

AN ANALYSIS OF ETV ORGANIZATIONAL
PROCESSES WITH REFERENCE TO
ETV IMPLEMENTATION IN KENYA

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ABSTRACT

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This thesis is an attempt to analyse the organizational processes of planning, production, utilization and evaluation in educational television. Specifically, it is concerned with an analysis of the essential functions involved in these processes in relation to the development and application of educational television as an integral part of the instructional process. A survey of such educational television systems which have been forthcoming in a number of developing countries and notable innovations in the developed ones has been carried out in regard to these processes, and in reference to the development of a systematic plan for educational television implementation in Kenya. The application of the systems approach is proposed as a viable and effective method of ETV organization. In conclusion, a diagrammatic model of the type of ETV organizational structure discussed is presented.

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INTRODUCTORY CHAPTER:

2

INTRODUCTION : PART A

The learning process is facilitated by both internal and external factors available to the learner. The external factors when planned for the purpose of facilitating learning constitute what is called instruction. An instructional system then consists of a process of communications and control procedures intended to implement identifiable learning outcomes, which can be discerned as contributing toward the achievement of stated educational goals.

The potential of media such as television to contribute to the instructional process has long been recognized. The capacity of the medium of television to present stimuli that can be instrumental in the instructional process has, for example, been proven over and over through research studies such as those reviewed by Chu and Schramm (1967). The use of media for education, however, involves other questions beyond those relating to their capacity to present stimuli effectively.

Since most media like television have been developed originally for other purposes, with their adaptation to educational use, the question has always arisen as to how they can be organized and employed most effectively for educational purposes. There has not always been agreement on this issue when new media are considered for use in education. The history of the adaptation and acceptance of a new media in education is therefore often controversial.

0.1 Development of Educational Broadcasting

The organization and use of educational television can perhaps better be understood when it is seen as part of the process of the development of educational broadcasting. This development dates back to the 1930's and 1940's when radio became widely adopted for educational purposes. At this early stage there were two discernable patterns : the first was exemplified by the development of educational broadcasting in Britain and Japan. Here, and over much of continental Europe, educational broadcasting developed under the aegis of the existing national broadcasting concerns, such as BBC (Britain) and NHK (Japan). The second pattern was in evidence largely in the United States. Here the establishment of educational broadcasting was largely under educators and educational institutions, following the pioneering work done for example by the University of Iowa.

By the 1950's, especially with the advent of educational television, the patterns established in the 1930's and 1940's led to a prolonged debate on whether educational broadcasting was best served under control of the educators or the broadcasters. At the same time that this debate was going on, a parallel disagreement had developed between the advocates of the 'direct teaching' and 'enrichment' approaches to educational television. This situation was aggravated by the fact that with the advent of educational television, much had been made of the possibility of total instruction by television. Many classroom teachers had felt threatened by this presumption, especially in the face of the early "master teacher" notion evident in many of the early 'direct teaching' educational television efforts.

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This situation was not alleviated by the proliferation of research studies on educational television in the 1950's and early 1960's, particularly in the United States. Many of these studies consisted of comparing the effectiveness of live classroom instruction and 'television instruction' which in fact consisted largely of the same teacher used in the live classroom situation being broadcast as a 'talking head' over television. The results of such comparisons usually indicated no significant difference, and eventually led to the realization that there was no magic in the television medium per se that was likely to affect learning one way or the other.

This realization, together with results of the application of the 'enrichment' educational broadcasts by the national broadcasting services, an increasingly better understanding of the medium by educators, and the exigencies of changing curricular, led to a modification in approach. More of the capabilities of television began to be used in 'direct teaching' situations; and more direct instruction, for example, in mathematics, science and correspondence education began being undertaken by the national broadcasting concerns such as BBC and NHK (Nishimoto, 1969; BBC, 1964).

The period of the 1960's and early 1970's also saw the increased introduction and use of educational television in 'Third World' countries such as Niger, Singapore, Hong Kong, American Samoa, El Salvador and others. In the industrialized countries, educational television developed as an addition to established and on the whole efficient educational structures, so that its functions were largely either innovatory or supplementary. In the developing countries, with the need to meet more basic needs of education, educational television played a different role, being most

successfully used either as a major catalyst in educational reform, or extensively to improve the quality of instruction in rapidly expanding educational systems.

New developments were also taking place in the industrialized countries. In Britain, for example, where educational broadcasting had developed under the BBC on a nation wide scale, new smaller local services came into being to cater for local demands, for example, in the local education authorities of London, Glasgow and Plymouth City. In the United States on the other hand, where educational broadcasting had developed largely on local and regional scale, the establishment of a National Education Television network came into being. These kinds of developments and a variety of others around the world indicated the possibility of a variety of educational purposes for which television could be used.

The late 1960's saw the development toward a need for accountability. Studies and exhaustive reviews of the uses, experiments and research in educational television such as those by Chu and Schramm (1967), indicated that although there was no longer any doubt that learning could result from educational television, it could be a more efficient tool if organized and planned efficiently and used in a suitable context of learning activities at the receiving end. Briggs and associates (1967) in a study for the American Institutes for Research, indicated concern that mediated instruction was developed on whatever topic interested the media producers and that the media were selected for classroom use in the absence of a definite rationale for choices made other than reference to the catalogs of what was available. They then discussed and suggested the application of procedures of instructional design, in the design and use

of such instructional media, calling for more attention to be given to the desired learning outcomes.

Partly as a result of such studies and also as a result of some of the past experiences whereby many of the presumptions about the potential of educational mass media such as television had proven inaccurate, planners and financiers began to ask television and other media producers and users to prove that the media were satisfying a particular set of needs in the most convenient and cost-effective way (Hancock, 1975).

The need for accountability called for a certain rigour in the planning and management of educational media. Out of this climate and as a result of the less satisfactory results which accrued from the compartmentalization of planning previously, new efforts in interdisciplinary co-operation between researchers, educators and broadcasters began to forge. This kind of cross-fertilization resulted in more systematic planning and more sensitive consideration to the needs and expectations of target audiences in the development of new educational broadcasting ventures such as in the multi-media Open University in Britain, and the Children's Television Workshop's "Sesame Street" and "Electric Company" programmes in the United States. In addition to these, there has been the development of educational broadcasting as part of public educational communications centres; with the establishment of agencies that make available to users not only educational broadcastings but other media and materials; thus encouraging the use of a choice or combination of channels for a variety of educational purposes. This kind of services are in evidence for example in the Ontario Educational Communications Authority and the Alberta Educational

Communications Corporation in Canada; and also the 'TRU' in Sweden.

It is no longer fashionable, as was the case in the early days of educational television to talk of total instruction by television. This fashion has long been superseded and the concern now is to develop educational communications channels and agents in their optimum roles, and to lay more stress on inter-relationships. The development of more complex educational communications services, the need for accountability and the increased consideration of target audiences, has meant that all contributors to the educational media system need to be involved in a systematic manner in the planning, production, utilization and evaluation of educational materials, with media like television being taken into consideration at the design stages of the instructional system. No longer is the compartmentalized organization where "planners and administrators have attended to policy, producers and curriculum experts have looked after programme development and evaluations and utilized have followed suit" viable (Hancock, 1975). New frameworks for cooperation association have become necessary with due attention given to the problems of modelling and organizational structures. The functions to be fulfilled and tasks to be performed require clarification in order to facilitate the forging of interdisciplinary links and responsive patterns that are essential in the development of educational media systems.

0.2 The Systems Approach

One technique that seems to be increasingly accepted in the planning and organization of educational and other complex and probalistic processes is the 'systems approach'. The systems approach views the process of solving a problem, of pursuing an objective or achieving certain

goals and purposes as a coherent 'system'-- a system in this sense being a dynamic purposeful, organized process with four main features : (1) Objectives - well defined tasks to be accomplished; (2) Inputs - resources needed to accomplish the task; (3) Process - the methods, technologies and organization which combine and actuate the inputs to produce desired results; (4) Outputs - the results actually accomplished (Schramm et al , 1967).

The systems approach involves viewing any productive (goal oriented) system as a whole in order to examine how its productive process functions in relation to its inputs and intended outputs. It is both a process tool for more effectively and efficiently achieving required outcomes, and a mode of thinking that emphasises problem solving. Problem solving in this sense refers to the process of moving from a goal to its attainment. The primary purpose of this procedure is to eliminate the discrepancy between the stated goal and actual output. It is therefore

"a process by which needs are identified, problems selected, requirements for problem solution are identified, solutions are chosen from alternatives, methods and means are obtained and implemented, results are evaluated and required revisions to all or part of the system are made so that the needs are eliminated" (Kaufman, 1972, p. 2)

The system goal is a consequence of a recognized need. When a need has been identified, the system goals and functions are determined and the human and material resources required to meet the need are allocated. In carrying out these operations there is concern with both the effectiveness and efficiency of the approach. The degree to which the output corresponds to the stated goal is the measure of effectiveness.* Efficiency is determined by comparing the time and energy invested with

*See footnote (1) page 216.

the cost utility of alternative methods.* An efficient procedure which is ineffective serves no purpose, and an effective procedure which is inefficient is wasteful. A systems approach therefore utilizes the strategy of systems analysis, design and management to try and achieve efficiency. Systems analysis defines the objectives to be sought and identifies various alternative ways in which the objective might be attained, considering the advantages and disadvantages of each, in order to select the most effective and efficient one possible. It elaborates a plan of action to be accomplished, the various resources required, the nature and timing of results expected, a means for evaluating the system and making necessary changes. System design is the conceptual model derived as a result of/and for implementing the requirements derived in systems analysis; and system management establishes the procedure for monitoring the operation of the system to provide an accurate assessment of progress measured against criterion standards established in the system analysis (McManama, 1971).

Early efforts in educational television programming were concerned primarily with the design of the message alone, without taking into account the kind of environment in which it was received, or the effect on the receiver. Currently, however, educational communicators have become increasingly aware that messages may often fail because some aspect of the total system has been overlooked or ignored in designing the communication. The systems approach is advantageous in that it calls attention to the multiplicity of factors and inter-relationships which retard or expedite the desired effect at the receiving end. It therefore indicates the necessity for more comprehensive planning and decision-making by all involved in all stages of analysis, design and management

*See footnote (2), page 216.

of the system. Consideration needs to be given first to the functions to be served and then to the components required to fulfill these functions.

The application of this methodology in designing instructional learning systems

"consists of systematic procedures for planning, designing, carrying out and evaluating the total process of learning and teaching. It is directed at achieving specific objectives and is based on research in human learning and communication. Applying this methodology will produce a learning system which arranges human and non-human resources in an efficient manner to bring about effective student learning..... Thus because the system approach is both a point of view and a methodology, it provides a guide for planning instruction and carrying out the plan."

(Davis, Yelon and Alexander, 1974, p. 34)

In applying this methodology to the instructional process, the selection of media such as educational television, is no longer considered in isolation but becomes one stage in an overall system approach. The decisions at the media selection stage, as discussed in the next chapter of this study, depend on the requirement and results of earlier stages in analysis and design.

Schramm et al (1967, pp. 162-164) list several advantages in using the systems approach in educational planning which apply equally well for an educational television system:

1. It encourages a clear definition of objectives in practical operational terms that provide a clear basis for organizing the effort and checking results.
2. It obliges us to recognize all of the components that go into any particular process and the need to orchestrate these components into a unified, efficient, and effective process. Looking at a "teaching-learning system" in this fashion we can detect weak spots and failure points that need remedy. We may also be inspired to ask how the components might be combined

differently, or what kind of new components might be added to get better results. We may also open our eyes to new ways of meeting important needs which cannot be met by conventional means.

3. It focuses attention sharply on the important need to evaluate educational results -the outputs- in more specific and relevant terms than simply the number of school-leavers or graduates or proportion receiving particular grades on some standardized examination.
4. The systems approach provides a way of dealing with costs and efficiency which makes both educational and economic sense. The efficiency of an educational system is not absolute; it is the relationship between the system inputs and outputs (judged in relation to its objectives), and can be changed.
5. The systems approach can provide help in bringing about much-needed educational changes. By encouraging a more comprehensive and systematic examination of the existing system, it can identify the specific things most in need of change and the best leverage points for securing improvement. It can lead to a classification of important objectives which the present system is not achieving and perhaps simply cannot achieve in its present form for various practical reasons. In this event it leads us to search for new solutions, sometimes involving unconventional technologies such as the new media. It provides a clearly defined purpose for whatever innovations we may undertake. It provides an orderly basis for planning such innovations, so that they have maximum chance of success and provides a rational basis for evaluating effectiveness in comparison to other solutions.

The systems approach is therefore required at the highest levels for the proper planning and coordination of functions and resources. Procedures must be established for identifying educational needs which should be met through media like educational television, and these media must be made available to those who are to benefit from the teaching they provide. The systems approach should also be applied at all operational levels of planning, production, utilization and evaluation of programmes. An organizational framework needs to be created, in which all functions and components operate in a single system.

0.3 Educational Television as a Component of the Instructional System:

Television was established as a medium of mass communication before its use was extended to educational purposes. In a mass communication system, television tends to be largely content and performer - centred, with no systematic concern given to what happens at the receiving end. The television mass communication system comprises of the processes of planning, production and dissemination, and may be depicted in the following kind of relationship:

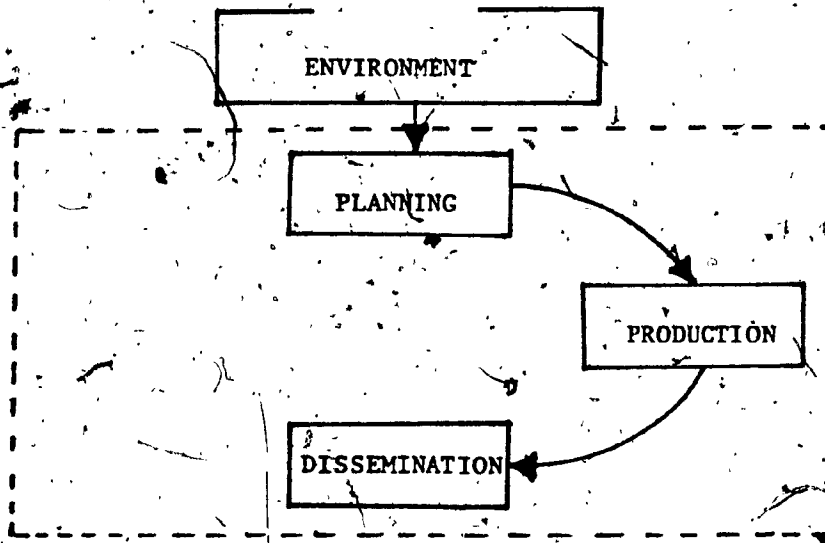


Figure 1: Television system in mass communication.

