recommend some action as a result of the evaluation.

The third category focuses on decision-making. Thus evaluators' role is to provide decision makers with information needed to make a decision.

These categories overlap in practice; for instance, decision-making uses objectives attainment as a major criterion to produce a judge and make a decision.

The concepts of the Systems approach have been applied to the evaluation field. The systems approach uses several techniques drawn from management, operational research, problem solving, etc. This orientation leans heavily on the goal attainment approach, but its scope is holistic in so far as it considers more elements and processes being important in evaluation. In addition, this orientation stresses efficiency and productivity as criteria for evaluation.

Using the contributions to evaluation provided by these four orientations, evaluation can be defined as the process of obtaining relevant information for judging and making decisions. Evaluation thus, is more than to measure or assess, information gathered by evaluative instruments is analyzed and compared against standards drawn from goals and objectives, in order to make a judgment; and on the basis of this judge, make a decision. The decision should be made, considering efficiency and productivity criteria. Each one of the evaluations performed must seek the improvement of the school system.

#### Brief History of Evaluation

Educational evaluation has been a subject of several changes both in its philosophical bases and in its instrumentation.

Taylor and Cowley (1972) identify three parts of development:

1st. Era. Prior to 1930's evaluation was equated almost exclusively with the administration of standardized tests. Evaluation did not possess the same meaning that nowadays has, rather it bore a limited concept: measurement.

2nd. Era. Comprises from about 1935 to 1957. This period was important for the establishment of a basic pattern of evaluation activities. This era was based in part on an increased concern for the high order cognitive and affective objectives and the consequent inappropriateness of comparative evaluation using either another group or norms as a comparison.

The major contribution of this era was the idea that the domain of evaluation must be extended beyond the mere measurement of outcomes to improvement of courses. During this time, there was an stress on stating



objectives behaviorally but, at the same time a lack of stress on valuing the objectives themselves.

3er. Era.- This present era can be characterized by an expansion of the evaluation domain brought about in part by the funding agencies for proof of results, in part by educationists who saw a need for more information and knowledge about the educational process. Hence this period is marked by the need to go beyond goals assessment. Programs not only should be effective, but efficient; learning is not only a matter of evaluation, but also teaching, school administration, instructional programs and all those elements which can be important variables in learning attainment and in its efficiency. May be this is the reason by which hundred of methodologies, instruments, procedures have been developed in this field.

#### Issues in Evaluation

According to the last section, there are several major concepts of evaluation, mainly coined during the third era of evaluation. Some of them will be discussed here.

Formative and Summative evaluation. Scriven (1967) distinguished between evaluation in its formative and summative roles.

Formative evaluation essentially is concerned with helping the developer of programs or products (instructional design and development, curriculum design, instructional materials production etc.) through the use of empirical research methodology.

Formative evaluation must occur in close collaboration with program or product development. In short, formative evaluation refers to judgments

as to the worth of educational programs or products that are capable of being changed.

Summative evaluation has as a purpose to assess the overall effectiveness of a program. Summative-evaluation reports are directed toward those who make decisions. Hence, summative evaluation is the assessment of an already developed program.

Formative evaluation provides information on how educational programs or products operate in practice and how their operations are deficient, with a view to improving them; whereas summative evaluation is more a weighing up process, an estimation of the worth of the final product (Unwin & McAleese, 1978).

Goal Free Evaluation. This approach proposed by Scriven (1972 a) was designed to ensure that evaluators take into account the actual effects and not just the intended effects of education.

According to the author, some programs achieve their goals but are terminated because of particularly adverse side effects, while other programs make little or no progress at all toward intended outcomes but are implemented because of important unintended gains.

Scriven (1972a) concluded from these facts that the consideration and evaluation of goals is an unnecessary and possibly contaminating step. In contrast to goal-based evaluation (in which the evaluator is attentive to not only the quality of an educational program's goals but also the degree to which those goals are achieved), Scriven proposes goal-free evaluation which is focused on the outcomes of a program, intended as well as unanticipated.

An important point is that Scriven (1972a) does not recommend

goal-free evaluation as a replacement for goal-based evaluation but as a complement to more goal-oriented frameworks.

Formal and Informal evaluation. According to Stake (1967) educational evaluation has its formal and informal sides.

Informal evaluation is recognized by its dependence on casual observations, implicit goals, intuitive norms and subjective judgment.

Formal evaluation of education make use of more valid and reliable procedures and instruments. In many instances is more objective than the informal evaluation type and usually is conducted because of an special request from authorities.

However, and educator who wishes to conduct a penetrating and insightful evaluation on his program should opt for a formal evaluation in order to have a real success in controlling the development of his program.

Types of Decisions. As long as the major end of an evaluation is change, the type of decisions which can be formulated were proposed by Stufflebeam et al. (1971). The next table resumes those decisions.

	Intended	Actual
Ends	Planning Decisions to determine objectives	Recycling Decisions to judge and react to attainments
Means	Structuring Decisions to design procedures	Implementing Decisions to utilize, control and refine procedures

Taken from Stufflebeam et al. (1971) (p. 80)

Planning decisions specify major changes that are needed in a

program. The need for planning decisions arises from what the program is intended to be and what it actually is or 2) awareness of a lack of agreement between what the program could become and what it is likely to become.

Structuring decisions specify the means to achieve the ends established as a result of planning decisions. They consider such variables as method, content, organization, personnel, schedule, facilities and budget. The sources for structuring an action plan to achieve the desired objectives are: 1) planning decisions which specify what the program is to achieve, 2) the existence of alternative means available to achieve the specified outcomes and 3) the relative strengths and weaknesses of the available alternatives. Sometimes objectives are modified in structuring decisions because of realistic limitations on available means to ensure their achievement.

Implementing decisions are those involved in carrying through the action plan. These arise from two sources 1) knowledge of the procedural specifications and 2) continuing knowledge of the relationship between procedural specifications and the actual procedures. Implementing decisions involve many choices regarding changes of procedures in process. It comprises much of the day-to-day responsibilities of operating any program.

Recycling decisions are decisions used on determining the relationship of attainments to objectives and whether to continue, terminate, evolve or modify the activity. Basically recycling decisions involve product control choices. They occur through an activity as quality or product control devices. Recycling decisions are concerned with

attainments at any point in the program.

Evaluation as a political activity. Evaluation has a political nature as long as it is related to resources allocation. Resources are scarce and they must be allocated between many competing elements. Evaluation can provide evidence to help in making decisions about where resources should be allocated. However, the decision made is not always based upon evaluative information. Decision makers themselves have their own political ideals, values and biases.

Evaluation study provides evidence to support the continuing of some program or to change it and usually is part of the evidence used to reach a decision. As such it is part of a political process (Unwin & McAleese, 1978).

Some authors have developed interesting approaches to study the political nature of evaluation, i.e. House (1972) ; Hamilton (1976); McDonald (1976). These kind of studies offer a more real view of how evaluation results are used. Evaluators have to be aware that evaluative information does not always lead to an expected decision or change. There are many interests and policies that may deflect in some manner the evaluation process.

#### Purposes.

This Guide has as a major purpose to orient practitioners in planning and conducting an evaluation. As there are unlimited aspects of education that can be evaluated, as there are many purposes behind each evaluation plan, it is impossible to build a step-by-step guide to perform all sorts of evaluations.

Rather, this Guide would be useful in identifying the subject or

object of evaluation, selecting the more appropriate evaluation framework, identifying the instruments to be used in the evaluation and forecasting the kind of decisions that could be reached.

The next part of this Guide attempts to offer a view of how the school system is composed, in order to identify critical elements, processes, interrelations and goals of school system and its subsystems. There are of course, many other elements that can be treated as an educational subsystems. However, the subsystems identified are considered by the author as having a major importance in the academic field. However, the practitioner can consider other educational elements as system, according to his needs, when planning his evaluation.

Finally last part is a description of how to perform a program evaluation. It should be emphasized that program evaluation has been considered as the unit of analysis of educational evaluation. Thus instead of conducting a piecemeal evaluation (i.e. one student's learning), evaluators are urged to perform holistic evaluations in order to take into account more relevant data about more variables. This, hopefully would facilitate a better control of the educational system as a whole.

## B. School System Description

One of the most important activities when planning an evaluation is the identification of what is going to be evaluated. This assertion could be trivial until you find yourself in a position in which it is necessary to "evaluate all the educational program" or carry on a "diagnosis of an institution" and so on. In fact when dealing with complex systems such as the school, one needs an effective method to analyze the school elements, processes, and interrelations. In other words, it is necessary to have a method which permits an approximation to the parts, without losing the view of the whole.

Systems approach offers these advantages. Its key concept is "system" which can be defined as an assembly of parts, connected together in an organized way, and in continuing interaction. The assembly's activity leads to a predetermined goal or goals (Beishon & Peters, 1976).

It is possible to analyze the school as a system. The school system is comprised of many elements and processes which are in continuous interrelationships inside the school system and with the system's environment, that is, with other systems outside school system such as social, political, economical, health, etc. These systems affect in some way the school activity, but at the same time they are affected by the school activity.

A system is considered to operate in the next fashion. Some elements enter the system and they are in general called "inputs". The system processes or transforms these inputs into "outputs". Hence the

school system receives as its major input students in a state "X" (graduates from Preparatory school); the school transforms these students in some speciality of Health (outputs). There are, however other important outputs of the school system -many of them do not previously planned- such as drop-out students.

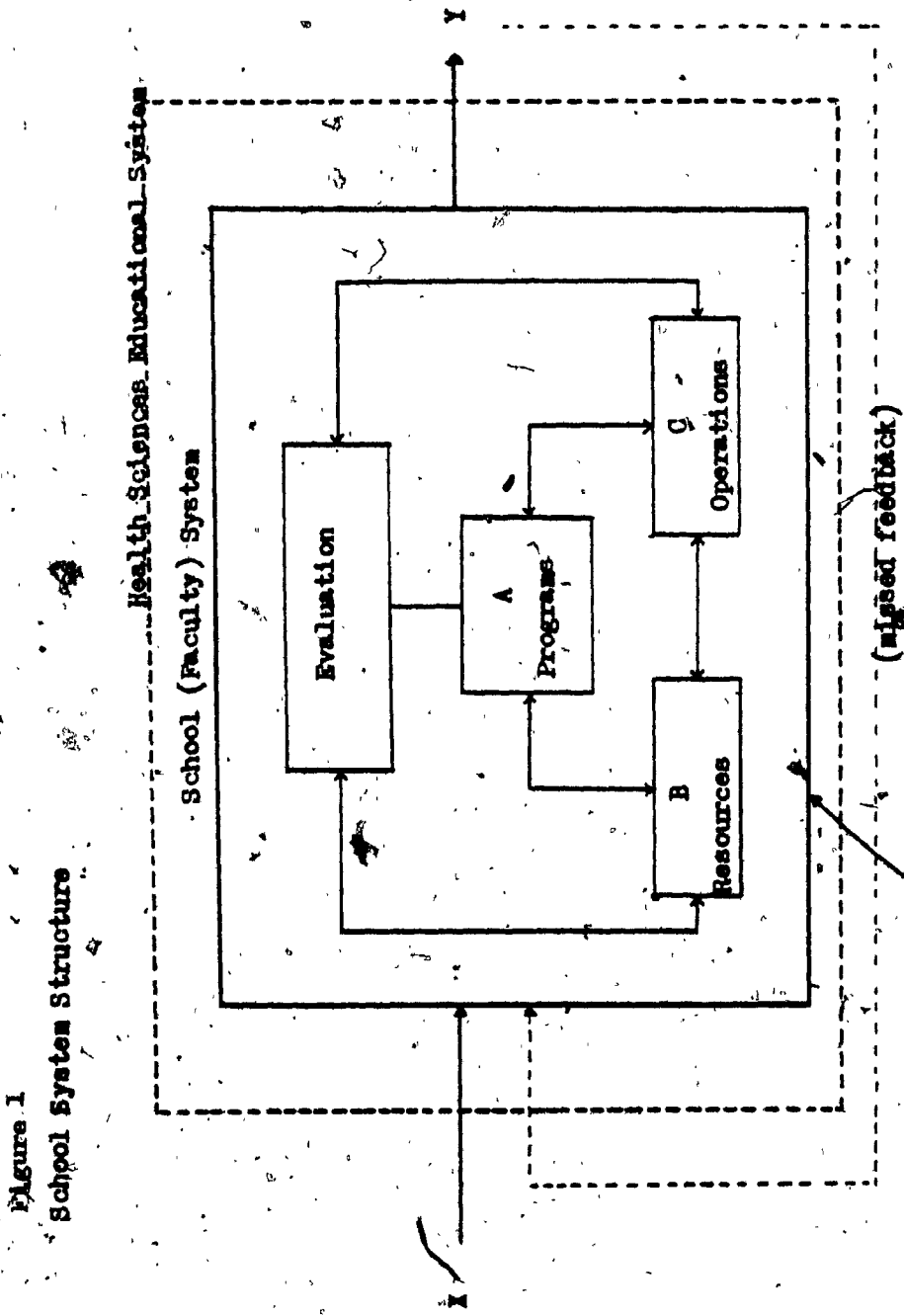
Figure 1 depicts some elements inside the school system which are the components that "processes students". These elements are human, material, and financial resources such as teachers, equipment, libraries, etc. Operations are considered to be formal and informal. Formal operations are courses of study, clinical practices, administrative procedures etc. whereas informal operations are casual interactions among students, and faculty members.

The function of these resources and formal operations is defined through several programs such as curricula, management programs, research programs, etc. All these components are supposedly evaluated to insure quality control. Evaluation may operate in a formal or informal fashion. That is, student's achievement evaluation is a formal evaluation, whereas the evaluation of teachers use to be informal, (only when some department's chief receive continuous complains from students about some teacher's performance is when he decides to do something).

Evaluation rarely operates outside school; that is, the system does not receive continuous and accurate information about its graduates' performance in the professional field. For this, Figure presents a dotted line going from the outputs to the inputs.

Finally, the school system possesses a set of political and





- X Student entering the system
- A Central Processing Component
- B Graduate Drop out students
- D Philosophical and political values

Figure 1  
School System Structure

Adapted from Sheehan, 1967.

philosophical values which function as a framework for the school system activity. For example programs are based in certain assumptions which are taken as true interpretations of the reality and also they obey to some political demands which come from the school environment. Hence, even if sometimes these values are not explicitly stated, they are present in the way the school system sees the world and in the way it operates.

Figure 1 only offers a simple structure of the school system.

Other elements of this system are:

Inputs. Social, psychological and academical needs, goals, objectives, purposes and expectations, curricula, educative methods, philosophical and political values, human resources, material resources, financial resources, policies, extra school regulations, student demands, time, organizational and management methods and techniques, inter-institutional contracts for health assistance.

Outputs. Teaching abilities developed, social, psychological and academical needs response to, new goals and expectations, curricula developed, instructional material produced, adopted or adapted, decision transmission, information transmission, enforcements of ministerial or extra-school policies and rules, and costs.

General goal. Formation of professional (in health sciences)

Conversion process. Planning, implementing and evaluating educational and administrative programs, business management process, internal and external negotiations, social needs assessment, communication processes, organizational procedures.

Environment. Educational system, social system, economic system.

political system, scientific and technological systems, national and international health systems, government system.

Attributes. Measure of effectiveness; School goal's attainment.

Programs. Research program, educational programs (curricula), administrative programs, community services programs, human resources development programs.

Decision maker. Director of the school; subdirector of the school, general secretary and general administrator chief.

School system is comprised of other "subsystems" which operate and have the same properties of a system. According to an academical interest, the author has identified as being of special importance:

Learning and Teaching system;

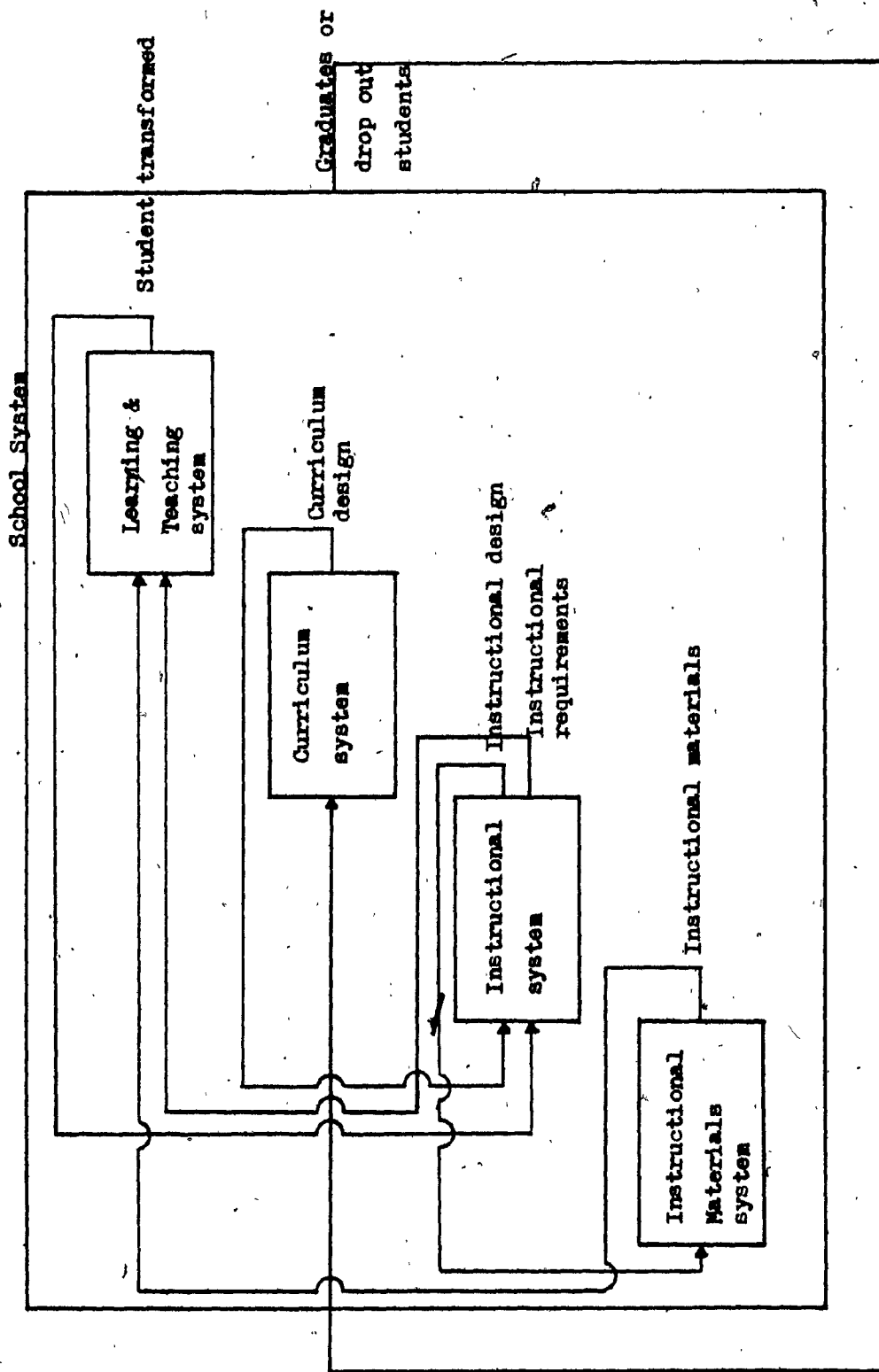
Curriculum system;

Instructional system and,

Instructional materials system.