There is no systematic plan for evaluation beyond a head-count of the size of audience a programme draws (rating); which determines whether or not a programme continues on-air or is dropped.

Some early uses of television in education tended to follow the mass communication pattern with programmes being assessed largely on whether or not they met certain technical standards, and appealed to a large audience.

This development appears to account partly for the 'tissue rejection' of television in some of the earlier efforts to use it in instruction. The television system had been thought of in isolation with no attempt to plan it as a compatible component of the instructional system in which it was likely to be utilized. The purpose of instruction, as previously indicated, is to facilitate learning. An instructional system has as its goal the implementation of identifiable learning outcomes which contribute to the achievement of stated educational goals. If educational television is to be planned and developed as a compatible component of an instructional system, it must be discerned to be contributing to the process of bringing about change in the capabilities of the learner. The educational television system in this sense provides programmes which are designed for a clearly defined audience and presented on a planned and usually continuous basis in conjunction with other instructional activities, for the development and change of specified behaviour of the defined audience. When the emphasis on behavioural change of the learner at the receiving end becomes the guiding purpose for programming, the process of evaluation becomes of particular importance in the educational television system; and in contrast to the mass communication system, an educational television system becomes a closed loop with the processes of planning, production, dissemination / utilization and evaluation all inter-related as follows:

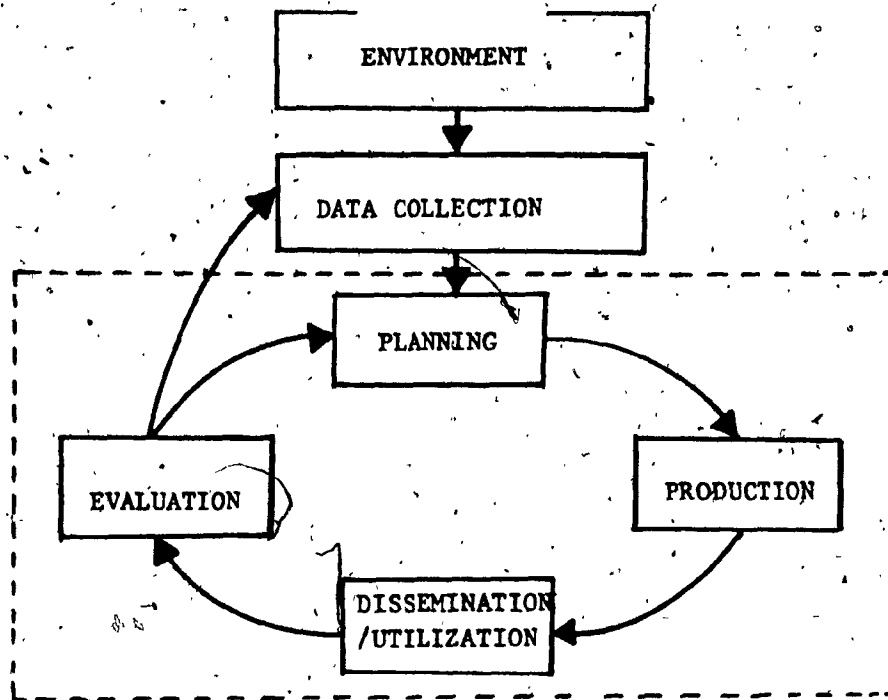


Figure 2: Educational Television System

Data for the educational television system exists at random in the environment and the data collection stage indicates a point of reducing the data into information for the system both through basic and applied research.

Such a television system functions within the constraints of the instructional system of which it is a sub-system. This requirements of the instructional system become the determining factor of effectiveness of the television sub-system. The primary concern in such a system is with what is communicated and not how the message is conveyed. As Bretz (1971) points out, the design of an instructional message, plus the way in which the received message is integrated and co-ordinated into other

functions of the user (instructional) system, will determine the degree of success of the user system far more than the mere choice of the medium to be used. This indicates that instructional method is far more significant than the instructional medium and corroborates the conclusion by Chu and Schramm (1967) that "the research seems to suggest that effective use of television grows out of attention to the basic requirements of good teaching, rather than to any fanciness that might be peculiar to television." There is therefore a need for the educational television sub-system to change and adapt to changes within the supra (instructional) system. This can be possible only if the sub-system is clearly defined and functions as part of the supra-system in the sense of playing a defined role in the system purpose.

The planning stage is of crucial importance in determining how television and other instructional methods are to be integrated into an effective instructional system. Heinich (1968) points out that traditionally audio-visual materials have been considered solely as "aids" to instruction, due primarily to the tradition of the teacher as sole arbiter of what is used in the classroom. Most instructional decisions are left to the teacher by curriculum planners, including decisions in regard to media, so that audio-visual materials enter the instructional process at the classroom implementation level (as shown below) when the teacher is casting about for materials that might 'aid' instruction.

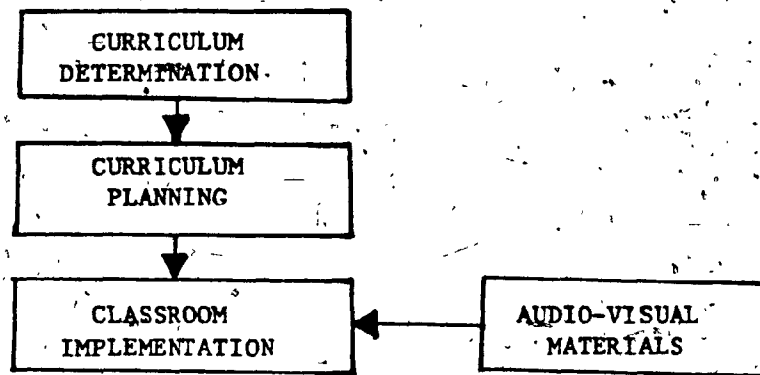


Figure 3: 'Audio-Visual Materials as 'Aids' in Traditional Instruction.'
Source: Heinich, 1968.

Heinich further points out that for the use of new media like television to be most effective, a new paradigm is necessary in which there is a shift in media decisions from the classroom implementation level to curriculum planning stage. Media decisions become part of the planning process and can no longer be seen as merely audio-visual aids to the teacher. This requires a new term -- instructional technology -- and audio-visual materials are subsumed under instructional technology.

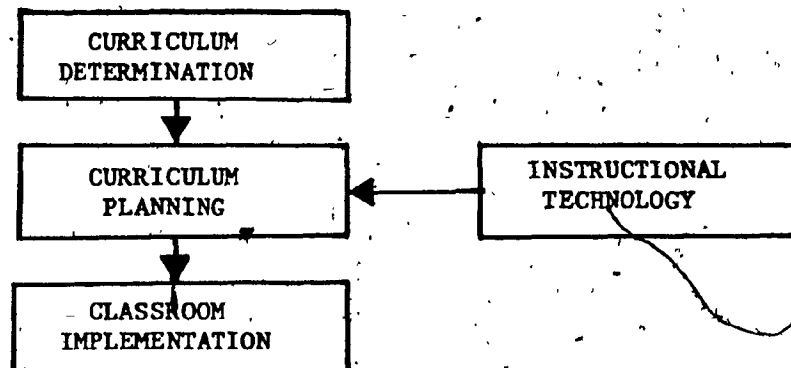


Figure 4 : Media Choice as Part of Instructional Technology
Source: Heinich, 1968.

Under this altered framework, decisions made at the curriculum planning phase result into three broad classifications of instructional strategies - mass instructional technology, conventional instruction, and individual instructional technology (Hancock, 1971) which go into making the instructional (implementation) system:

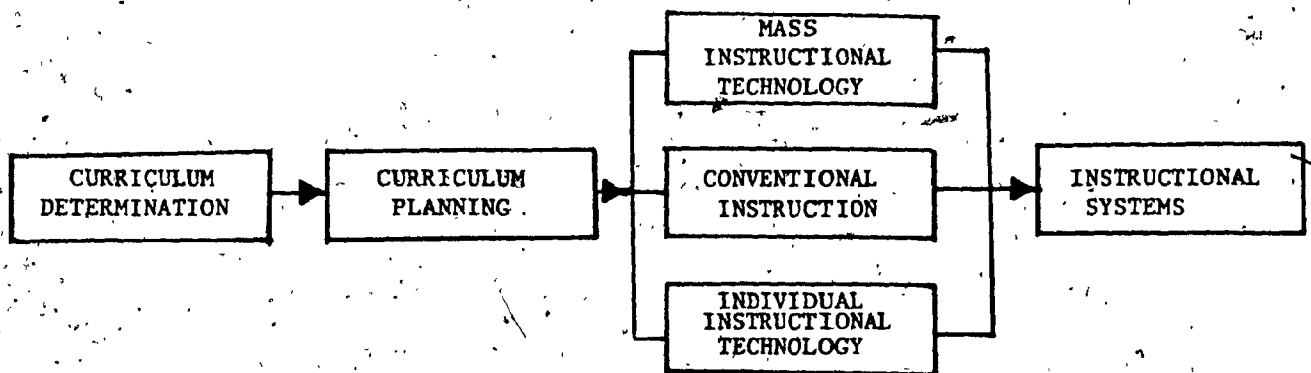


Figure 5: Evolution of Systems Approach to Media in Instructional Systems.

In this type of framework the evolution of a systems approach to instruction becomes possible with mass instructional technology, conventional instruction and individual instructional technology being used in any of the possible combinations desirable, toward the implementation of specified learning outcomes. In this framework educational television may be developed as part of mass or individual instructional technology depending on the needs to be met and decisions made at the curriculum planning stage. Educational television becomes more effective in this kind of framework as it is integral, adapted and improved to work with, and not in competition with other media and methods. Viewed in this framework, educational television is no longer "just a collection of separate processes, of devising 'nice' programmes

and catching production techniques, or identifying audiences, or arranging follow up methods and evaluation surveys" (Waniewicz, 1972). Rather it begins to approximate what the National Association of Educational Broadcasters (NAEB, 1970) refers to as the facilitating mechanism for new instructional systems, in which television and classroom activities perform one task, with several components that interact toward co-operative instruction. This involves assignment of 'team' duties among members of a total teaching force who co-operate in order to develop and carry out instructional plans. It is the development of educational television within this sort of co-operative instructional systems approach that this study will, in later chapters, attempt to analyze the essential functions of the processes of planning, production, utilization and evaluation in educational television.

0.4. Different Types of Operational ETV Systems

There are a number of operational educational television systems which have been established in many different parts of the world, as part of co-operative teaching ventures. In these systems, although television is a major component of the educational projects, their effectiveness does not depend on the medium in isolation. The time has passed when the television programme can be considered an educational entity by itself, and efforts are being made to use it within the educational context, together with related materials and activities that make it more relevant.

The pattern in which educational television is combined with other methods of instruction, as well as the teaching role of programmes in the instructional process, differs from project to project.

Table 1: ETV as a component of Educational Reform

	<u>Niger</u>	<u>American Samoa</u>	<u>El Salvador</u>	<u>Ivory Coast</u>
MAJOR OBJECTIVES	Expand primary enrollment, make curriculum more relevant, test ITV	Swift improvement and expansion in schools, make curriculum fit Samoan life, concentrate on mastery of English	Greatly expand enrollment in Plan Basico without loss of quality, introduce new curriculum, then turn to other parts of system	Expand enrollment in primary school, train teachers to carry load of new responsibility
OUTSIDE SUPPORT	France provided about \$1.5 million capital, \$600,000 annual operating	U.S. through territorial budget provided \$2.5 million capital for TV, about \$1 million annual operating, plus capital budget for new schools	From U.S.A.I.D. about \$1 million in grant, \$2 million loan; from IBRD, \$4.9 million loan; from UNESCO, UNICEF, others, about \$2 million	From France about \$5 million over 5 years, \$1 million from UNDP and UNESCO, \$1 million from Canada, \$11.2 million loan from IBRD
PREPARATION TIME	About two years	About three years	About nine years general, two years specific planning	About four years
USE OF TV	Core teaching	Core teaching	Core teaching	Core teaching
SUPPORT OF TV	Classroom materials, feedback, inservice training, ITV team, curriculum revision --latter especially noteworthy in Niger	Same	Same	Same
Pace	One grade a year, never more than 800 pupils	12 grades in two years; reached every child in American Samoa in four years	One grade at a time; doubled enrollment in Plan Basico in 4 years	One grade at a time; 20,000 pupils first year, 60,000 second year
CLASSROOM TEACHERS	Monitors	Qualified teachers	Qualified teachers	Qualified teachers

Continued

Ivory Coast

El Salvador

American Samoa

Niger

**TEACHER
TRAINING**

Six weeks before first term; repeated second year

Emphasized inservice training

Full year of retaining for each teacher

Extensive inservice training

ORGANIZATION

Almost completely separate from Niger ministry of education; operated as experiment under French ITV team

Integral part of Samoa Department of Education; under U.S. educators and broadcasters at first, administration now Samoan

Integral part of Ministry of Education; used advisers, but project always in Salvadoran hands; number of foreign experts

**TELEVISION
FACILITIES**

One low-power TV transmitter, well-equipped production center with three studios

Six open-circuit VHF channels, two transmitter towers on mountain, four studios, 10 VTRs

Rented time on air for four years, and got along with one studio for three years; now has two transmitters of its own and building with three studios. Has building with two TV studios, one radio; national TV network provides time

PRODUCTION

About 400 programs a year, representing about one hour a day: French, arithmetic, basic programs

6,000 programs a year (2,000 hours) until 1971; now about 2,200; all subjects in 12-year curriculum, plus pre-school and adult services

13 programs per grade per week; about 500 per year in 5 subjects --between 4 and 5 hours a week 7 to 8.5 hours a week; French, math, basic education

Source: Schramm (1973)

The projects to which reference will be made in this study may be grouped into four categories. Examples of each category are summarized below:

0.4.1. Educational Television as a Component of Educational Reform

This category consists of projects in which television has been aimed at abruptly changing a school system or creating a new system. Examples in this category include the use of television in Niger, American Samoa, El Salvador and the Ivory Coast. A summary of these projects is presented in Table 1, and it can be seen that along with the introduction of television to effect core teaching, other major system activities such as curriculum revision, teacher training and creation of new classroom materials were carried out.

0.4.2. Educational Television Used to Extend the School

This category includes projects in which television is being used as a component of instructional systems that are helping to extend formal education to audiences, who for a variety of reasons do not have this opportunity available to them through the existing educational institutions.

1. Chicago Television College:

This project was initiated in 1956 under the auspices of the Chicago City College System. A complete junior college programme is offered leading to the degree of Arts Associate, and the possibility of transferring to a four year university. Television is used in conjunction with texts, assigned papers, telephone conferences and in some cases class or laboratory meetings on

campus (UNESCO, 1967; Schramm et al, 1967; Schramm, 1973).

2. The Open University, Britain:

The Open University was chartered by parliament in 1969 and started operations in 1971. It is financed chiefly by parliamentary appropriation and offers a complete university curriculum. Television is used along with radio, study materials, self-corrected and computer or tutor marked exercises and papers, consultation with tutors and meetings with other students at study centres, short term residential study in the summer, home experimental kits, field trips and a host of audio-visual aids and computer facilities (Lewis, 1971b; Schramm, 1973; Turnstall, 1974).

3. NHK Gakuen, Japan:

High school correspondence education in Japan was established in 1948. With considerable experience from which to draw, the Japan Broadcasting Corporation (NHK) in cooperation with the Correspondence Instruction Association, established the 'NHK Gakuen' in 1963. The NHK Gakuen is a radio-television-correspondence high school. It offers the complete three year high school curriculum in four years, for students who did not find places in residence high schools. Most of the students work, and most of the television and radio lessons are scheduled at prime time in the evenings when most students can have access to them.

Television is used along with radio, correspondence texts, one day a month and five summer days in supplementary classes

(Nishimoto, 1969; Schramm, 1973).

4. Tellekolleg, Germany:

Established in 1967 under auspices of the Bavarian Broadcasting system and Ministry of Education, the Tellekolleg offers intermediate school preparatory to trade and technical study. Students who are working and are unable to attend regular school are offered a variety of courses using television, correspondence study and five-hour meetings every weeks, leading to a diploma and entrance into higher school (Schramm, 1973).

0.4.3. Educational Television Used to Improve Instruction:

In this third category, television does not aim for institutional changes, but rather, either due to rapidly increasing school populations or changing curriculum and shortage or lack of instructional materials, educational television is used to help improve the quality of instruction. In this category are educational television systems such as those established in Hong Kong, Zambia, Singapore and Haggerstown. An educational television syllabus is prepared closely following the syllabus in use in the educational system and television programmes are integral components of the instructional systems.

0.4.4. ETV in Multi-Purpose Educational Communications Agencies and Non-Formal Education.

The past ten years have seen the development of a number of educational television services as part of public educational communications organizations. These services cater for different types of specified audiences with a variety of educational needs, within the

jurisdictions in which they are established. The following are three examples of such services:

1. 'TRU' (Radio and Television Committee), Sweden:

The TRU is a relatively independent organization, although it is financed by out-of-state funds and is closely co-operative with the Swedish Broadcasting Corporation and various adult education organizations. Established in 1967, the TRU offers a wide variety of courses ranging from pre-school and special education to adult education. Some of the courses lead to examinations and formal credits, and others do not. Among courses offered are some vocational, refresher and general adult education. The TRU is a multi-media organization, and along with television, radio, text-books, correspondence, recordings and home-study kits are utilized (Schramm, 1973; Lundgren, 1972).

2. The Ontario Educational Communications Authority (OECA), Canada:

The OECA is an Ontario Crown Corporation formed by an Ontario Legislative Act in 1970. The Authority initiates, acquires, produces and distributes materials in the educational broadcasting and communications field for pre-school and elementary school children; secondary school students; college and university students; adults and teachers.

3. The Alberta Educational Communications Corporation (ACCESS), Canada:

ACCESS has been in operation in the province of Alberta since 1973, and works in close co-operation with the Department of Education and Department of Adult Education to provide a variety of educational materials for audiences ranging from Elementary

school to Adult Education students. Along with broadcast television other services such as radio, videotape dubbings, film strips and learning kits are made available to help meet a variety of identified needs at all educational levels.

Aside from the kinds of services discussed above, there have been experiments in using educational television in attempts to meet needs that could not otherwise be efficiently met by any other existing educational services. Well known among such experiments is the Children's Television Workshop's "Sesame Street" programme from the United States. The programme is aimed at helping disadvantaged pre-school children to acquire a number of cognitive and affective learned capabilities. The 'Sesame Street' experiment is particularly noteworthy in approximating the application of a systems approach in the planning, production, dissemination and evaluation of educational materials as well as for its exemplary efforts to relate research to the creative process of planning and producing educational television materials.

None of the projects discussed in this section is exclusively a 'television' project, except in the sense that television is a principal component---the only exception is perhaps 'Sesame Street'. But even here an effort is made to encourage mothers to watch and discuss the show with the children so as to facilitate more active participation in the learning process (Ball and Bogatz, 1971). Other educational materials based on the series are also available commercially so that it is possible for children to have active practice with the material presented via television.

For most purposes where behavioural change is the objective, it is recognized that television is not a self-sufficient instructional tool and needs to be used in conjunction with other presentational, interactive and object-media (Haney and Ullmer, 1975), so as to allow for more active learning. Television must be built into a system; and as the Commonwealth Secretariat and CEDO (1974) point out, in this respect, television's ability to help bring other elements of the system into existence and streamline them may be more important than its direct effect on the students.

0.5 Conditions for the Success of ETV

It can be seen from the preceding sections that during the history of the development of educational television, a number of effective patterns of use have emerged. The evidence available from successful operational systems indicates that by and large educational television is a resource that must be selectively used as an integral part of a package of instructional-learning resources. A certain number of pre-requisite conditions also seem essential to foster the successful establishment of educational television in an educational system.

0.5.1. Existence of an Identified Problem of Feasible Size:

Evidence from most successful systems seems to indicate that the existence of a publicly recognized problem is a prime condition for the introduction of educational television. For example, in American Samoa the problem of upgrading education as swiftly as possible was first recognized; in the Ivory Coast the emphasis was towards universal primary education and the TV project was to be part of this drive,

In El Salvador the problem was with grades 7-9 which were the weakest link in the educational system and television was first used to help deal with that inadequacy. In the Open University, the Tellekoleg, NHK Gakuen and Chicago Television College, television was part of the problem-solution in trying to extend the school to those who otherwise could not receive the formal education offered. In Singapore and Hong-Kong, the problem of quickly expanding school population coupled with changing curricular in a number of subject areas, threatened the quality of instruction in schools and television was infused for that purpose. In the case of Sesame Street, the problem of providing disadvantaged children with stimulation for cognitive and affective learned capabilities parallel to those of middle-class children was recognized; and so forth. Schramm and associates (1967) point out that such media as educational television are also most useful when introduced in a context of change. They are not likely to have great impact if merely added onto what is already being done otherwise.

The broadcast media especially are likely to be used at their full power and efficiency when a system is trying to solve stubborn, basic problems or to bring about some fundamental change (Chu & Schramm, 1967). The problem to be solved or change desired should be of sufficient magnitude to be perceived as both economically and educationally advantageous for the use of educational television. There is a critical point of size and use when the advantages of educational television justify their relatively initial high cost. It would be an expensive investment, for example, to use television to provide a few supplementary programmes per course, per year, unless perhaps ETV is already being used extensively by many courses in a system; then the expense of adding

a few supplementary programmes for courses not making regular use of television would not be too great. The size or magnitude of the problem is significant as no-one would take the value of ETV very seriously if it is spread too thinly over audiences and learning objectives to achieve a significant impact. It is easier to obtain the essential administrative, financial and teacher support if the problem is demanding and urgent. Administrative support is especially crucial in calling for national or system wide support. Major needs or major campaigns make it also easier to elicit teacher support; otherwise there may be resistance caused by what may be perceived to be the threat of intrusion by the television teacher (Chu and Schramm, 1967; Schramm et al, 1967; Schramm, 1973).

0.5.2. Defining the Role of Educational Television

An adequate definition of the role that educational television is to play in a given project is a crucial prerequisite for its successful use. Once the problem has been identified and the needs defined, if television is envisaged as one of possible alternatives or means for meeting these needs, it must be determined how and where ETV can effectively help to satisfy the needs. Nuss and McAnany (1972) point out that very early in the El Salvadoran project, television was seen as more than just a medium of instruction, and that it could function as a powerful catalytic agent in the desired educational reform, ETV was seen as something more than a relatively inexpensive substitute for well trained teachers, and this was related to other systemic requirements and necessary changes. The ETV contribution was therefore not seen to be only on the direct level of classroom learning, but also on the more indirect level of systemic changes.

The role that educational television is to play whether as a visual aid as in traditional usage, or as part of a multi-media package in transitional systems, or as part of a systems approach in innovative systems, (Hancock, 1971b) must be established since it will influence subsequent decisions in the operational system.

0.5.3. Need to Review Educational Goals

When new technology such as television is applied in highly traditional systems such as education, the expectations for important change increase. Schramm et al (1967) have pointed out that when so much is to be invested in facilities, and teaching is to be lifted from the privacy of the classroom into public view, the decision to introduce the new media raises basic questions about what is to be taught and why, how it is to be taught and what effect it has. This provides a chance to review curricula and programmes against the national goals: what is to be taught and what kinds of graduates are produced. If this rare opportunity of improving the system in fundamental ways is missed and the existing curricular is merely "polished up a bit", as was the case in the first year of operation in El Salvador (Nuss and McAnany, 1972), this is likely to lead to dissatisfaction with the new system and possibly a consequent loss of public support. Breitenfeld (1968) points out for example, that television in many school systems in the United States did not confirm original expectations about learning gains of students, due partly to the fact that it was applied in a superficial manner with no attempt made to review existing goals, with the traditional system left largely intact. No attempt was made to clearly relate the new technology

to an identifiable function in the system. In contrast, with a project like El Salvador's it was recognized early that many elements have to be changed if television was to be employed effectively. The result was an extensive revision of the curriculum so that its focus was on relating and applying concepts rather than on remembering facts. An extensive teacher retraining programme was also carried out so that teachers could become familiar with the new curriculum and their new teaching roles, and classroom and laboratory materials for teachers and students were developed to accompany each televised lesson (Hornik, 1972).

0.5.4. Adequate Financial Resources

The problems of finance should be considered in preliminary stages and planned for, so that during the operational stage attention can be focused on the educational aspects and not money matters. If financial requirements are not carefully planned for, the educational television project may end in disappointment or become lopsided. Economics of scale are required to make educational television worthwhile, but the cost feasibility must be judged in terms of the relationship of costs to results and not by costs alone. Trivial educational results attained at bargain prices may have far less justification than significant educational results that cost more (Schramm et al, 1967).

If a project is to start with a pilot, it is essential to ensure that if the pilot succeeds, there will be ample resources available to carry out the full-fledged project. This was, for example, a fact that was not taken into consideration in Niger where the establishment of the pilot project was without full commitment to ways and means of expansion

beyond the pilot, which was very successful. Other projects such as the American Samoan, Ivory Coast and El Salvadorian, have also relied on substantial support from outside for initial success; but in the case of El Salvador and Ivory Coast, efforts were made to plan for gradual absorption of costs as the operation continued, and American Samoa as a territory of the United States was assured of financial support through American territorial administration (Schramm, 1973). Educational television is an expensive undertaking and consideration must be given to the financing of all aspects of investment and operating costs if it is to prove successful.

0.5.5. Strong Support from Top Authority and Broad Involvement

One ingredient that seems to be essential for easy and successful introduction of an educational television project is strong support from the top authority. If the project is to reach national (or other defined) dimensions and to be absorbed into national or other public budgets and plans, then it must be integrated from the beginning not only into the local culture, but also into the local primer structure. This was the case for example in El Salvador, where the project started off with support reaching all the way to the Ministerial and Presidential levels (Nuss and McAnany, 1972; Hornik, 1972). In Ivory Coast, support was also up to Presidential level with the ETV organizational structure established as high as cabinet level (Grant, 1974). With the Open University support through Education and Science Ministry insures financial support from Parliament. In American Samoa, Governor Rex Lee was personally involved in initial efforts to launch the ETV project.

Niger again is a case in point where this was not accomplished, with the project operating largely separate from the Education Ministry and largely ignored by officials responsible for education in the country, although it had the initial support of only President Diouri (Schramm, 1973). As a result the excellent television teaching project was regarded as a foreign experiment (being staffed and operated from the outside) on Nigerenne soil. Its future remained uncertain and it folded with the cessation of French involvement (Schramm, 1973).