These subsystems are interrelated specially by their outputs which successively serve as inputs to the next subsystem. Figure 2 represents these series of loops. Curriculum system receives information about graduates and drop-out students, such as number, years to complete the curriculum, general difficulties in the attainment of goals, etc. This information, added to other inputs, is used to develop a curriculum design ( an organized body of goals and general objectives). This curriculum design enters the Instructional system. Here the system processes that and other inputs and produces instructional designs which are sets of detailed activities designed to attain curricular

Figure 2 School System Loops



goals. These instructional designs are part of the learning and teaching system's inputs. The instructional system determines which instructional materials will be necessary to support instructional practices. Thus this is an important input to the instructional materials system. This system satisfies these requirements and its outputs: instructional materials are inputs as well for the learning and teaching system. The outputs of this latter system are inputs for the instructional system. That is, if the student is transformed in the way it was planned it was a success for both instructional, and teaching and learning systems; but it might happen that the student has an unexpected transformation, this information fed back the instructional system to improve instructional designs.

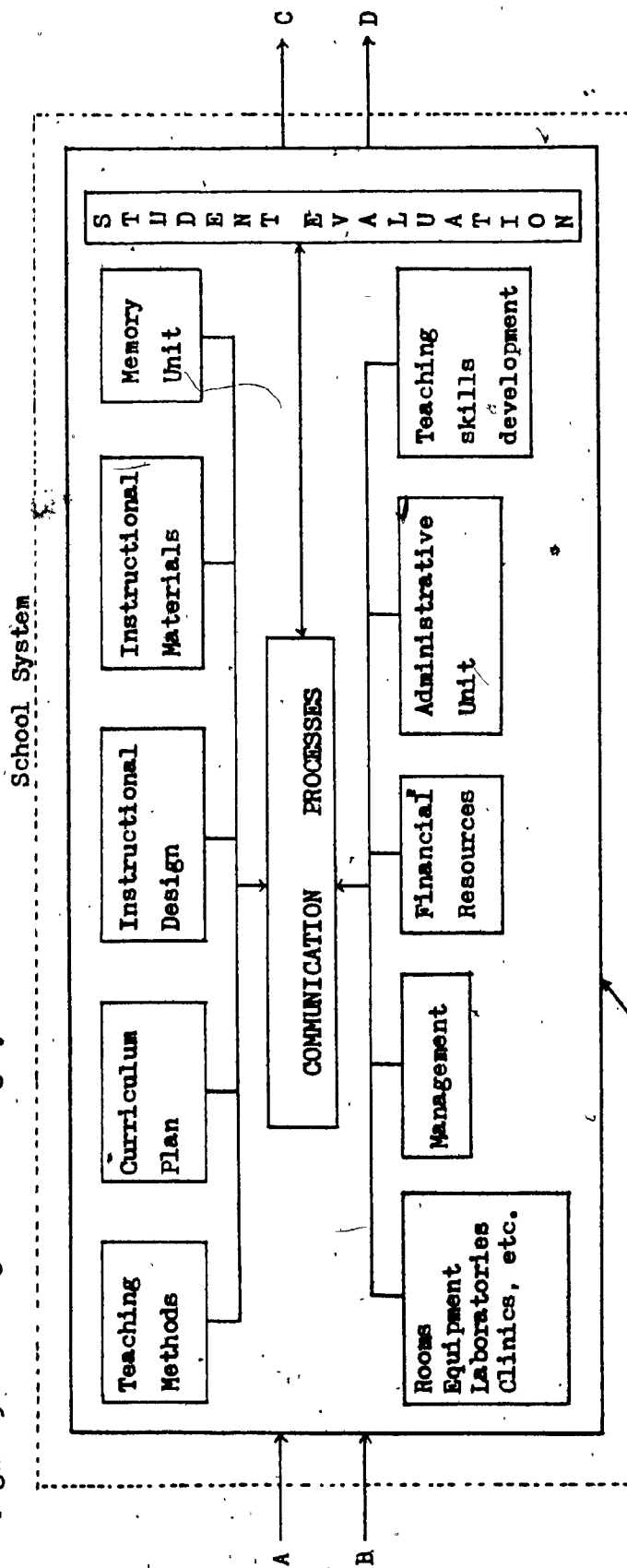
These school system loops are an abstraction of how the school should operate. It is necessary, however, to look at each subsystem more closely to have a better idea about their components and activities.

#### Teaching and Learning System

This is one of the most important subsystems of the school. It is obviously composed mainly by students and teachers. The main goal of this system is to change student's behavior.

Figure 3 depicts the teaching and learning system components. The central operation is the communication processes which consist of series of interactions in which alternatively or simultaneously the teacher and learner can play the role of transmitter or receptor. The teaching phases go from providing student with information and

Figure 3 Teaching and Learning System Structure



A Entering students' characteristics

B Entering teachers' characteristics

F Philosophical conception of education

C Student transformation

D Teacher transformation

direction; make him to practice that information and provide him with feedback about the quality of his performance. In these interactions both the students and teacher suffer some kind of transformation. The students might learn a subject matter and the teacher might learn to teach even better.

The boxes which are located at the top of the communication processes in Figure 3 are tangible tools or devices (instructional materials, teaching methods, instructional designs) or information (curriculum plan, memory unit which contains essentially academical knowledge); Under the communication processes' block there are some elements which make the communication process feasible such as rooms, financial resources and so on. As a parallel activity there is a development of teaching skills .

Formal evaluation is focused only on the student's learning, the rest of the components are rarely evaluated.

Other elements not represented in figure 3 are:

Inputs. Information (about students, staff, teachers, methods, techniques, etc.) material resources (instructional materials), installations (rooms, laboratories, clinical fields); financial resources; goals, objectives, purposes and expectations; institutional policies and regulations; curriculum and instructional designs, human resources (new faculty members, managerial staff etc.); time.

Outputs. Records, policies enforcements, rules enforcement, decision transmission, information transmission, costs.

General goal. Change student's behavior (educate students).

Conversion process. Student's behavior modification by instructional

processes: a) information, b) practice, c) feedback.

Environment. Curriculum system, administrative system, philosophical and value system, students' association and extracurricular activities system.

Purpose and function. Purpose: student's behavior modification regarding curriculum goals. Function: provide students with adequate conditions (information, practice and feedback) in order to achieve student's learning.

Attributes. Measure of effectiveness: Curriculum's goals student achievement.

Programs. Instructional program.

Decision maker. Teacher and/or faculty member.