Just as important in a situation where television is part of a teaching-learning system is the need to involve the users. As Chu and Schramm (1967), have pointed out, television is most suitable as a tool for learning when used in a suitable context of learning activities at the receiving end. In this case, especially where teachers are involved at the receiving end, it is essential to involve them as early and as much as possible in the educational television project. If the support of teachers is not gained, the materials may not be properly utilized or may be ignored altogether, hence failing to achieve intended learning results. Schramm and associates (1967) point out that attitude research on new media projects indicates that the more experience a teacher has had with one of the new educational media, the more likely he is to be favourable to it. In fact effective systems like Hong Kong, Singapore, El Salvador and Samoa have realized early in their plans, the need for involving teachers either through retraining, seminars, surveys or serving on television subject committees (Commonwealth Secretariat and CEDO, 1974; Schramm et al, 1967; UNESCO, 1967). Haggerstown also managed to maintain broad involvement by including teachers in early seminars to define the role of

television in the system and secondly by using wholly local materials and presenters from among the county's teaching cadre. This built a sense of localness about the programme with teachers identifying with it and not feeling threatened by something being imposed upon them (UNESCO, 1967). This is a particularly crucial and important condition for the success of the ETV system and it must be planned for from the beginning of the project and be actively kept up throughout the operational life of the educational television system if it is to be effective. This involvement applies not only to teachers in the formal system, but equally as much to monitors, supervisors or tutors who lead or guide learning activities related to the utilization of television programmes.

Along with this involvement will be the need to clarify or re-define the teacher's (monitor's, supervisor's or tutor's) role in the teaching-learning system in relation to educational television. The kind of definition adopted will effect (a) the kind of training given to teachers, whether formal or in-service; (b) the role and tasks of the television teacher; (c) the curriculum and materials - i.e. whether programmes and accompanying materials should be self contained or less so depending on whether the role is more of a monitoring than complementary teaching one; (d) the way in which the programmes are related to the pupil's interests and backgrounds and aim to fill their needs (Mari, 1971).

0.5.6. Unity of Purpose Between Education and Media Professionals

That most successful educational television services have this as a feature of their system, points it out as a condition to which consideration ought to be given in establishing new system. A noteworthy example of the unity of purpose in this respect is the kind of organization which has been established at the Open University in Britain. Through the course team, there is give and take between the academics and producers, so that although each one fulfills a different function, right from the beginning of a course, to its evaluation, revision and recycling, they are concerned about the same task (Lewis, 1972). Another example of such co-operation in achieving educational goals is found in the Japanese NHK Gakuen, where there is an interlocking structure of committees and organizations from the correspondence schools of the country, the NHK school, the Ministry of Education, the NHK producers, the teachers who write textual materials and classroom teachers throughout the planning, producing, dissemination and evaluation of the television programmes (UNESCO, 1967, Vol 1:). Other systems such as those in Hong Kong, Singapore, Zambia, El Salvador, Chicago and Hagerstown have established a unity of purpose by recruiting media producers and/or presenters from among the teachers, and in some cases by forming teachers' committees as part of the ETV planning and evaluation machinery.

This kind of unity needs to be forged to avoid the kind of confrontation and disagreement that occurred between educators and broadcasters in the early days of educational television. It is important to regard the whole operational system as a continuous and integrated process, and those involved need to work together from the outset in a team. Evaluators need to be involved from the beginning to know how

to evaluate the performance, taking the basic decisions into account. The teachers or teacher trainees need to be involved so that the realities of the classroom situation are considered in planning; and the producers have to be involved so that both overall and specific objectives for programmes are related to the basic goals (Hancock, 1976). The more this kind of team work is fostered, the smoother and more successful the operation is likely to be than otherwise.

0.5.7. A Planned and Phased Introduction of Educational Television

A common feature about successful educational television systems is the way their introduction has been planned and usually phased. In most of the cases discussed earlier, a period of at least two years has normally elapsed between serious commitment to the project and its actual operational installation. During this time a number of essential activities necessary for operation are normally carried out. Hancock, (1971, pp. 73-77) for example, presents samples of the kind of network planning that might need to be adopted to ensure that all activities related to training, technical installation, production and so forth are taken care of before initial broadcast deadlines. Indeed this period is crucial, as a difficult first year of operation, could create an unfortunate first impression, and possibly result in a consequent pattern of ineffectiveness from which it may be difficult to recover. The complexity of activities to be carried out in each of the stages of a pre-operational period needs to be carefully detailed and where applicable, use should be made of systems techniques such as the Programme Evaluation Review Technique (PERT) and Critical Path Method (CPM), to ensure that certain activities pre-requisite to others are completed to

meet necessary deadlines.

In most successful systems such as those discussed earlier, the ETV project is gradually introduced by phasing one grade level or one complete cycle before adding the next and so forth. Schramm (1973) in fact points out that if one introduces a televised system faster than one grade at a time, one risks serious administrative problems. Schramm further points out that this fact is well illustrated by the experience of American Samoa, which would have found its task vastly easier technically and administratively if it had not decided to introduce the use of television at all twelve grades at once. Hong Kong, Singapore, El Salvador and Ivory Coast on the other hand are good illustrations of well planned and systematically phased projects that have proved successful (Grant, 1974; Commonwealth Secretariat, 1974; Honik, 1972; Haye, 1970)

0.5.8. Technical Adequacy

Insuring the acquisition, installation and maintenance of adequate technical facilities, services and equipment before operation starts is of crucial importance. Unless it is ascertained that technical aspects are functioning well, the educational programme may become undermined by technical difficulties, as the efforts that should be devoted to teaching with the facilities will be usurped by worrying about these problems.

It must be insured that the television network does reach all areas where intended users are located. If facilities do not exist, then they must be installed or extended where necessary. The maintenance of transmission, production and reception equipment must be carefully

planned for. The maintenance of receivers is particularly in need of a systematic way of operation especially in countries where the electronics industry is not yet widespread. A travelling maintenance truck as in Samoa (UNESCO, 1967) or the contracting of local television supply companies as in Ivory Coast, Zambia or Hong Kong are some of the ways of dealing with this problem (Grant, 1974; Commonwealth Secretariat, 1974). In any case, the standardization of equipment appears to be an advantage in maintenance work (Schramm et al, 1967).

The electric power both at the point of origin in the broadcast station and reception centres should as much as possible be stabilized, so that it does not cause frustration during utilization of programmes. Where power is not available, for example, in rural reception centres, plans should be made early enough for the supply of battery powered sets as has been the case in Ivory Coast and Niger (Grant, 1975; Schramm, 1973). Where availability of sets are not widespread or in the case of reception centres lacking them, prior planning must be done and sets supplied by the educational television service or educational authorities as the case has been in Hong Kong, Zambia, Singapore, Ivory Coast, Niger and others.

Pre-operational technical planning must be carefully carried out to insure smooth and effective use during operation.

0.5.9. Technical and Programme Staff Training

Coupled with the need for adequate technical planning is the necessity for well-trained competent technical and programme staff. If possible, part of their training should be done locally so that they are fully familiar with the system in which they are to function; its particular needs, difficulties and requirements (Schramm et al, 1967).

0.5.10 Communication between the Service and Users

In an educational television system constant communication between the service and users is of particular importance in project effectiveness. The need to deliver materials to users, whether teacher guides, study guides, study or supplementary materials, is as important as getting the programme to them. The delivery system whether mail, truck service or some other means must be organized and reliable, if the project is to avoid being paralyzed by failure of materials to arrive.

Systematic ways must also be established through which users can communicate with the originating service. This may be accomplished either through evaluation returns, surveys or through visits or other regular contact with the service. Besides the need to communicate back with the service, there is the importance of keeping users from feeling isolated which requires the establishment of systematic ways of interaction between them and the service. This may be accomplished by various means such as visits, mail, workshops or field support, all of which should be directed at keeping users involved in the development of the service by soliciting their ideas and advice and helping them make good use of the central services. Where teachers are involved, this is particularly important in fostering the cooperative team teaching spirit (Schramm et al 1967).

0.5.11. Fostering Effective Context for Learning at the Receiving End

Whenever and wherever possible, television out-of-school students should be brought together in supervised groups to encourage the kind of active learning possible through discussion and other kinds of student interaction. A motivated student can learn by himself, but the shared

experiences and sense of purpose that result from group contact can contribute to this sense of motivation and lessen the sense of discouragement that is likely to come from strictly isolated learning. Such groups must be properly equipped at the receiving end and given as much support through the various kinds of communication as may be given in-school groups. Competent supervision must be provided and the supervisors and monitors will need to undergo any kind of desirable training necessary to carry out their duties effectively.

Where students cannot be brought together some other means of contact between them and the teacher ought to be established. Various ways such as telephone consultation where possible, papers sent in for comments and even a few meetings on campus should be built into the system.

This kind of group interaction or student-teacher contact is a feature of most successful distant teaching systems making use of television, such as the Chicago Television College which makes use of telephone consultation, teacher marked papers and a number of meetings on campus. The Japanese, NHK Gakuen also maintains contact both through correspondence study and bringing students together for several days a year (UNESCO, 1967; Schramm et al 1967). The Open University in England has also built in a system of meetings and consultation at study centres and scheduled summer sessions on campus. The same applies for the German Telekolleg (Schramm, 1973).

This section has attempted to present certain conditions that are discernable from successful operational systems and which seem to contribute to their success. Most of the conditions discussed here would need to be carefully preplanned and established before the system

is put into operation. Later in the discussion of this study, they will be presumed to already have been planned for, so that the concern will be focussed only on educational aspects of the educational television system.

INTRODUCTION : PART B

0.6. Kenyan Educational Situation:

0.6.1. Introduction

The general purpose of education in any society may be said to be what Peters (1963) calls "Education as Initiation". If we accept this notion, education in a developing country context may be seen as the process of developing individuals to become effective members of a changing society, by initiating them into the activities and modes of thought and conduct which are required for adaptation in a modernizing society. This view implies as the criteria for education, the instillation of capabilities for individual adaptation to participation in creative contributions to, and constructive transformation of the environment. In a society which is in a transitional stage from a traditional to a modern society, traditional means of meeting such educational requirements rarely suffice in fulfilling the new social demands. Therefore new ways of initiating people into contemporary society must be found.

0.6.2. Structure and Development

Since independence in 1963, the most striking feature of the educational system in Kenya has been the increasing demand by more and more people in society for the opportunity to receive education. The response of the system has been the rapid increase in enrolments at all levels of the formal system, coupled with an upsurge in the number of alternative and vocational training institutions (Cowan, 1970; Anderson, 1970; Stabler 1969; Government of Kenya, 1972, 1973, 1974).

Since independence Kenya has retained an educational structure largely inherited from the British Colonial Administration. Formal education consists of primary (first-level), secondary (second level), teacher and tertiary (the Polytechnics, the University and Egerton Agricultural College) education (See Appendix A). The first decade following independence was largely directed at the removal of racial segregation and trying to cope with the ever increasing numbers within the inherited educational system. Toward the close of the first decade of independence, however, a number of problems inherent in the established system and unfulfilled educational needs made certain changes in educational policy necessary, and also resulted in changes within the established structure (Appendix B).

Immediately following independence, the need to change the educational system was complicated by the government administrative framework, in which the responsibility between educational policy and administration was divided between the central and local government levels. This division was not always conducive to co-operation at the two levels in matters relating to education, nor was it likewise conducive to promoting desired changes within the whole educational system. As a

result, by 1969 the central government found it necessary to change the administrative framework, taking over among other powers, the direct control of primary education, in addition to secondary education which it had administered since 1965, in order to co-ordinate and promote its development (Meck, 1971; Anderson, 1973; Ndegwa Commission, 1970).

Second-level education was a crucial issue at independence. Only ten percent of first-level school leavers could find places in second-level schools. With the age of school leaving falling rapidly, large numbers of twelve and thirteen year old children began to leave first-level school without any chance of further education, but too young to start looking for employment (Meck, 1971; Anderson, 1973; Sheffield, 1966).

In the first years after independence, with the control of second-level education under the regional councils, the position was rather confused. The number of enrolments in both first-level and second-level schools increased by thousands yearly (Appendix C). The number of pupils leaving first-level schools increased more than fivefold, from 29,870 in 1961 to 156,865 in 1965 (Appendix D). With this increased demand for second-level schools, independent groups began to develop their own harambee (self-help), second-level schools, outside the government system. The regional councils had done little to control this independent movement, so that by the time the central government took over administration of second-level education and instituted new efforts to build government-aided second-level schools, these efforts were paralleled by a growing self-help movement, which has since achieved rather remarkable results. By 1974 approximately 579 second-level, self-help schools had been created since independence (Government of Kenya, 1975; See Appendix E).

The self-help schools are now being progressively integrated into the government system (Appendix B).

0.6.3. Educational Policy

The task charged to the educational system since independence has been: 1) the expansion of educational opportunities; 2) the production of high level man-power; 3) the promotion of national unity. (Government of Kenya, 1974).

The response of the system to these challenges may be summarized in the following list of achievements:

- a) the rapid expansion of educational opportunities at the primary and secondary levels in the rural areas;
- b) the removal of racial segregation from the school system;
- c) the localization of syllabi;
- d) the production in Kenya of textbooks and other educational material on an increasing scale;
- e) the establishment of secondary teacher education at the University, Kenya Technical Teachers College, Egerton Agricultural College and Kenya Technical Teacher's College;
- f) the introduction of applied subjects into secondary schools, and associated teacher education programmes;
- g) the introduction of Supervisory Service for primary education;
- h) major advances and rapid expansion in technical and tertiary education.

The first decade following independence, development in education was largely directed at removal of segregation and coping with the increasing numbers. The content and curriculum especially at the secondary level, changed very little from the established academic approach. This development can be best understood by looking at two major factors:

1) the formal education system is seen as the most accessible route to individual social and economic advancement. In the past, most of the gains from Kenya's rapid economic growth have tended to concentrate in the modern formal sector of the economy, entry to which has been easiest for those who have completed the secondary and tertiary levels of the formal education system. 2) the structure and content of the formal educational system tended to reinforce this pattern (Sheffield, 1966).

The system has been highly selective in character. With increase in numbers, the system has heightened the competition among its products for social and economic advancement within the modern sector of the economy (Somerset, 1971; Kinyanjui, 1972). Moreover this process has drawn an increasing proportion of the nation's human and material resources into the urban areas and rural areas are being drained of their most valuable resource: the abilities and energies of their youth. This development has resulted in a vicious cycle of more young people with proforma qualifications chasing relatively fewer jobs in one small part of the economy (Sheffield, 1966). The serious nature of this situation has gradually been recognized, with the government making efforts to initiate reform along several lines:

- 1) efforts to influence the pattern and rate of economic growth so as to reduce disparity of development between the rural and urban areas. The creation of new opportunities in the country-side is

an attempt to reduce the outflow of human resources from the rural areas.

- 2) efforts are being made to create new means for individuals to acquire those skills and abilities necessary to improve their social-economic status in rural communities. This means is being made possible both through changes in the existing educational system and by encouragement of a network of alternative institutions such as the Harambee Institutes of Technology. The educational policy stipulates that these alternative institutions should not run parallel to or duplicate the structure and content of the existing system of education. Rather, they are encouraged to cater for individuals of widely varying backgrounds and ages, and provide more specific forms of training and skill development, within a setting that is more responsive to local needs. Moreover these institutions, by addressing themselves to the more specialized problems of skill development at the community level, will be able to stimulate employment in a flexible and efficient manner.
- 3) In order to achieve maximum effectiveness, the policy toward encouragement of technical institute development is to be matched by changes in both the structure and content of the formal educational system. A National Commission on Educational Objectives and Policies has been established. Its aims are: to evaluate the present educational system, to define a new set of educational goals for the second decade of independence and to formulate a programme of action to implement these goals (Government of Kenya, 1974, pp. 104-110; Anderson, 1973; Godfrey, 1973).

The second decade of independence is therefore characterized by an increasing concern for the need to integrate education with the needs of community and national development. This is evident in the trend toward the development of diverse, technical and practical education at the post-primary level (Anderson, 1973; Government of Kenya, 1973; Ndegwa Commission, 1971; Godfrey, 1973).

0.6.4. The Primary Education Programme

The primary education programme encompasses the first seven years of the educational cycle (See Appendix A,B). The most striking feature of this cycle has been rapid increase in enrollments which resulted in the near doubling of numbers within the first decade, from 890,000 in 1963 to 1,676,000 in 1972 (See Appendix C,F). With an enrollment of 1,816,017 in 1973, the number of children aged 6-12 enrolled in primary school had reached 73 percent of the total (Government of Kenya, 1974, pp. 179).

The government has remained committed to the policy of universal free primary education since independence. The first three years since the takeover of primary education administration by the central government in 1969 were directed toward the co-ordination of plans for the implementation of this policy. The implementation of the first phase of this programme went into effect in January 1974 with the provision of free primary education for standards I to IV (Government of Kenya, 1974; 1975). As a result of this provision, enrolment in primary schools rose by 51 percent in 1974 as compared with 8 percent in 1973 (Government of Kenya, 1975, pp. 176; Appendix F). With total enrolment reaching 2,734,398 in 1974, it was estimated that the rate of enrolment approached close to

100 percent of the school age population in most parts of the country (Appendix G). It was estimated that by 1974 the number of children aged six to thirteen would be about three million (Government of Kenya, 1973, pp. 151). Enrolment is expected to increase to about 3,250,000 by 1978 (Government of Kenya, 1974, pp.13). The government is committed to a target of universal primary education by 1980 (Government of Kenya, 1973, pp. 151-153).

A major difficulty in the implementation of this programme occurs in the sparsely populated areas, in some of which life tends to be to a certain extent nomadic. In these areas, the government has instituted some boarding school programmes for primary pupils, and in addition is carrying out an experimental programme with Mobile Teaching Units (Government of Kenya, 1974, Part II, pp. 68-69; Part I, pp. 79, 412; King, 1972).

As well as widening in scope, primary education has also been changing in content. It is intended that the functions of the primary school be to give "a fundamental education in respect of literacy, numeracy, manual dexterity and general knowledge of the world" (Stabler, 1969, pp. 27). The aim here is to develop a curriculum particularly in the upper standards which can serve both as a terminal form of education for a large number of students, as well as serving the needs of those going on to second-level education (King, 1972). In this effort to make curricula and examinations more relevant to Kenya's needs the Curriculum Development and Research Centre has made notable strides in development of new curricula and teaching materials for new mathematics, the African primary science series, social studies and language

(Government of Kenya, 1974, Part I, pp. 79; Ndegwa Commission, 1971, pp. 149; Government of Kenya, 1973). It is intended to also introduce some practical and technical subjects at the upper primary level (Government of Kenya, 1975, pp. 184-185).

Since 1963 primary schools have also undergone reform in teaching methodology. This reform originally employed in the teaching of language in primary school puts more emphasis on practical learning through 'activity' and 'discovery' as opposed to the former teaching methods of rote memorization. This 'New Primary Approach' has extended the child-centered methodology throughout the primary syllabus (Stabler, 1969, pp. 35-37; Government of Kenya, 1973, pp. 151-153). This has led to great need for both pre-service and in-service teacher training; and also resulted in the introduction of the UNICEF Supervisory Scheme which provided financial assistance for the training of primary school inspectors (Ndegwa Commission, 1971, p. 149).

0.6.5. Secondary and Technical Education Programme

The second level education programme has in the past consisted of two stages: a four year 'ordinary' level course immediately following the primary level, and a two year 'advanced' level course after the 'ordinary' level (See Appendix A). Some of the problems encountered at this level of education have been discussed earlier in this chapter. At this level the increase in enrolments has been more than sevenfold since independence. In 1962, enrolment was 26,000 of which 9,000 were African. In 1969 it was 115,000 and by 1974 it was estimated to be 195,779 (Government of Kenya, 1975, p. 181; See Appendix F). This increase has come about through public and private effort; thus in

1974 there were 103,765 students in 392 government maintained and assisted schools, and 92,061 at 579 unaided schools (Government of Kenya, 1975, pp. 181-183; Appendix E). Despite the large increase in secondary enrolment, the national average for those able to find secondary places in the existing system was only 33 percent in 1974 (Court, 1972; Government of Kenya, 1975, pp. 182; Appendix H).

Despite a large allocation of the government budget for educational purposes and attempts at curricula modifications, the products of the system still remained largely academic (Godfrey, 1973; Sheffield, 1966). This was partly because the secondary school syllabus was still geared to enabling students to pass the Cambridge Overseas School Certificate Examinations until early 1970's. The localization of this exam at the 'ordinary' and 'advanced' levels has now allowed for more control over the syllabus being examined and has facilitated the acceleration of curricula changes. In 1973 a number of technical and applied subjects were examined for the first time as part of secondary school qualification (Ministry of Education, 1974). It is at the secondary level of education that the most extensive changes are beginning to occur as the expansion and diversification of technical and vocational education continues, and as the communities seek for productive alternatives in post-primary education.

Technical education which has previously been largely offered at the tertiary level is now to be extended to the secondary level. Industrial and vocational education has been introduced into 30 schools as part of phase one of this programme. The programme will allow for the first two years to serve as the common core, with year three and four of high school allowing for specialization in either the Technical

Education programme or the Industrial Education course. Phase two of this programme will be largely a doubling in size of the programme by increasing the number of participating schools (Government of Kenya, 1974, Part II, pp. 82-85).

Another aspect of change toward practical subjects is the introduction of a commercial education programme at the high school level.

Phase one of the programme was instituted during 1970-74 Development Plan period. It proved quite successful, and as a result forty new projects were to be instituted in the later part of 1974-78 Development Plan period (Government of Kenya, 1974, Part II, pp. 85-88).

An agricultural education programme is also now part of secondary education. This consists of 'major' projects which emphasize mechanized agriculture, with project components including a workshop and mechanized implements. This sort of project is to be implemented in 26 schools between 1974 and 1978. The 'minor' projects in the programme emphasize small-scale agriculture and are designed primarily for schools located in those areas where small holder agriculture is predominant. Forty such 'minor' projects were planned for implementation during the 1974-78 Plan period (Government of Kenya, 1974, Part II, pp. 88-90).

Besides introduction into existing schools, three new vocational secondary schools are to be built to supplement the two already in operation at Kisumu and Mombasa, and in addition one technical school will be converted to vocational. These schools will be two-year institutions with entry at the Form III level (Government of Kenya, 1974, Part II, pp. 90-93).

A number of Home Science Education projects were successfully launched in the 1970-74 Plan period. The 1974-78 Plan period is to see

an expansion of the existing projects with the introduction of only 2 two-stream new projects (Government of Kenya, 1974, Part I, pp. 421).

As regards the harambee secondary programme, there has been a major shift from government takeover of Harambee Secondary Schools (Form I to IV) to a programme of assistance to Form I and II at this sort of school. Twenty new Form III's will be provided annually at well established government maintained schools for successful Form II graduates from Harambee Schools. In addition, the government has instituted a scheme of aid to the harambee secondary schools entitled the "Harambee Package Programme". Fifty schools per year will be offered government aid in the form of fully qualified teachers, correspondence courses for the Kenya Junior Secondary Examination (KJSE), audio-visual equipment, and help from the inspectorate. This programme is designed to help harambee schools in Form I and II only, i.e. up to KJSE standard. Schools which choose to be helped will be required to have their accounts audited by the government. Furthermore, if any harambee school committee can purchase the complete science teaching package from the Kenya Science Teacher's College Production Unit, they will be supplied with a qualified secondary (S1) science teacher in addition to an S1 arts teacher. Similarly if a local community constructs a workshop for Industrial Arts (to Ministry of Education specifications), the Government will supply an S1 Industrial Arts teacher (Government of Kenya, 1974, Part I and Part II). In the maintained schools, the government plans for implementation of the following measures:

- (a) 20 new form III's to be opened per annum to give a second chance entry to the maintained schools from harambee schools.
- (b) the government intends to lower unit costs of education by

expanding on the basis of existing institutions rather than by building new ones. The aim is to establish the 3-stream school as the minimum.

- (c) there is a shortage of successful mathematics and science graduates from the higher school level especially from the single stream schools. Many of the existing classes especially those in single stream schools will be relocated and reorganized in the form of Sixth Form Colleges which will use the facilities of well-established, multi-stream schools. These classes will be given support in the form of experienced graduate teachers, new equipment and facilities (Government of Kenya, 1974, Part I, pp. 419-420).

0.6.6. The Teacher Education Programme

No problem at independence was more urgent than the supply of qualified teachers, particularly at the secondary level. Before independence there was practically no available training for secondary teachers in Kenya. As late as 1969 two-thirds of the teachers in main-
tained and aided schools were expatriates. This caused a problem of rapid turn over as most expatriates come on two year contracts. This factor, combined with the fact that the public examinations were still governed by the Cambridge Overseas Examination Syndicate made curriculum change more complex in secondary school (Government of Kenya, 1973; Ndegwa Commission, 1971).

At the primary school level the biggest problem was that a large proportion of the teachers were unqualified and many had not gone beyond primary school education themselves. This problem was partly met by

in-service training courses, and by upgrading courses through correspondence and intensive residential training during school vacations (Government of Kenya, 1973; Commonwealth Secretariat, 1974, pp. 233-239). The problem was being solved to a large extent until the large influx of enrolments following the granting of free primary education in 1974, which has necessitated the hiring of large numbers of unqualified teachers again (Government of Kenya, 1973, 1974, 1975).

A number of teacher training programmes are now in existence or under the process of being instituted in the effort to overcome these problems. The training programmes include:

- 1) 17 Primary Teacher's Colleges
- 2) Kenyatta University College Nongraduate/Graduate Secondary Teachers Programme (opened 1965)
- 3) University of Nairobi, Graduate Teachers Programme (established, 1965)
- 4) Kenya Science Teachers College- for non-graduate Science and Industrial Arts Secondary Teachers
- 5) Egerton College - Diploma in Teaching of Agricultural Subjects
- 6) Kenya Polytechnic - Technical Teachers Programme (being phased out)
- 7) The Kenya Technical Teachers College (under construction), to train tutors for the polytechnic and teachers of secondary technical, industrial and commercial education, as well as District Development centers and Village Polytechnics. (Government of Kenya, 1974, part II, pp. 93-95, 417-418).

The biggest problem in the area of teacher education, is that of trying to supply enough qualified Kenyan teachers in the face of expanding programmes at the secondary and primary levels; and also that of providing in-service training in the face of changing curricula and methodology. An example of this was in 1974 when the increase of students in schools necessitated an increase in the number of new classes, and hence an increase in the number of unqualified teachers hired to meet the immediate need. This resulted in a percentage drop of qualified teachers in the system (See Appendix L). Particularly acute is the shortage of science teachers. Attempts have been made to make up for this by offering better salaries to attract science graduate (who would normally opt for better paying jobs in industry) into the teaching profession (Ndegwa Commission, 1971; Government of Kenya, 1973, 1974).

0.6.7. The Tertiary Education Programme

0.6.7.1. General Policy

The cost of education at the tertiary level is significantly greater than at the primary and secondary levels. For example in 1974, the government spent 1000 pounds (K) per annum on a university student, as opposed to 15 pounds (K) per annum on a pupil in a rural primary school (Government of Kenya, 1974, part I, pp. 428). In view of scarce resources and the need to spread the benefits of education as widely as possible, enrolments at the tertiary level are being carefully controlled according to the need of the economy. Since the recipients of education at the tertiary level stand to gain much more personally from their education than those who have received primary and secondary education only, the government's policy since 1973 is that these recipients are

to bear a greater proportion of the direct costs of their education. A student loan scheme has been instituted by the Ministry of Education to ensure that no individual who has been granted entry into an institution will be denied access for financial reasons (Government of Kenya, 1974, Part I, pp. 428-432; Fields, 1972).