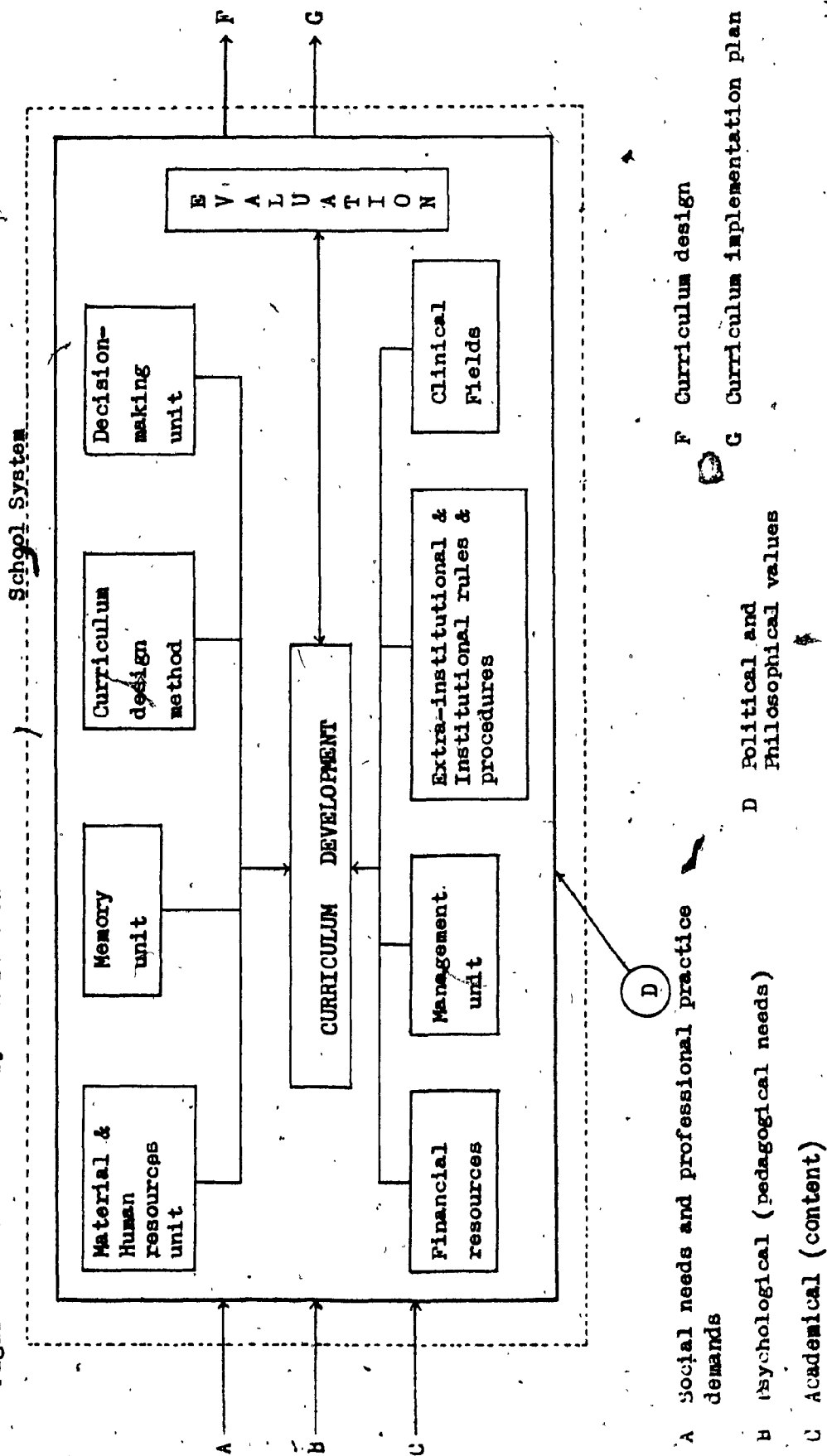
#### Curriculum System

Curriculum was defined by Johnson (1977) as a set of intended learning outcomes, that is an organized body of goals and general objectives aimed to form a professional.

A Curriculum system transforms inputs (data) into a curriculum design. Figure 4 presents the structure of this system. The main activity is the development (or creation) of the curriculum design and in this process human resources, organized into a curricular committee; methods; other data such as curricula past trials and experiences organized into a memory unit; and decisions are the major elements required in the curriculum development process. Other elements (depicted under the curriculum development's block) are important too. For example, in designing a curriculum the committee



Figure 4 Curriculum System Structure



should have information about what clinical fields are available for students practices and it is important as well to consider internal and external rules and procedures because they could be possible constraints or facilitators in the future academical practices.

This system operates under a set of political and philosophical values. Maybe these values become more evident when a decision about curriculum setting is made.

Finally, evaluation is performed based mainly in an agreement between the design and the values of the school system and regarding as well the consistency and coherence among all the goals and objectives.

The curriculum system elements missed in Figure 4 are:

Inputs. Philosophical and value framework additions; human resources (curriculum committee, faculty, curriculum design specialists) financial resources, goals, purposes and expectations, time.

Outputs. Curriculum social effects, educational philosophy and values enforcement; decision transmission, information transmission; curriculum planning costs; policies enforcement; rules enforcement.

General goal. Develop a curriculum which can meet the social, psychological and academical needs.

Conversion processes. Curriculum design methodology, need analysis, curriculum implementation methodology, curriculum improvement methodology, administrative procedures, feedback processes.

Environment. Learning and teaching system; administrative system, philosophical and value system; business management system; social and health system.

Attributes. Measure of effectiveness: social, psychological and academic expectations satisfaction.

Programs. Curriculum design and curriculum implementation designs.

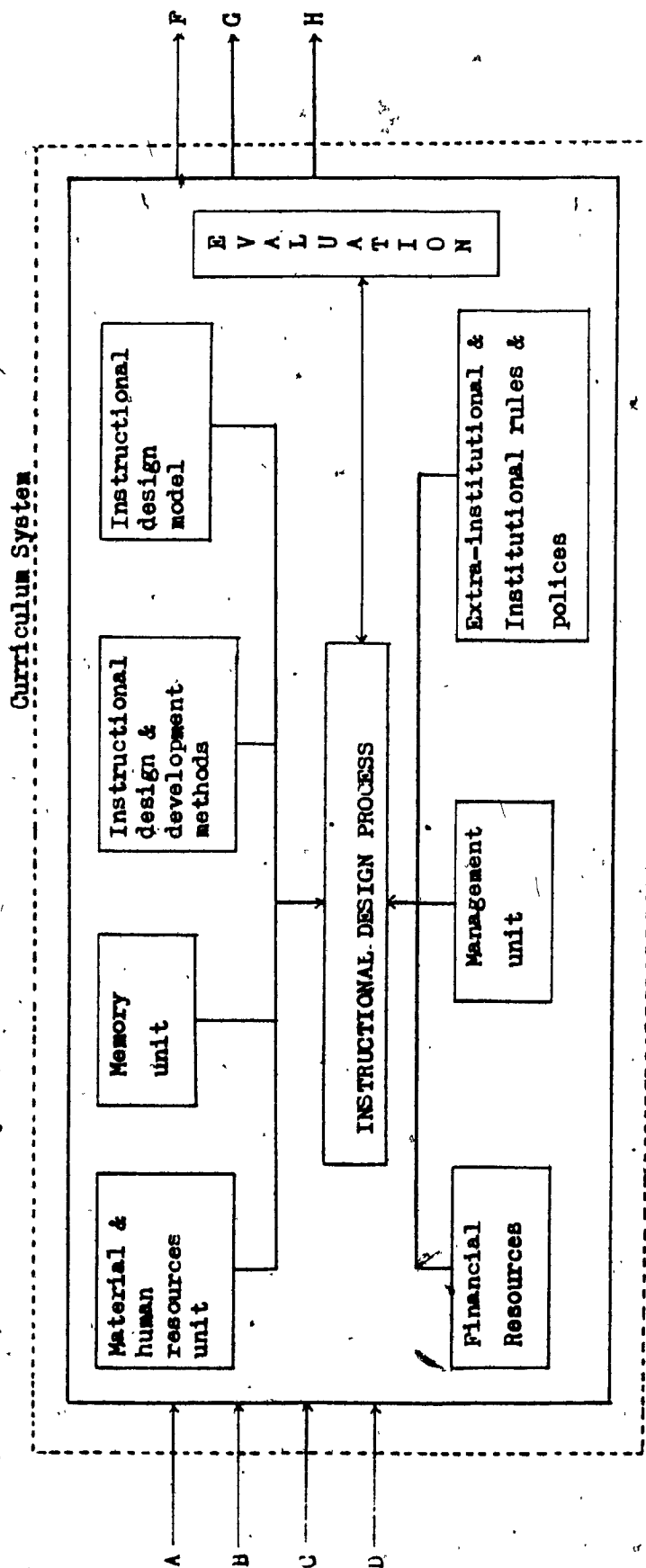
Decision maker. Curriculum committee, faculty director, health ministry representant.

### Instructional system

Instruction is the operative part of the curriculum, its implementation. Curriculum design establishes what has to be attained by the student, while the instructional design describes in detail how the student will attain those curriculum goals and objectives. Finally, this instructional design serves as a guide in the teaching and learning system.

Figure 5 depicts what elements enter the instructional system and what are the system's outputs. The main process here is the instructional design process. Continuously the system receives information about students, school facilities, administrative constraints such as time schedule, etc. This information goes to the memory unit to be organized and used in the instructional design process. Physically, memory unit could be department's files, books, records, or information and experience in the minds of the people working in the instructional design. There are several models of instructional design. Joyce and Weil (1972) identify three: training psychology; cybernetic psychology and systems analysis. The system also should manage instructional design methods or procedures drawn from the instructional design models. Through them, the instructional design is created.

Figure 5 Instructional System Structure



- A Curriculum design and implementation plan
- B Information about: number of students, age, sex and other characteristics; about school facilities such as libraries, clinical fields, instructional materials, etc.
- C Curriculum content
- D Time schedule
- F Instructional design (per course or unit)
- G Human and material resources required for developing instruction
- H Instructional implementation strategy

The instructional design process cannot be carried out without other elements such as financial resources, or management support. At the same time the instructional design should be in accordance to the instructional rules and policies. Evaluation is focused here to determine the consistency of the planned instructional activities (which constitute the instructional design) with the curriculum goals achievement, the feasibility of the design, coherence, time schedule, etc.

Next are elements which complete those presented in figure 5.

Inputs. Human resources such as new teachers or faculty members; instructional technologists, financial resources.

Outputs. Decision transmission, information transmission.

General goal. Develop instructional designs which can lead toward curriculum's goal achievement.

Conversion processes. Instructional design process; administrative procedures; feedback processes; remedial learning activities plan;

Environment. Curriculum system; administrative system; instructional materials system.

Attributes. Measure of effectiveness: Curricular and course's goals achievement.

Program. Instructional design development.

Decision maker. Teacher, faculty committee, department's chief.

#### Instructional Materials System

Instructional materials are devices which when used within an instructional plan, serve to facilitate student's learning.