0.6.7.2. The Polytechnics and Egerton College

The responsibility of the important area of post-secondary technical education is carried by the Kenya Polytechnic in Nairobi and the Mombasa Polytechnic. Since 1964 the Polytechnics have expanded rapidly and now offer a wide range of technical courses on a full-time or day-release basis designed to meet the needs of commerce and industry. Courses covered include: mechanical, electrical and building/civil engineering; printing, science, management and business studies, catering and general studies. The polytechnics provide technical courses in liaison with industrial employers and government ministries concerned. Enrolment growth is based on the known demands from industry and government for expanded outputs from polytechnic courses. Egerton College in the Rift Valley Highlands is also developing as a major agricultural education institution at the tertiary level. It offers courses leading to a post-secondary diploma in a variety of agricultural study areas, as well as agricultural teacher education. The main problem in these areas of tertiary education is largely that of the need for qualified Kenyans to teach the necessary courses (Ndegwa Commission, 1971, pp. 159-160; Government of Kenya, 1974, Part I, pp. 428-430, Part II, pp. 96-98).

0.6.7.3. University Education

Part of the university functions is to assist in meeting economic and social requirements for high level manpower. Initially, the University was not greatly involved in formulating what these requirements are. This was largely due to the fact that the capacity of the university to produce graduates was demonstrably below the demand of the economy. The emphasis therefore tended to be on maximizing intake and output of students. These circumstances have changed rapidly. In the faculty of Arts for example, there are now more qualified applicants than can be accommodated. On the other hand there are clear shortages in the scientific and technical fields. In order to integrate university development more closely with national needs, the university has now set out enrolment guidelines for individual faculties (Appendix I). It is now geared to producing high level manpower particularly in professions such as education, commerce, medicine, engineering and agriculture that are essential to support the nations rapid social and economic development. A scheme has also been instituted, whereby university students are to serve in rural areas for one year before completion of university studies. This scheme is meant to : 1) promote development of rural areas, and 2) provide practical focus for university education (Ndegwa Commission, 1971; Government of Kenya, 1973, 1974, 1975; Southall, 1974; Fields, 1972).

0.6.8. The Formal Adult Education Programme

This programme is intended for those who have cut short their formal schooling and for working people in both the public and private sectors. Instruction is offered in such areas as : agriculture, mathematics, home economics, business management, civics, social studies, elementary science and so forth. Correspondence courses are being instituted for candidates who wish to obtain the Certificate of Primary Education and the Kenya Junior Secondary Examination. It was planned to increase the number of formal education classes from 200 in 1973 to about 400 in 1978 with a consequent increase in enrolment from 5,200 to 10,000 students (Government of Kenya, 1974).

0.6.9. Non-Formal Education Programme and Training

One of the most notable developments in the non-formal education sector is the growth of a system of second chance Harambee Institutes of technology, to which reference has been made earlier in the discussion of educational policy. (See Section 0.6.3.). These have developed as part of the response to try and meet post-primary educational needs. They do not parallel the formal secondary level, but rather provide an alternative to cater for those who for a variety of reasons have not developed their full potential in the formal system. They are intended to specialize in technical and technological studies associated with production in different areas; for example, agricultural, fisheries and local industries. Appeals were launched for about fourteen institutes in 1971, and by 1974 there were two already in operation and others still under construction (Government of Kenya, 1973, 1975; Godfrey, 1973).

While the institutes operate at the district or provincial level, 'village polytechnics' have developed in various parts of Kenya on a harambee basis, as part of the effort in promoting the interest and productivity of primary school leavers (Court, 1971, 1972).

Another category of non-formal education programmes are the 'education extension programmes' including literacy and numeracy for adults through the Ministry of Social Services; primary and secondary level courses to be offered through the Mass Media Unit of the Ministry of Education; tertiary level and non-formal courses for adults by the Institute for Adult Education and others (Government of Kenya, 1974).

A number of training programmes in various fields of rural development are also centrally directed by the respective operating ministries and by some voluntary agencies. These programmes include a number directed at those who are employed in the subsistence and informal sectors of the economy and include : training in agricultural extension, community development, co-operatives, health and nutrition, adult education, literacy and courses for traders.

A second category of training programmes is directed at primary and secondary school leavers. They include courses under the auspices of the National Youth Service, and the Youth Training Programme. Other training programmes aimed at supporting the formal sector include courses directed at skilled workers and business managers. Such courses are carried out for example through the Management Training Advisory Centre, and the National Industrial Vocational Training Centers. Their immediate requirement is to identify existing and potential shortages of manpower, the means of skill development and most equitable method of apportioning training costs (Government of Kenya, 1974).

The field of education in Kenya is thus rapidly changing and expanding as efforts are made to meet the diverse needs of society, and as it were, to initiate the members of that society at different levels to become effective members of a changing society. Formal and non-formal education and various training programmes are the means being harnessed to accomplish this task. These are already playing a vital role in the educational development of Kenya, but it is recognized that other means and resources are still required if the diversity of needs are to be met both in quantitative as well as qualitative terms.

0.6.10. Education Support Services

While the major restraint on the rapid development in the quality of Kenyan education lies in the shortage of well qualified teachers, even the most excellent teachers can be disheartened by the lack of resources available in the institutions where they teach. Some teachers' colleges have shown ingenuity in helping their students make the maximum use of available local materials, especially for science, art and social studies teaching. But there is a limit to the extent of such self-resourcefulness. Therefore along with all the changes taking place in the educational system there has been increasing effort to provide a wide range of educational support services through the following agencies:

- 1) The Examinations Research and Development Unit:- for the development, design and evaluation of tests of achievement and selection procedures, in accordance with the localization of syllabi.

- 2) The inspectorate: - to provide a wide range of professional support services to practising teachers, while also carrying out the responsibility of teacher training; and to participate in the process of introducing new courses to schools.
- 3) The Curriculum Research and Development Unit (CRDU): to research, develop, design and test new curriculum.
- 4) The Education Mass Media Centre (Discussed below)
- 5) Teachers Advisory Centres (TAC): - to provide direct support in the field for major changes in the educational process; provide in-service training for teachers, and contribute to the curriculum development activities of the CRDU.
- 6) The Educational Facilities Service Unit: to ensure that all facilities at the more than seven thousand educational institutions are utilized efficiently; to survey existing facilities, to design and site new capital structures by providing data and sponsoring prototype development; and to establish norms and guidelines for the provision of educational guidance.
- 7) The Education Equipment Production Unit: a non-profit making foundation to design and distribute low cost science kits and other teaching aids.

- 9) The Bureau of Educational Research: to carry out short term and long term basic and applied research (Government of Kenya, 1974, 1975, 1976).

0.6.10.1. The Educational Mass Media Centre

The government envisages a vital role for mass media in promoting major changes in the educational process through the dissemination of new ideas, methods and materials directly to the classroom. Mass media is seen to offer the best educators the opportunity to achieve maximum impact. Presently the centre consists of the schools broadcasting section of the Ministry of Education and the correspondence course unit of the Institute of Adult Studies. Initially the Mass Media Centre is to concentrate on the recruitment and training of additional staff and on the production and testing of educational materials. Once this base has been firmly established the centre will embark on a number of major programmes in the field. The centre will have responsibility for the distribution of audio-visual equipment and teaching aids to the schools. Initial priority is to be given to the 'Harambee School Package' programme, the Primary Teacher Training programmes and the primary schools (Government of Kenya, 1974, 1975, 1976).

0.6.10.1.1. Educational Television Service

An educational television service is to evolve within the Educational Mass Media Centre. Already there has been a telecast of an experimental series to Teacher Education Colleges. The series has been evaluated and on the basis of this, a series of educational television programmes is under production for use as part of the

instructional process at the colleges. (Government of Kenya, 1973, pp. 159; Commonwealth Secretariat and CEDO, 1974, pp. 106-109, 233-239). Educational television will then be phased into other formal and non-formal educational programme areas (Teacher's Service Commission, 1977).

If television is to prove effective in application within the educational system, it is of importance to examine and clarify various aspects of its application that may contribute to its use as an effective and efficient tool in the instructional process. The subsequent chapters of this study will deal with an analysis of the processes of planning, production, utilization and evaluation, in an attempt to indicate how the requirements of these processes might be related to the Kenyan Educational Situation.

0.7. Purpose and Scope of the Study

From the historical development of educational television, several patterns of operational application have developed, and at the same time certain conditions necessary to successful application and organization can be discerned. A country like Kenya, which is in the early stages of planning for an educational television system may gain considerably and avoid waste in terms of human, technical and time resources by taking into account experience gained in the successful application of educational television elsewhere. This is likely to result in more efficient application, than an unsystematic trial and error approach. As in every other country, educational television must be adopted to Kenya's particular experience and educational situation, but it must follow certain guidelines which have developed as a result of past experience elsewhere.

It can be seen for example, that television is rarely being used alone to carry out the responsibility of instruction. Rather it is used in combination with other learning resources, exercises, correspondence work, and so forth. Educational television must thus be seen as a component of a teaching and learning system, that is most effective when all components of the system are well integrated and mutually reinforcing to achieve the system goal. Past experience has shown that educational television cannot be seen as something quite separate and self-sufficient, and that attention must be given to the context of the learning activities that can be built around it at the receiving end. Since educational television, like any instructional means should facilitate learning, it becomes essential that the design production and use of educational television be based on pertinent learning theory.

The subsequent chapters of this study will be directed toward developing a systematic scheme for the planning, production, utilization and evaluation of educational television programmes. The scheme developed is not intended to present a rigid set pattern that must be slavishly followed. Rather it is an attempt to develop a systematic frame of reference for an educational television system. The frame of reference is meant to be adaptive to existing circumstances and may be revised or modified through experience in use. It does, however, attempt to include essential functions related to the educational aspects of the system, and which it is hoped would make it more effective.

Although the scheme is presented in a linear fashion for the sake of analysis and clarity, the process is in fact a very dynamic one. Every phase of the system does not only influence stages that follow, but is itself influenced by the experience gained in putting subsequent stages into effect. What results then is a process that is both interactive and iterative nature:

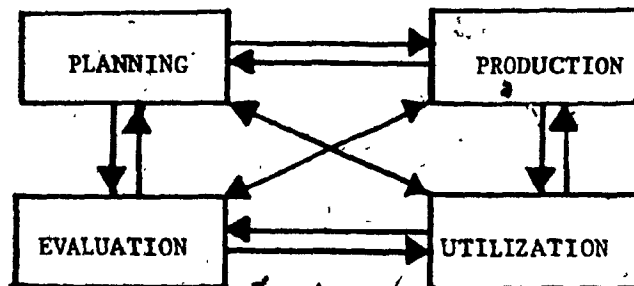


Figure 6: Interactive and Iterative Nature of ETV Processes.

Although in design or implementation we can only work on one phase at a time, it is necessary to continually keep in mind the requirements of the other phases as well. All decisions made in one phase of the system have implications for the decisions made in the other phases and it is necessary to continually refer to what has already been done and ahead to what remains to be done, in order to take into account the impact of each decision or decisions previously made or those that are to follow. This is why it is important to see the whole process first as a system and to specify functions that must be fulfilled at each stage.

It should be emphasized here that although the focus of this study is strictly on the educational aspects of the system, each stage of this would be accompanied by certain technical and administrative

functions. What results is not only an interaction among the educational functions that must be fulfilled, but also between these, administrative and technical functions. The educational aspects will naturally be affected by how effectively and smoothly the technical and administrative aspects are functioning. Therefore, like the educational aspects, both administrative and technical must have specified and clear goals, and a breakdown of tasks to be accomplished if the goal is to be fulfilled. This results in detailed objectives, standards and specified strategies for achieving these vis a vis the educational goal, and an accompanying evaluation procedure to gauge their effectiveness and efficiency, and what modifications if any, need to be made. Each of these aspects in itself is, therefore a subsystem per se that helps to further the achievement of the educational television system. Although the educational aspects remain the central focus and determining factor, there is a continuous give and take between the functions of these three aspects, operating both in terms of long term as well as short term objectives, making the educational television system an exceedingly complex one:

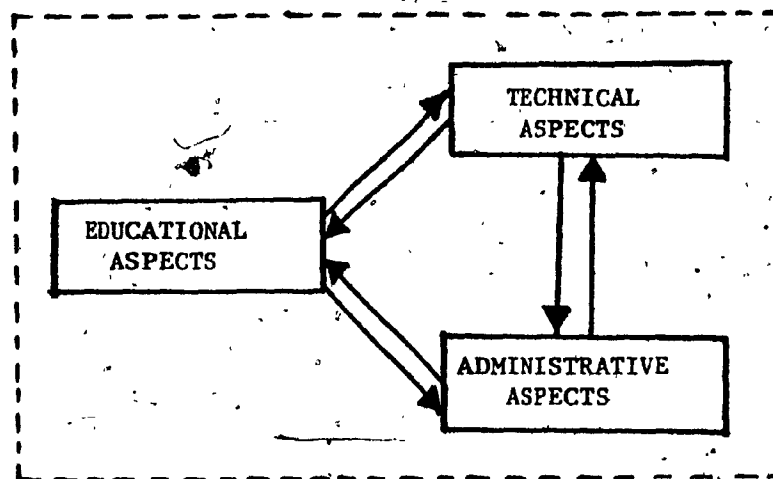


Figure 7: Interactive Nature of Educational Television Subsystems

In an educational television system, the educational goal and functions must first be determined in order to plan for the other system requirements, including the technical and administrative components. The subsequent discussion therefore does not refer to the technical and administrative requirements but rather attempts to clarify the central educational requirements of the system.

Another benefit of clarifying the functions which must be fulfilled, is that it provides a central focus in terms of other requirements such as staffing and training for the system. Once the functions are delineated we have guidelines as to the kind of personnel that must be recruited or the kinds of functions the personnel must be trained to fulfill.

The scheme that follows is an adaptive one and applies whether the educational television system is part of the formal or non-formal, institutional or distance learning educational system. Examples from operational systems are referred to where pertinent, to indicate that most of these requirements are in fact practicable and need only to be systemized into a new operational system.

CHAPTER ONE:

PLANNING FOR EDUCATIONAL TELEVISION

1.0. INTRODUCTION

Planning for educational aspects of the educational television system is effected at two complementary levels, involving both long term and short term planning functions.