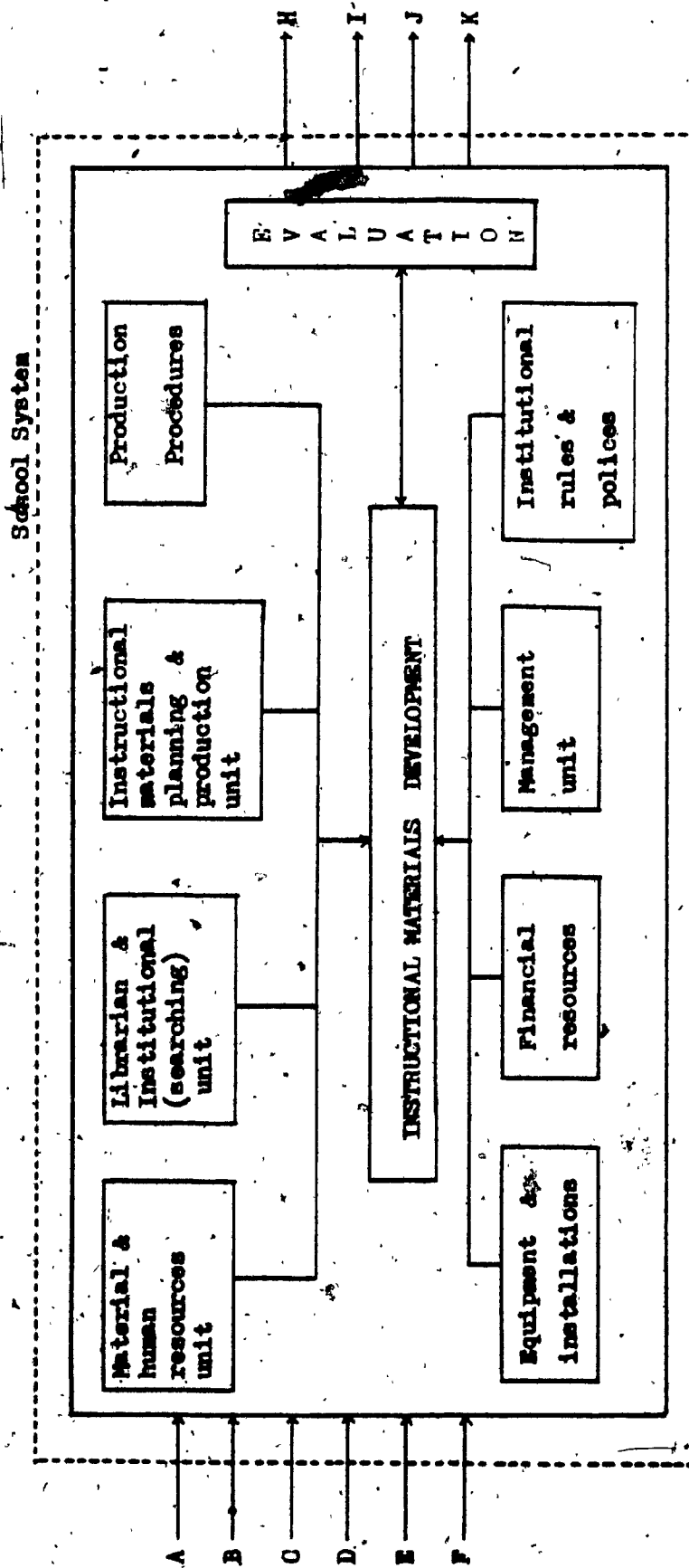
The instructional materials system is focused on the design and production of instructional materials through a major process called instructional materials development. Figure 6 depicts the main inputs entering the system. Actually, this system does not produce all the instructional materials required for instructional practices. Many instructional materials are produced outside the school, but before being applied they have to be evaluated to assess their capability to fulfill the instructional materials requirements. This evaluation is carried out inside this system. If the instructional materials are not quite satisfactory, they could be adapted. When there is not instructional material available or found to satisfy an instructional requirement, then the material is designed and produced. Thus, the main outputs of this system are those presented in figure 6.

The search, evaluation, adaptation, design and production of instructional materials are complex activities developed by many human resources: teachers, technicians, designers, subject matter experts, etc. These activities require of procedures, equipment, installations, financial resources and administrative support. Evaluation is not only focused on final products (instructional materials already produced) but also it should be present along all the instructional materials development.

Some other elements of this system are:

Inputs. Instructional design methods and techniques; instructional materials evaluation procedures; information about material, human and financial resources; student's characteristics (such as number, age,

Figure 6 Instructional Materials System



- A Instructional materials requirements  
 B Raw material  
 C Time schedule  
 D Additional or extra-school personnel  
 E Requirement satisfaction policies  
 F Information about, similar systems, materials produced, procedures in design and production, findings relating learning and media, etc.  
 H Instructional materials found  
 I Instructional materials found and adapted  
 J Instructional materials produced  
 K Costs

sex, general background); human resources (teachers, AV designers, technicians, subject matter experts, etc.); academic content; financial resources; time schedule.

Outputs. Decision transmission, information transmission; policies, and rules enforcement; costs.

Goal. Provide the instructional materials required to support teaching and learning system.

Conversion process. Instructional materials need analysis; instructional materials design; instructional materials adaptation; instructional materials production; instructional materials evaluation; instructional materials classification; administrative procedures.

Environment. Instructional design system; teaching and learning system, administrative system.

Attributes. Measures of effectiveness: Instructional requirements satisfaction, learning improvement, learning goals attainment.

Programs. Instructional materials development program.

Decision maker. Audiovisual and printing department's chief, content experts, teachers.

### Conclusions

From these descriptions it is possible to simplify a little what could be evaluated and assert that in fact the probable subject(s) of evaluations are:

- student's learning
- teaching skills
- educational plan ( i.e. curriculum design, curriculum implementation



plan; instructional design, instructional materials design, etc.)

- educational processes (i.e. school programs in the developmental phase, curriculum development; teaching-learning communication processes; instructional design process; instructional materials development process, etc.)

- educational products ( i.e. school graduates or drop-out students; instructional materials produced; students transformed by the teaching and learning system, etc.)

- educational effects ( i.e. school graduates performance in the professional field; health services given in a community; the impact of new methods and devices inside school, etc.)

This "reduction" can help you to determine the nature of what is going to be evaluated and facilitate the selection of the instruments required to make observations or measures.

Finally whatever it might be the subject or object of evaluation, it is important to have in mind that these elements form part of certain structure, they are related with other elements and their evaluation might affect the rest of their system and the school system as well. These facts have to be presented when planning an evaluation.

### C. Steps to Develop Educational Evaluation

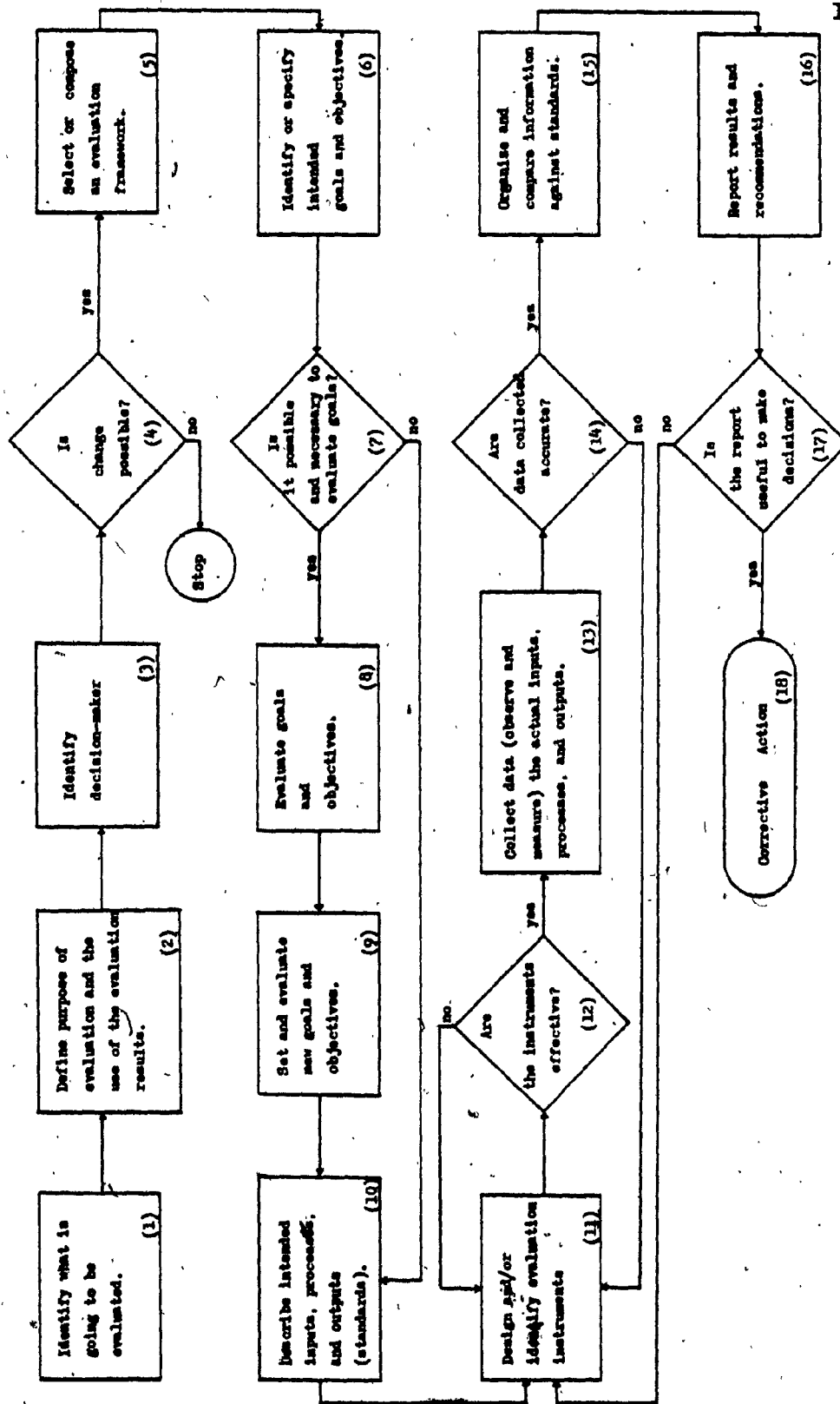
#### Overview

This section is focused on the problem of how to develop an educational evaluation. This part will not make the reader an evaluator -no document or book could do that. Only experience plus considerable training can teach the skills necessary to make one a competent evaluator. On the other hand, there are specialists in those skills; thus in principle, an evaluator does not need to have all such skills. However, he needs to know how and when to initiate an evaluation; he also needs to know where a particular evaluation is likely to lead him, for there are many kinds of evaluation, all likely to produce wildly different results. In sum, the evaluator needs to know what evaluation technology can do for him. He should be "up-to-date" with respect to evaluation models or frameworks. This could help him to take advantage of several strategies developed into the evaluation field and use them in his own evaluation plan.