1.0.1. Long Term Planning

Long term planning involves the projection of the overall policy for the educational television system and the specification of its general function and status within the educational system. Specifically, this entails the delineation of such factors as educational television philosophy and organization in relation to educational methodology and organization, and also a delineation in general terms of the expected approaches for production, distribution and utilization (Hancock, 1971, b; See Appendix J). Furthermore, it entails specification of areas of programming; the educational audience levels at which the programmes are directed; the frequency or weight given to programming in each area and level; the relationship of the programmes to other educational media and agents, and most important, their function within the educational system or institution.

This is the level of planning at which the necessary co-ordination of the people, institutions and agencies involved in the use of the educational television system must be effected. Examples of this may be found in the work of the Alberta Educational Communications Authority (A.E.C.A.), which is authorized by the Government of Alberta to identify and coordinate the needs for educational communications, provide policy guidelines and establish priorities which may be met by the Alberta Educational Communications Corporation (ACCESS). (A.E.C.A., Programming

Policy Guidelines, February 1975). Singapore also has one main inter-ministerial committee responsible for policy and overall planning for areas and levels of programming, frequency of transmission, selection of language of broadcast, the convening of sub-committees and working parties to discuss syllabuses, evaluations and so forth, for the Singapore educational television system (Commonwealth Secretariat and CEDO, 1974).

Long term planning, thus needs to be effected at the policy making level of organization to ensure that all agencies involved in the educational television system have unity of purpose in pursuit of directives. Within the Kenyan educational structure. (See Appendix K). this would require that long term planning for the educational television system be effected and co-ordinated at least at the level of the Director of Education, in order to establish unity of purpose between the different educational programmes and support services that need to be co-ordinated for the successful establishment and functioning of the system.

1.0.2. Short Term Planning

Short term planning involves planning specifically for individual programmes and series, and for their relationship with other media and agents in the learning system. It also entails planning for audience and user involvement that facilitates interchange between the producing and receiving agencies (Hancock, 1971).

Kemp (1975) points out that in conventional curriculum planning decisions are most often made in an intuitive fashion and may be based on ambiguous purposes. Subject content is usually the basis for planning and only casual attention is given to other details. This is the type

of planning used by those engaged in many of the early efforts to use educational television. However, as the complexity of the instructional process has become increasingly recognized, any effort to contribute to this process including the use of educational television must be planned, taking into account the many factors involved in effective curriculum planning and instructional design. It is at this stage of planning that the unity of purpose between educational television and other media is established, and educational television is integrated into the instructional process by the decisions made at this stage. The selection and use of educational television is among many decisions made during the planning process. Television is selected to serve particular functions and must be held accountable for achieving planned results that contribute to the facilitation of learning. Effective planning for an educational television programme, or programme series, therefore employs the problem solving or systems approach and proceeds in reference to recognized educational needs and specified goals. It involves the detailed specification of desired results, the development of instruments by which success can be measured, and development of strategies and means designed to achieve the specified results.

All planning, whether long term or short term, must proceed from the recognition of needs that must be met.

1.1. Identification of Needs

The existence of a recognized problem has been found to be one of the conditions essential to the establishment of successful educational television systems. The problem is normally identified as a need, an educational need being defined as the discrepancy between the current educational output and desired output, whether in quantitative or qualitative terms of the skills, knowledge and attitudes learners need to be provided with in order to function as productive members of their society. Tyler (1949) has identified the sources of such skills, knowledge and attitudes as the learner, the society and subject matter. The learner needs are represented by a void or deficiency between learned competencies and learning expectations; while the societal need can be identified as the discrepancy between the individual's ability to, assimilate into, cooperate in and contribute to the socio-economic and socio-political environment, and what it should be as expected by society. Subject matter needs arise as the result of the fact that, particularly in an academic environment, or in order to play certain roles in society, the individual is expected to achieve certain degrees of performance competencies in manipulative skills; to achieve certain levels of intellectual capabilities, and to adjust his pattern of behaviour to accepted attitudes or values in various disciplines. The discrepancy between these expectations and the individuals actual capabilities identify the subject matter needs.

1.1.1. Present Needs Assessment

The assesment of need may proceed, as is commonly done, in reference to contemporary learner, societal and subject matter needs. In Kenya for example, current needs of a society that is becoming increasingly interdependent are found in the socio-economic requirement for people who can fulfill various agricultural, commercial, industrial and other essential functions. This entails the shift in both formal and non-formal education becoming directed toward these ends. The changing society also increasingly requires citizens who are literate, numerate and also generally knowledgeable about the world. This creates the need for educational programmes directed toward meeting such needs at both the primary and adult levels of education.

Like the Plan Basico (Seventh to ninth grade cycle) which was found to be a weak link in the El Salvadoran educational system, the Kenyan post-primary cycle is in need of attention as it still offers opportunity for very few to continue with education. Furthermore, the products of this level of education in the formal system, as has been indicated in the previous chapter, have not been successfully assimilated into contemporary society due to lack of instruction directed at meeting recognized societal needs. The quality of instruction, particularly in the Harambee schools and the primary schools, which must rely on a large number of untrained teachers in the face of expanding numbers, changing methodology and curricula, also creates a discrepancy between desirable output and current system performance.

Needs in these and other areas of the educational system, as well as educational needs in the open sector must first be identified. This has been the case in other systems; for example, the need for rapid

expansion in Niger and Ivory Coast; the need to share expertise and improve quality in Haggerston; the need to improve quality in Singapore and Hong Kong or the need to extend the school through the German Telekolleg, the NHK Gakuen and the British Open University; or as in the case of 'Sesame Street' the need to meet the cognitive and affective needs of disadvantaged children.

1.1.2. Assessment of Future Needs

While working to meet contemporary needs, it is essential to also establish ways and means of assessing what the future needs of society and its citizens are likely to be and formulate plans toward meeting them. This aspect of planning was not given close attention in the first few years immediately following independence in Kenya. The content and curriculum remained largely the established academic approach which prepared people for jobs in one small part of the economy. This eventually resulted in an excess of people who could gain employment of the sort for which they were prepared, while other sectors of the economy lacked adequate manpower. Procedures such as the consultation that has been established between the Polytechnics and industry in Kenya, which allows for enrolment in courses to be based on known demands in industry, and the enrolment guidelines now established for individual faculties of the university need to be extended to planning in other educational programmes. It is becoming increasingly recognized in many parts of the world that in the face of what is termed the 'knowledge explosion' and the associated accelerated change, the educational process must prepare learners not only for today's needs but also for future roles that may be required during their lifetime (Rowntree, 1974). Consideration should be given

to the use of procedures such as the Delphi technique, for forecasting likely socio-economic developments and related manpower requirements, and establish through consultation with social and economic planners, subject matter experts, and various industries what kinds of skills, knowledge and attitudes are likely to be needed by learners in the future, for which the educational process ought to be preparing them.

1.1.3. Establishment of Priorities

Identified present and future needs for education are likely to be greater in scope than can be met effectively by material, personnel, financial and time resources available to the educational system at any given time. Not all needs can be embarked upon at once, and priorities must be established in order to meet effectively those needs discerned to be more widespread and of more significant consequence and/or of most urgency in making a contribution to the improvement of the learners' lives and national development. In Kenya priority areas include, for example, the need for qualified teachers; the need for improvement of instructional quality in the expanding primary schools and in high schools such as the Harambee types; the need to open up more post-primary opportunities; the need for educational materials and sharing of expertise in the recently established curricula subjects and the upcoming non-formal and alternative educational systems; literacy, adult and other extension programmes and so forth. Some means of systematically identifying such needs and priorities must be established, so that as for example in the case of ACCESS in Alberta every programme produced is labeled by each need and priority number, to ensure that needs are being met as specified and that the frequency established as desirable for each need and priority

is maintained in actuality (ACCESS, Annual Report, 1974-1975). Or as in Singapore, Hong Kong and El Salvador, the most pressing levels of education in terms of needing reform or improvement in quality were those given priority and to which the use of television was first applied (Commonwealth Secretariat, 1974; Ingle, 1973).

1.2. Determination of Goals

Goals are basic statements describing a broad or abstract intent, state or condition, which is discerned as desirable to achieve. Educational goals are designed to identify the overall intent, competency or end designed to eliminate educational needs or solve educational problems. The goals are the target at which the effort of the educational process aims, and they become the fundamental basis and justification for decisions about the design and management of instruction.

1.2.1. Derivation of Goals

Goals should reflect the social, cultural and academic needs of the learner. They must therefore be derived from identified present and future needs of the learner, society and subject matter. The established priorities resulting from the needs assessment suggest tentative areas that might be made the concern of the educational process. To derive the actual goals to be met through education, these priorities must be passed through what Tyler (1949) calls the screens of philosophy and psychology. The philosophy of education to which we subscribe will help in deciding what should be taught and reduces the chance that the resulting goals will conflict with one another. What we know of the psychology of learning will help determine a number of things including:

1) distinguishing what is developmental or maturational and cannot be achieved by education, 2) what is possible or not possible as far as education is concerned, 3) what experiences and activities are appropriate at different age levels and 4) identifying requisite conditions for learning. Any of the identified needs or certain aspects of needs which are consistent with these 'screens' of philosophy of education and psychology of learning may be stated as goals.

The process of goal derivation may be depicted as follows:

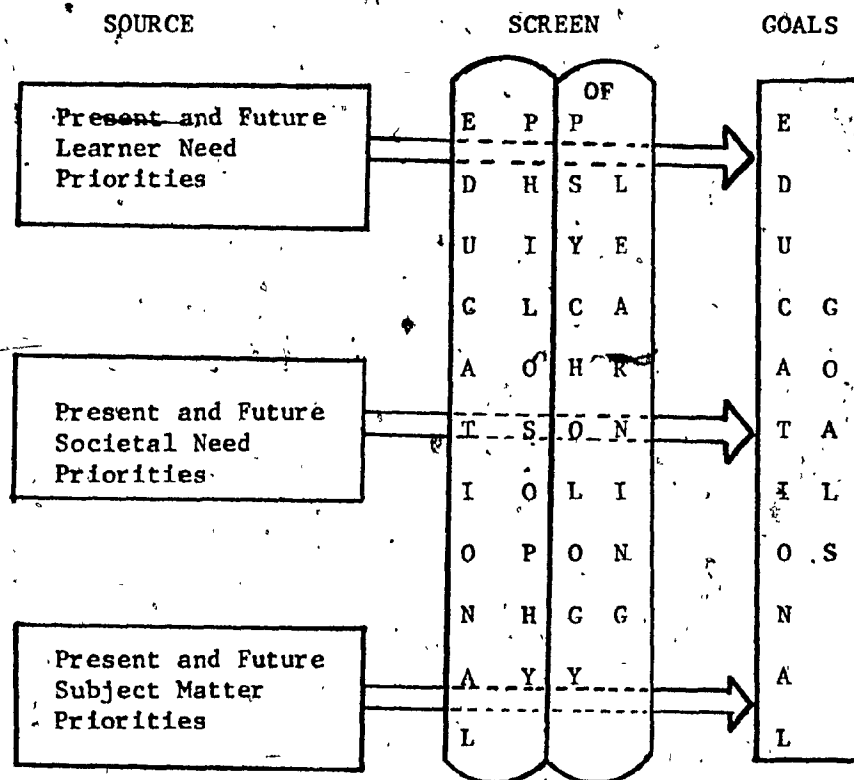


Figure 8: Derivation of Educational Goals.

Adapting this sort of scheme entails for Kenya the need to formulate and clarify a philosophy of education that can define the view of the good life and good society, and what role is envisioned for the educational process toward its achievement. It also indicates

the need for a psychology of learning relevant to the Kenyan situation. In this respect, the socio-psychological research findings of the Child Development Research Unit and the research of the Department of Educational Psychology at the University of Nairobi, and other Kenyan based studies need to be considered in formulating what this psychology is, rather than wholesale subscription to theories developed in other foreign cultures. This can contribute toward the derivation of relevant goals that can be more effectively met by Kenyan educational programmes.

Polsky (1974) gives a good illustration of this kind of goal derivation process in his description of the summer seminars that were held with educators, psychologists, evaluators and media specialists during the planning stages of 'Sesame Street'.

1.2.2. Statement of Goals

Educational goals derived from needs must be stated so that all those concerned with the educational effort are clear about what is to be achieved. One way of clarifying this intent is by stating goals in terms of the learned capabilities that the learners will have after exposure to the educational process. In this respect generalizable learning outcomes within particular fields as well as across various fields are particularly useful. Gagné and Briggs (1974) for example list five major categories of learned capabilities which include:

- 1) verbal information, 2) intellectual skills, 3) cognitive strategies,
- 4) attitudes and 5) motor skills.

Stating goals in terms of such learned capabilities facilitates communication to those who have to implement them by clarifying what capabilities are to be of primary intent in instruction. An examination of the East African Certificate of Education Regulations and Syllabuses for 1977 (East African Examination Council, 1977) indicates that many of the course aims, which serve as the basis for learning objectives in Kenyan schools, are largely content-centered, or directed at what the instructor will do, without making clear the kinds of learned capabilities students are expected to have upon completion of high school. Clear and unambiguous goals at this stage need to be developed, particularly as the Regulations and Syllabuses serve as the basis for the examinations that determine successful completion of the prescribed course of study. Since the syllabus is used by schools scattered throughout East Africa, stating goals in terms of learned capabilities should reduce ambiguity and facilitate the discerning of what behavioural performances students work toward. Whether it is in agricultural studies, chemistry, literature, industrial arts or any other subject, knowing whether students are meant to gain verbal information, intellectual skills, attitudes or motor skills increases the probability of more effective and efficient implementation of goals at the instructional level.

In this regard, it is significant to note that in his interviews with those involved in the Childrens Television Workshop, Polsky (1974) notes that a clear statement of goals resulting from the planning sessions in the summer seminars was often cited as one of the major factors contributing to the success of the 'Sesame Street' experiment. It allowed for both the development of the programme around the goal and

measurement of programme effectiveness. Polsky gives an illustration of these goals (pp. 86-88) stated in terms of intellectual skills, attitudes and cognitive strategies.