Finally, as long as there are thousands of potential subjects of evaluation inside educational system and because each evaluation situation has its own peculiarities, it is impossible to provide the evaluator with a "cook-receipe" handbook of evaluation. What is going to be presented in this section are some general guidelines for planning, designing and conducting evaluation.

Figure 7 is a flow chart representing the activities and decisions which take place in the planning, designing and conducting an evaluation.

Figure 7 Flow Chart for the Planning, Designing, and Conducting Evaluation



This sequence of steps can be divided into the three phases of the evaluation process:

#### PLANNING

- 1) Identify what is going to be evaluated
- 2) Define purpose of evaluation and the use of the evaluation results.
- 3) Identify decision maker.
- 4) Is change possible? .

#### DESIGNING

- 5) Select or compose an evaluation framework.
- 6) Identify or specify intended goals and objectives.
- 7) Is it possible and necessary to evaluate goals?
- 8) Evaluate goals and objectives
- 9) Set and evaluate new goals and objectives.
- 10) Describe intended inputs, processes and outputs (standards)
- 11) Design and/or identify evaluation instruments.
- 12) Are the instruments effective?

#### CONDUCTING

- 13) Collect data, observe and measure the actual inputs, processes and outputs.
- 14) Are data collected accurate?
- 15) Organize and compare information against standards.

- 16) Report results and recommendations
- 17) Is the report useful to make decisions?
- 18) Corrective action

#### Planning the Evaluation

##### 1) Identify what is going to be evaluated

Erlandson (1973) asserts that many decisions in education are poor not because of inaccurate data but chiefly because of a failure to consider a sufficient range of data. It is true that it is impossible to evaluate everything in a school; it is necessary then, to select those points to be evaluated and assign priorities.

Usually one starts an evaluation because "something is not working" as expected. If the unit of evaluation is not too big, then the selection and prioritization of elements is not a difficult task. However, when dealing with large units of evaluation such as school programs, etc., then it is necessary to perform a preliminary search to identify the elements which could be subject of a more formal evaluation. For this purpose the "Institutional Diagnostic" developed and tested by CLATES could be useful. The instrument was designed to help in the identification of "deficiency areas" inside school; that is, the identification of the school elements which are not functioning as expected. The instrument provides the user with a general diagnostic of what could be wrong in the institution, but, it is necessary to carry on a formal evaluation to make decisions. In other words, this instrument can be used to identify what is going to be evaluated.

2) Define purpose of Evaluation and the Use of  
Evaluation Results.

Evaluation can have many purposes: improvement, control, budgeting, etc. Different purposes in evaluation lead to different types of evaluation, with a consequent use of diverse instruments and the obtaining of distinct information. If the practitioner determines the purpose of his evaluation, he can save money, time and effort.

Evaluation always must lead to some kind of action. In other words, if the results of an evaluation do not prompt any action, we can say that the evaluation was useless.

3) Identify Decision-Maker

Evaluation is an activity that operates at any level of the educational system. The structure of the latter shows that decision-making process varies, according to the different levels of the system. For example the decision maker at the teaching and learning system is quite different from the decision maker at the instructional materials system or curriculum system.

Tanner (1971) defines decision-makers as authorities who process information and recommend a course of action.

Regarding small units of evaluation, the decision-maker could be the teacher (in an instructional situation teacher-student) or the student himself (in a self-instructional situation student-instructional material). In these instances the process of decision maker is usually an easy task. However, when the unit of evaluation is more complex, the decision making process functions in a more

sophisticated fashion. The decision maker usually is an entity who receives information relevant to a decision about some act performed by another entity called and "effector" (from a cybernetic point of view). Whether the decision making process is fluid depends on the degree of organization, effectiveness and efficiency of this control unit. In any case, the evaluator has to know who is the decision maker, how the decisions are made in a particular context in order to facilitate the overall process of evaluation.

4) Decision point: Is change possible?

This point is closely related to that of the second step. Evaluation is thought to lead to some kind of change (action); if this change is unfeasible then the evaluation can be suspended. There would not be any reason to waste resources. This decision requires the participation of the decision maker; changes always require consume of energy, money, time and other type of resources. The implications that a change may have should be considered before making a decision whether to conduct an evaluation.

Designing the Evaluation

5) Select or compose an Evaluation Framework

Alkin (1972) asserts that a model helps the modelers in structuring the universe or that segment of the universe being considered. Models must be functions of the frames of reference of their builders. There are many models of frameworks developed for specific or general evaluation purposes. Each evaluation situation is different from others and requires the setting of its own framework.

The selection or composition of an evaluation framework depends both upon the evaluation purpose(s) and the subject or object of evaluation. Decision Tables I, II, III, IV, V were designed to help you in this step. The subsystem description section could be useful also to clarify the nature of what is going to be evaluated.

Decision Table I is a general aid to help you in deciding the type of framework according to the purpose of your evaluation. Tables II, III, IV, V (all these Tables are located at the end of the Guide) offer several evaluation approaches pertaining to the four main categories of evaluation frameworks (i.e. Goal-Attainment Models, Judgmental Models, Decision-Facilitation Models and Systems Approach Models) presented in Table I. It must be clear that these Tables do not present the totality of models that can be included in these categories; nor do the Tables exhaust all the characteristics of the models presented.

It is recommended to take into consideration more than one model no matter if they do not pertain to the same category, study them and drawn a particular framework useful for the evaluation purposes and scope.

The evaluator should be aware of the fact that not all the evaluation models available offer a feasible and complete way to develop an evaluation. Hence, once selected or composed the evaluation framework, you have the option to forget the rest of these Guide's steps and follow the methodology proposed in your framework. However, you can compare the procedures contained in your framework against the rest of these steps and select the more feasible procedure or a



combination of procedures. This decision should be based upon your particular needs when evaluating.

6) Identify or specify Intended Goals and Objectives

Goals are usually general statements about desired outcomes whereas objectives explicitly describe what it is hoped learners could do after instruction.

Most of the times evaluators work with objectives, that is, given a set of goals evaluators derive operational (behavioral performance or measurable) objectives in order to conduct an evaluation. Other times, evaluators are given the objectives already derived from goals. For evaluators, objectives expressed in behavioral or operational terms are highly desirable, since they represent a first step in the construction or selection of measurement instruments.

Part of evaluation is the whole process of setting objectives and measuring how well those objectives have been reached; in fact, objectives are essential, whatever the evaluation model followed. For instance, the goal-attainment models focus almost entirely on instructional objectives and the degree to which they are achieved. Judgmental models also make much use of objectives as do the decision-facilitation models and the systems-approach models.

The degree of which objectives are attained represents a criterion of effectiveness; decision-facilitation models and system-approach models propose not only effectiveness as a criterion for judging a program, but also efficiency; that is, how many attainments can be reached with less resources.

7) Decision Point: Is it possible and necessary to evaluate goals?

In general goal-attainment, decision-facilitation and systems-approach categories of models start from the assumption that goals and objectives do not need to be evaluated because they are worthwhile. However, evaluator must always question the value of goals and objectives, if evaluation is intended to be complete and naturally if the situation allows such activity.

8) Evaluate Goals and Objectives

Theoretically, goals are stated after the Need Assessment process. This term has been defined as the process by which needs are identified and prioritized (Anderson et al., 1975).

Need is a condition in which there is a discrepancy between an acceptable state of affairs and an observed state of affairs. The process of needs assessment may be applied to individuals, groups or institutions.

As long as educational programs (i.e. curricula) are designed to satisfy some identified and analyzed needs (i.e. social, psychological, academical or scholar needs), goals are stated in terms of general outcomes able to fulfill those needs. Objectives derived from goals taken together are thought to contribute to the envisioned final goals.

Goals may be evaluated in terms of how well they help to satisfy (even as a part of a plan) the identified needs. Objectives may be evaluated considering their correspondence to the goals-attainment. Caldwell (1968) offers a serie of criteria to evaluate plans; some of these criteria can be used to evaluate goals and objectives (see Table VI ).

Table VI Criteria for the Evaluation of Goals and Objectives

Relevance	Legality	Congruence	Legitimacy	Practicability	Cost/Effectiveness
to determine the relevance of goals to the identified needs.	to determine the legal status of goals and their set of objectives relative to the context within which their are to be implemented.	to determine the congruence of the goals with the value system(s) of the context within which they are to be implemented.	to determine if the goals and objectives are within the purview of the agency charged with implementation.	to determine the practicability of the goals and objectives in terms of achieving their stated purposes.	to determine the relative desirability of the goals and objectives (in comparison with alternative goals and objectives) in terms of the ratio of costs and expected outputs (effectiveness).

Adapted from:

Caldwell, (1963)

Another more subjective way to evaluate objectives is using the "Field Analysis of Educational Objectives", a procedure presented in several courses of instructional design in CLATES Mexico.

The educational objectives are analyzed in terms of their "transferences" or their capability to support the achievement of other objectives at the same level of complexity and at upper levels of complexity. As well, objectives are analyzed in terms of their "effects"; that is, how often the future graduate is going to use the skill or knowledge contained in the objective in his professional practice?; how long the ability stated in an objective will be up-to-date in the professional field?. Is the knowledge or ability proposed in the objective useful in a large or restrict geographical area?

This kind of evaluation is focused mainly on the potential "content" of the objectives and is specially useful in the phase of instructional planning.

#### 9) Set and Evaluate new Goals and Objectives

Van Gigh and Hill (1971) assert that goals must integrate the demands of the general philosophy and the expressed values and expectancies of all the groups in the system; teachers, administrators, board, government, etc. In other words, goals have to obtain a general agreement; this process is influenced continuously by the constraints upon the system which in turn, are influenced by the cultural environment within which they operate.

Goals are concerned with ultimate outcomes and are usually phrased in general or global terms. Objectives are narrower and usually short-range. They are behavioral or operational statements

which lead to the attainment of the final goals (Anderson et al., 1975)

Van Gigh and Hill (1971) propose to breakdown goals into sub-goals, and the sub-goals into specific objectives. To be useful an objective should have next characteristics:

- a) quantifiable or observable
- b) definite
- c) measurable
- d) obtainable
- e) in conformance with organization's goals.

#### 10) Describe intended Input, Processes, and Outputs (Standards)

This step concerns with the description of the intended resources to meet goals (input); the process by which those resources are transformed into outputs (process) and the intended results.

Intended input description specifies required assistance and/or resources to meet objectives, the strategy to state objectives operationally, in some cases the allocation of resources and the plan to implement the general strategy to meet objectives.

Intended processes description explain the development of the plan to meet objectives. It concerns with people responsible or involved in the plan implementation and procedures, communication channels, logistics, adequacy of resources, physical facilities, time schedule, etc.

Intended outputs are the results expected and also those which may result as a parallel or side effects.

The reason for performing an accurate description of these three major elements is to determine the criteria required to compare actual

input processes and outputs against the intended ones.

Stufflebeam et al. (1971) asserts that these criteria should be drawn from the values that exist in the specific decision-making situation. The authors, in fact, suggest the formulation of a value model. In the creation of the value model the "decision-maker tries to explicate a particular view of the world at a given time within a limited value system that relates to the needs and problems under consideration. His goal is to limit a relationship between 1) his view of the world, 2) the purpose that arises out of it, and 3) his choice among the alternatives that present themselves. This relationship is a part of the limited value system he considers and that value system is in turn a part of a larger value system that precedes and extends beyond the particular decision situation." (p. 108).

#### 11) Design and/or Identify Evaluation Instruments

This is a technical step. The evaluator can choose from a large list of instruments, techniques and procedures designed to gather data. Table relates some of the most known of these devices with the possible subjects or objects of evaluation identified in section B of this Guide. The evaluator, however, should pay attention to the evaluation framework selected, and the kind of measures required to obtain useful information for evaluation. There is a large literature which deals with this technical step. Table VII offers some sources of information. (Table VII appears at the end of this Guide)

#### 12) Decision point: Are the instruments effective?

Criteria for assessing the adequacy of the evaluation instruments

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include mainly: validity, reliability, and objectivity.

Validity. An evaluation instrument has validity if provides the required information to make a decision regarding the objectives.

Reliability. The instrument provides consistent measure of the subject or object being measured to demonstrate achievement (or not) of an objective. In other words, provides reproducible information.

Objectivity. The instrument has objectivity if two or more observers can independently agree whether or not the performance of the subject or object being measured meets the criteria stated in an objective.

Stufflebeam (1968) adds other criteria such as timeliness and credibility. Timeliness refers to the quality of the evaluation instrument to provide information exactly when the decision-maker needs it. Credibility refers to the provision of information which can be trusted by the decision maker and those he must serve. This quality is related to that of objectivity.

#### Conducting the Evaluation

##### 13) Collect data: Observe and Measure the Actual Inputs, Processes, and Outputs.

This step is part of the implementation of the evaluation plan. The evaluator applies his evaluation design in order to obtain information about the real input, processes and outputs of what is evaluated.

Alkin and Fitz (1975) assert that in a "pre-formative evaluation" (input evaluation) the evaluator has to measure current status of the program to be evaluated, goal selection, pilot studies and so forth.

The evaluator, also should collect data about the processes which transform inputs into outputs. The classical concept of formative evaluation plays an important role here. It is considered the process of assessing the effectiveness of a program or product during development.

Finally, evaluator has to assess the effectiveness of a program or product after it has been developed. Here summative evaluation is used. According to Borich (1974) the real distinction between formative and summative evaluation is upon the kind of information that can be obtained using particular techniques. Thus formative evaluation looks for program's improvement, whereas summative evaluation seeks for evidence to make decisions about to continue or suspend the program under consideration.

The purpose of evaluation, the subject or object being evaluated and the evaluation framework selected should indicate evaluator what points need more emphasis and where and when observe and/or measure.

14) Decision point: Are data collected accurate?

Data collected must have validity, in other words the measures taken should adequately reflect and represent the domain of interest and they do not be measures of something else.

15) Organize and Compare Information against Standards.

Information is organized and analyzed by comparing actual and intended inputs, processes and outputs. This step also comprises the analysis of possible causes of discrepancies between actualities and intentions and interpreting the outputs in terms of recorded input and



process information. Here the standards stated in step 10, are the points of comparisons.

#### 16) Reporting results

Evaluation results must lead to some kind of decision and action (e.g. change of strategies, change of activities, implementing program design, producing instructional material, continue, terminate or refocus a program, and so forth). Stake (1967) asserts that the evaluator should describe and judge the results of an evaluation. This fact gives the evaluator certain kind of participation in the decision-making process. However, depending on the unit of evaluation (e.g. student, instructional materials, a program, etc.), the evaluation plan, and the purpose of the evaluation, the evaluator in some instances may be both evaluator and decision-maker (for example when evaluating student achievement). More complex units of evaluation require a division of roles in the process of evaluation. That is, one entity should be focused on the technical aspects of evaluation such as the design of instruments, collection of data, analysis, and so forth, whereas another entity called decision-maker should take the adequate decision at the right moment using the information provided by the evaluator.

#### 17) Decision point: Is the report useful to make decisions?

Evaluation reports summarize information obtained and analyzed in previous steps which supposedly should be useful to make decisions. Worthen (1977) identifies eleven characteristics of good evaluations:

1. Conceptual clarity. Refers to whether or not the evaluator exhibits

a clear understanding of the particular evaluation being proposed.

2. Characterization of the object of the evaluation. Evaluation must include a through detailed description of the program or phenomenon being evaluated.
3. Recognition and representation of legitimate audiences. The evaluation is adequate only if it includes input from and reporting to all legitimate audiences for the evaluation.
4. Sensitivity to political problems in evaluation. Evaluations must have an early agreement from who control(s) data. The agreement should concern about issues such as access to data and data sources and safeguards against misuse of evaluation data.
5. Specification of information needs and sources. The evaluation should be planned in order to identify the information required and the sources of that information.
6. Comprehensiveness/Inclusiveness. Evaluator should collect data on enough important variables to be certain one has included in the evaluation all the major considerations which are relevant; includes all of the main effects but also includes provisions for remaining alert to unanticipated side effects.
7. Technical Adequacy. Good evaluations depend on construction or selection of adequate sampling plans and the correct choice and applications of techniques for data reduction and analysis.
8. Consideration of costs. Evaluator should identify all the financial, human or time costs associated with programs they operate.
9. Explicit standards/criteria. An evaluation should include statement of standards and criteria in order to determine whether the program

was a success or a failure.

10. Judgments and/or recommendations. Standards and criteria are the base for judgments and recommendations making. Evaluation should reach a judgment of whether the program is effective or ineffective valuable or worthless.
11. Reports tailored to audiences. Evaluator will have tailor reports for different groups (school board, principals, teachers, etc.) so that they depend on non-technical language and avoid over-use of statistical symbols or tabular presentation of data analyses.

Stufflebeam et al. (1980) have prepared a book called "Standards for Evaluation of Educational Programs, Projects, and Materials" which offers 30 standards that are divided into four categories: Utility standards, Feasibility standards, Property standards and Accuracy standards. These standards are useful throughout the process of evaluation.

#### 18) Corrective Action

In the first part of this Guide the Types of Decisions and Evaluation developed by Stufflebeam et al. (1971) was presented to enlighten the kind of actions or decisions that evaluation at different levels of program evaluation can conduct.

However, in many instances making-decisions activity is not in the evaluators' hands. Decisions usually reflect ideological positions of the decision-maker or the institution or both.

Ackoff (1974) identifies four general types of attitudes toward change or action that can be maintained by individuals or institutions. They are: inactive, reactive, preactive, and interactive.

Their description may be useful to foresee and predict in some way the possibilities to perform corrective actions as a product of evaluation.

#### Inactivism

This attitude is characterized by a general satisfaction with the way things are and the way they are going. The general thought is that any intervention in the course of events is unlikely to improve them and is very likely to make them worse. The individuals or organizations in this group seek stability and survival.

#### Reactivism

Reactivists believe more in the past "state of affairs" than in the present one, because for them things are going from bad to worse. This attitude is opposed to change and try to unmake previous changes and return to where the things once were. As long as reactivism is reactionary (propensity to return to the past) its orientation is remedial, not aspirational. Experience is the key to deal with the present, as a consequence reactivists see very little new in anything proposed and still less that is worthwhile in what they accept as new.

#### Preactivism

This attitude is characterized by a great faith in the future. For this, preactivists predict and prepare thinking in terms of growth and optimization. Preactivists try to identify and deal with problems before they arise. For this reason they are very concerned with any way of obtaining glimpses of the future. For them future is uncontrollable but it is possible to accelerate its coming and control its effects on

them. They plan, therefore for the future; they do not plan the future itself.

Preactivists seek change within the system but not change of the system or its environment. As long as they do not try to influence other systems in the environment; they tend to consider environment as constraining rather than as enabling. Thus, they are competitive rather than cooperative when other systems are involved.

### Interactivism

Interactivists want to design a desirable future and invent ways of bringing it about. This attitude leans upon the assumption that it is possible to control a significant part of the future as well as its effects. Man's activity conforms the future.

Interactivists seek self-development, self-realization and self-control. They are idealizers they pursue ideals that they know can never be attained but that can be continuously approached. The design of idealized futures are not just exercises in utopianism but necessary steps in setting long-range directions for continuous development.

These attitudes appear combined in the real world; is very rare to find a pure inactivism attitude or a complete preactivist person. Whatever the attitude, the evaluator should be aware of the institutional position (or attitude) towards a change. This caution will help him in the evaluation planning and in the corrective action steps. In other words, the evaluation plan should have the same value system of the institution. For instance, if the school has a reactive attitude and the evaluation plan proposes an interactive change, the

evaluator can be pretty sure that his work will be useless or the results will be used to perform a "reactive action".

Some institutions, however, are more flexible in their attitudes toward change ( they can be classified as "preactivists" or interacti "interactivists"). In these cases, the evaluator has the possibility to introduce improvements at different levels in the system as results of evaluations, overall when the evaluator and the decision maker are one person or both share the same purposes.

#### Conclusions

This Guide was designed to help educators in higher education to perform better evaluations. This work was intended to remark several points that can be summarized as follows:

- The need to perform systematic evaluations throughout the school system to insure the effectiveness and efficiency of the system's activity.
- The use of theoretical evaluation frameworks in practical problems.
- The importance of planning an evaluation in order to insure its usefulness. The planning must include points as: identification of what is going to be evaluated, purposes, and feasibility of change as a result of the evaluation.
- To consider evaluation as a process in which planning, designing, and conducting phases have an equal importance.
- To consider educational evaluation as a process leading to corrective actions or school system improvement.

The Guide, on the other hand, was thought to be an heuristic

instrument, as such, it is a limited device. The evaluator should have to combine information coming from his bibliographical searchings with practical experience and some advisory to perform good evaluations. This Guide is the start point and all the merit of a good evaluation is on your own hands.

Finally, it is necessary to look at the controversial issue of evaluation costs. Usually many evaluations in higher education are informally developed; that is, these evaluations are asystematically performed, or they are improvisations, or are based on inaccurate measures or observations. These evaluations are rarely considered in educational program's planning. They become a part of the burocratic scholar procedures and they never contribute to the effectiveness of the educational programs. However, they have a cost for the whole system.

This situation in some way, prevents people involved in education about the worth of evaluation. Thus formal evaluations proposed to be planned along the educational programs themselves are usually rejected because they are considered as added-on cost activities, which do not contribute at all to the effectiveness of the programs. In short, evaluation is referred to as being very costly and non productive, and this provides a bad image to the formal evaluation activity.

As it was emphasized in this work, evaluation should be seen as a means to insure the effectiveness of the school system's activity. The benefits provided by a good evaluation, surely are higher than its costs.

Formal and effective evaluations may cost more than the traditional informal and no much useful evaluations. However, the former provide knowledge about the deficiencies or worth of the program. This kind of information allows timely corrections in the program's plan or program's development, and in this way insures the effectiveness of the subsystems' activity.

Since a practical point of view, formal and good evaluations are not only a worthwhile investment, but also a means to recognize whether the program's investment is good or not.

Any educational evaluation should be effective and efficient. That is, if an evaluation costs money it should be worth that cost. This means that the total evaluation effort needs to be evaluated. Roth (1978) offers some procedures to evaluate evaluation considering: decision-making, data collection, purposes and objectives of the evaluation and cost-effectiveness of the evaluation.

As it was discussed in this Guide, there can be many types of evaluation according to the object(s) or subject(s) of evaluation and the purposes and objectives for that evaluation. Thus the costs for these types of evaluation will vary. The evaluations performed inside the "Teaching and Learning" subsystem, for instance, are usually focused on student's learning; and as teachers play commonly the role of evaluators in this setting, then, evaluations can be little expensive. In addition, if teachers plan their instructional activities considering in parallel their evaluation, probably the total cost for the evaluation would be no significant.

In other subsystems such as the "Instructional Materials"



Table VII (continue)

Instrument and/or  
technique descriptor

Function

Sources of information

Observation techniques

Recording devices,  
provide qualitative  
information, personal  
impressions or  
opinions about  
procedures and  
products.

Ahmann, and Clock, (1971)

Karmel and Karmel, (1978)

a) Ranking

Ordering subjects  
according to the  
merits of the procedures  
they display or the  
products according to  
their excellence.

Fitzpatrick and Morrison (1970)

Wrightstone, (1960)

b) Rating

Summarizing procedure  
and product information.

Rosenshine and Furst (1973)

c) Checklists

Recording pupil or teachers  
procedures.

Gronlund, (1971)

d) Product scale

Recording product  
quality.

e) Anecdotal records

Produce a factual report for  
the study of pupil procedures  
or the analysis of teachers  
procedures.

Table VII (continue)

Instrument and/or technique descriptor	Function	Source of information
Attitudinal tests: Semantic differential technique, Likert scales, Equal-appearing intervals, Paired-comparison method Free-response and opinionnaire methods Content analysis	Assessment of affective variables (interests, values, opinions and attitudes).	Payne, (1974)  Mager, (1968)  Edwards (1957)  Osgood, Suci and Tannenbaum, (1957)
Tests	Measure student progress in terms of specific objectives, secure specific information for reporting purposes. Locate evidence useful for immediate modifications in instructional procedures.	Lien, (1967)  Ebel, (1965)
a) Essay examination	Measure the functioning of knowledge.	Lake, Miles and Earle, (1973)

Table VII (continue)

Instrument and/or technique descriptor	Function	Source of information
b) Recall type of objective item and completion	For isolate facts; descriptive information, definitions, acquisition and use of vocabulary. Basic concepts; solution of problem or situation type material.	Sjogren (1970)
c) Alternative-response items (true-false, yes-no, right-wrong, synonym- antonym, agree-disagree)	Measure for persistence of misconceptions; measure understanding of principles and generalizations, knowledge of facts. Reasons underlying an idea. Discriminate for value judgments for soundness of conclusions.	
d) Multiple Choice items	Measure of value judgments and discriminating ability; logical reasoning and relationships; insight and critical analysis; solving problematic situations; application and interpretation of data; isolated facts; cause and effect relationships.	

Table VII (continue)

Instrument and/or  
technique descriptor

e) Matching tests

Source of information

Function

Measure for association of concepts and meanings; measure of the who, when and where types; measure for degree of truth or falsity of a concept; measure for application of knowledge.

f) Analogies type of items

Measure the student's ability to associate meanings and to infer relationships.

Research

a) Historical\*

Identifying causal or functional relations.

Issac and Michael (1979)

To reconstruct the past objectively and accurately often in relation to the tenability of an hypothesis.

Campbell and Stanley (1963)

b) Descriptive

To describe systematically a situation or area of interest factually and accurately.

Bennett and Lumsdaine (1975)

c) Developmental

To investigate patterns and sequences of growth and/or change as function of time.

\*Part adapted from Issac and Michael (1979)

Table VII (continue)

Instruments and/or techniques descriptor	Function	Source of information
d) Case and field	To study intensively the background, current status, and environmental interactions of a given social unit; an individual, group, institution or community.	
e) Correlational	To investigate the extent to which variations in one factor correspond with variations in one or more other factors based on correlation coefficients.	
f) Causal-Comparative or "Expostfacto"	To investigate possible cause and effect relationships by observing some existing consequences and reaching back through the data for plausible causal factors.	
g) True experimental	To investigate possible cause-and-effect relationships by exposing one or more experimental groups to one or more treatment conditions and comparing the results to one or more control groups not receiving the treatment.	

Table VII (continue)

Instrument and/or  
technique descriptor

h) Quasi-experimental

Function Source of information

To approximate the conditions of the true experiment in a setting which does not allow the control and/or manipulation of all relevant variables.

i) Action

To develop new skills or new approaches and to solve problems with direct application to the classroom or other applied setting.

Survey questionnaire

Recording massive information

Oppenheim (1966)

Research interview

Recording more complete and sound information

Borg (1963)

Cost effectiveness analysis

Allocation of resources, program planning; program evaluation; curriculum revision; explanation of resource allocation to policy makers; and intra-programs comparison.

Tanner (1971)

Imnegart and Pilecki (1973)

Table VII (continues)

Instruments and/on technique descriptor	Functions	Source of information
Path analysis or Critical Path analysis	Provide information about the presumed causal relationships underlying social and educational programs; to perform local decision-oriented studies while simultaneously investigating fundamental causal mechanisms.	Smith and Murray, (1978)
PPBS Planning-Programming- Budgeting System	Relating program output to resources identified in monetary units; facilitates systems analysis with long-range projection of total resources.	Whitehouse (1973)
PERT Program Evaluation and Review Technique	Scheduled review of objectives, program analysis budget development and project monitor; early identification of trouble spots; facilitation of statement of objectives and task definition	Hartley, (1968)