1.2.3. Goal Analysis

The more abstract and ambiguous stated goals are, the harder they are to explain and decide how to attain. Mager (1972) suggests a procedure for analyzing goals that are important to achieve, or to achieve better than is presently the case, but for which the statement of intent describes an abstraction for which we cannot answer the question: "How will I know when I see one?" (i.e. one (person) who has achieved the stated goal). Mager refers to goals that do not give indication of overt action as "fuzzies" since their meaning is not clear. Goal analysis helps to make a goal more achievable by clarifying its meaning in terms of performance by which we can recognize that the goal has been achieved, so that we can select the most appropriate procedures for achieving it.

The goal analysis procedure starts with a stated goal for which instances of performance evident of its achievement are written down, analyzed and sorted out to further clarify the fuzzies. This is done repeatedly for each goal until we have statements for which it is clear that if someone achieved or demonstrated each of the stated performances, we would agree that he has achieved the goal.

It is of importance to consider the application of the goal analysis procedure not only in terms of determining goals for new educational programmes, but also when consideration is being given to adding a major new component, like educational television, to the instructional system.

It has been pointed out in discussing conditions for successful systems, that the introduction of new educational media provides a chance for the re-examination of educational goals, both in terms of their clarity about what is to be achieved. Lucid, unambiguous goals contribute toward making subsequent design and implementation stages much easier. The introduction of educational television and other new media into the Kenyan educational system should therefore be taken as an opportunity to analyze its educational goals, to insure that they are relevant and clear. Goal analysis can be a useful procedure for this purpose.

1.3. Task Analysis

In order to breakdown the stated goal performance to manageable learning objectives, the tasks performed toward its accomplishment must be known. This function is fulfilled through task analysis, and involves a careful examination of units of performance in an effort to identify those factors which will influence the design of the learning system by categorizing the tasks in terms of frequency, difficulty, importance and interrelationship between tasks. It proceeds in two stages: task listing and task description.

1.3.1. Task Listing

Task listing is the first step in task analysis. It consists of identifying all of the sub-tasks or steps involved in performance toward achieving the goal. It is a checklist or sequential listing of tasks which taken together will yield the overall goal performance. It describes what the competent person does or is supposed to do when he is fulfilling his role.

There are various techniques which may be used alone or in combination to accomplish task listing. These include: questionnaires, checklists, individual interviews, observation interviews, job interviews, jury of job or subject-matter experts, daily work records, work performance, critical incident analysis, analysis of job documents or technical manuals and publications, and so forth.

1.3.2. Task Description

Following task listing, the next step of task analysis is task description. Essentially task description entails the identification and sequencing of the salient characteristics of the tasks and their context in terms of stimulus-response factors; environmental, time, physical, health and safety requirements; order and relationship of tasks and/or sub-tasks, and so forth.

Every description of a performance task takes into consideration a certain number of essential elements including:

1. Stimulus characteristics, i.e. cues or signs that signal the requirement to start the task.
2. Response characteristics of the required output, whether manipulative, discriminatory, psycho-motor, verbal or otherwise.
3. Indications of the objects or persons acted upon.
4. The tools, equipment, devices or instruments involved in performing the task.
5. Psycho-motor requirements such as force, energy, coordination, etc.
6. Physiological and health considerations, where necessary.
7. Location for the performance such as indoors, outdoors, in the field or other working space.
8. Time requirements.
9. Sequence : whether they are fixed sequence or variable sequence tasks or sub-tasks.

10. Supervision requirement.
11. References necessary to perform.
12. Not given - i.e. items specifically denied in performance.
13. Criterion : quality, quantity, time or other standard used to judge adequacy of the performance.
14. Criticality of the task : whether the whole performance would be destroyed if the task were not accomplished correctly the first time, or could not be redone if performed incorrectly or out of sequence.
15. The frequency and difficulty of performance (Davis et al, 1974; Kaufman, 1972; Mager and Beach, 1967; Tracy, 1971).

In preparing task descriptions, charts are normally used including the tasks and selected elements relevant for interaction in the particular performance. Detailed performance information should be provided in task analysis as this provides the basic structure and information for the actual design implementation and evaluation of the instructional plan when put into operation.

This process of task analysis is of particular importance when new curricular areas must be established as is presently happening in Kenya. To ensure that learners are provided with the necessary skills, knowledge and attitudes, what they are to learn must be systematically analyzed and organized so that salient points are identified and critical information is not omitted. This makes for a more efficient instructional system. Task analysis also gives an indication of the sequence of performance necessary, by identifying the hierarchical relationship of sub-tasks and tasks (Gagné and Briggs, 1974).

1.3.3. Consideration of Problems of Task Analysis

There are, however, certain problems likely to be encountered in task analysis. For example, not all tasks have an overt component, especially as some behaviour is private to the individual and cannot simply be described from observation. There are some tasks which are done at the cognitive level, such as sub-tasks involved in deciding, discriminating or solving. Davis et al (1974) point out that there may be a way around this if there are experts who can tell us how to perform the cognitive task, or if there is a generally agreed upon procedure for performing the cognitive task in question. A more serious problem occurs in some creative tasks which involve an element of personal taste, preference or value which are hard to describe or record, although other aspects of the task may be described. It is therefore necessary to keep in mind that although task analysis can be carried out for most tasks, it is not a rigid prescriptive process, and should be employed where appropriate. It can undoubtedly prove of value in the effective development of particularly the new applied courses that are becoming increasingly part of the Kenyan curricula. Task analysis should be set down in clear unambiguous and simple terms, and should ascertain that the task is internally consistent, so that it does not require the learner to do two incompatible things at the same time.

The course of instruction will be influenced both by this careful analysis of the performance itself, plus the type of students who are to be instructed. Therefore it is necessary that at the same time that task analysis is going on, consideration be given to the learners and their characteristics through the process of population analysis.

1.4. Population Analysis

The final responsibility in any instructional effort is to the learner. The responsive instructional system seeks to modify the performance of the individual in some way to better equip him to exist in his environment. Effective instructional communication is not therefore concerned purely with the technical problem of how accurately the message is transmitted to the receiver. Rather, it becomes concerned with the semantic problem of how precisely the transmitted message conveys the desired meaning; and also with the pragmatic problem of how effectively the received meaning affects conduct in the desired way.

To be able to deal with these problems and increase the probability of deriving meaningful instructional outcomes, detailed knowledge of the characteristics of the learners concerned and the environmental influences that have bearing upon their educational process must be well known. This section outlines some of the factors that need to be identified in the process of population analysis which fulfills this function.

1.4.1. Identification of Communication Skills

One view of communication sees it as a social process that involves the sharing of mutually accepted signs and symbols which are recognized and held in common ownership or use by each person (Cherry, 1974), and indeed to ignore this fact can have serious consequences for the intended communication. Some of the most serious failures that can occur in communication are a result of lack of knowledge on the communicator's part of the communication skill of the intended message receiver.

Before designing instruction for a given audience we need to ascertain whether they have the basic communication skills often used in instruction, such as the ability to read and write. In a country like Kenya where there is still a considerable rate of illiteracy, this is a factor that must be given prime consideration. But even more basically the language of the target audience - in terms of language spoken and language level - needs to be known. Here again in Kenya one must take into account the multiplicity of languages as the knowledge of the national and official languages of Swahili and English cannot always be guaranteed in all corners of the republic. Even when dealing with in-school audiences who have been exposed to the usage of these two languages, the language level, in terms of proficiency and vocabulary is not always the same; for example, between the rural and urban school children. These factors of language used and difficulty are essential if the messages sent are to have any meaning or effect at all.

Another factor that has crucial bearing, particularly for Kenya, is that of visual literacy. Because we have variations within the country in cultural and artistic traditions, the variation in the skills of learners from different parts of the country in interpreting, judging, responding to, and using visual representations of reality is a matter that needs consideration, particularly in considering design of visual instructional materials. If visual representation are to be used it must be ascertained that all of the intended audience comprehend what the symbols mean. In students of all levels, experiences must be provided which can allow them to recognize and understand either graphic, photographic or other material that represents objects, events, places or people. Of significance in this respect is the visual symbol survey

study conducted in Kenya by Bernard Shaw in 1969. This study which involved a survey of recognition of visual symbols (drawings) in Kenya, had results that indicated differences in visual recognition between urban-rural, urban literate-urban illiterate, educated-uneducated, urban-illiterate-rural-illiterate groups (Shaw, 1969). Somewhat in the same vein, but using sound effects, was a study done by Ball (1971) who was involved in schools broadcasting in Kenya. This study revealed that there were differences in recognition of a variety of sound effects by primary school audiences and also among their teachers. Here the differences occurred particularly in recognition patterns depending on whether the pupils were located where such sounds were likely to be familiar; for example, with children from farming areas being able to recognize the sound of a tractor more easily than those who were not. There were also differences in sounds recognized by different standards (grades) of students and surprisingly, the pupils in the upper-primary standards proved better on the average, at recognizing the sounds than the teachers.

These kinds of findings have significant implications for educational communications in Kenya, in terms of the need to know the "visual and audio literacy" of the audience, particularly when using mass communication. This is especially significant since the message designers and senders are not from similar groups or localities as the majority of the audience, and making assumptions on the basis of experience with one group is likely to lead to communication problems with others.

Similarly in the area of communication skills is the variety of non-verbal patterns of communication in the traditions of various peoples

of Kenya. The significance of differences in non-verbal communication is well documented by authors such as Mehrabian (1971, 1972); Hall (1968, 1974) and Eisenberg (1971). The importance of carefully considering this factor is well illustrated by the reference made by Schramm (1964) to an educational film on baby-care, shown to Ugandan mothers. The film seemed appropriate for the group concerned, but its message was rejected by the group since the presenter in the film was a West African foreigner, not aware of the local customs, and held the baby she was washing in a manner that was found totally improper and unacceptable to the mothers.

The learner's perceptual experience background should also be taken into account as this will have bearing on their comprehension, which will be affected by message treatment and techniques used. In this regard, Schramm (1964) gives an example of an educational film, on how to exterminate lice, which was shown to a South American audience who had a problem with lice in their community. The film however had no effect, since techniques such as full screen close-ups of lice made them appear to the audience as some unknown large animal with which they were not familiar. Another example given by Schramm in this respect was one in which the technique of having someone walk off screen (as if going off-stage) left an audience in Africa, unused to such techniques, extremely disturbed and distracted throughout the rest of the film by the disappearance of the man (Schramm, 1964).

Clearly then techniques and other elements of treatment such as the dramatic, pacing and effects that have become accepted in the visual materials production trade elsewhere, must be pretested for comprehension with the concerned audience. On the other hand, where the audience is

used to certain kinds of treatments and techniques, it is important to take these into account. Molsky (1974) points out for example that when the Childrens Television Workshop looked at the effect of television on pre-school children, before starting the "Sesame Street" series, they found that most children were accustomed to professional, fast pace, commercial television; whereas most educational television which was largely locally produced was slow and not interesting to children. The Workshop then saw the need to adapt professional, fast pace, repetitions, clever visual presentation of brevity and clarity. This seems to have worked well in holding children's interest and attention when the programmes were shown (Feinstein, 1971).

These are some of the considerations that must be given to target audience communication skills. Many other communication skills will require attention depending on requirements of the message to be communicated. The effect of many of these skills will need to be verified through empirical research.

1.4.2. Identification of Learner Attitudes

Attitudes are an important factor in determining whether or not instruction has the desired effects. In planning a programme of instruction it is of importance to try and identify the learner's attitudes, biases or prejudices, particularly toward the skills and knowledge involved, and also toward the communicator and other matters related to these. If the attitudes in any of these cases happens to be negative it is likely to create noise in the communication and decrease the probability of its effectiveness.

The learners' motivation is also important to analyze. If they are motivated, then it will be easier to help them toward the achievement of the desired outcomes, than it would be with something they do not particularly care about. Closely related to this will be the need to know the students' interests, as this will provide one way of keeping them motivated. Students' special skills and aptitudes will influence to a certain extent what can reasonably be expected in the way of terminal performance. Generally then, any emotional, affective characteristics relevant to the instruction being designed ought to be considered.

Identification of attitudes may be accomplished through questionnaires, surveys and aptitude tests, such as has been done for example in the school system in El Salvador as part of the educational reform (Hornik, 1972).

1.4.3. Identification of Knowledge and Skills

The better we can identify the target population's previously learned capabilities in terms of factual knowledge, intellectual skills, strategies for learning and remembering that may be activated from previous practice and other skills relevant to the goals of the programme, the more accurately we can subtract what is already known by the learners from what needs to be known. Otherwise we may be led to erroneously assume that the learners have experienced things that are quite foreign to them; or we may underestimate their capabilities and cause them to lose interest by covering ground with which they are already familiar. In the case of young children, instruction should not be designed to expect intellectual activities of them at levels to which they have not yet matured; reference should be made where necessary to

relevant psychological theories in this regard. The most direct way of determining whether anyone -child or adult- has the skill in question, is to ask them to perform it, or simulate its performance.

Previously attained intellectual skills and intellectual level of performance attained by learners will have bearing on the length of instruction, examples that may be used, vocabulary that will be understood, the level of abstraction that might be meaningful, and also the degree of learner self-management that can be designed into the instruction (Mager and Beach, 1967; Gagné and Briggs, 1974).

1.4.4. Identification of Academic Environment Influences

Of particular concern in this respect would be the influences upon the learner of the structure in which the instructional programme takes place : whether or not opportunities are made possible for individualized learning; whether or not a course of study already exists to map out the total articulated route for the learners' progress toward a goal or whether guidelines are based merely on following textbooks, and the extent to which resources are or should be made available to the learner (Cavert, 1974). This is a crucial aspect of population analysis when a medium such as television is to be introduced into the instructional system. Unless the academic environment influences are such that they will prove supportive to its introduction, the success of educational television is likely to be doubtful. Some revision to the academic environment may therefore prove necessary as has been the case in El Salvador, American Samoa or Ivory Coast.

These academic environment influences can be identified most effectively only through direct and systematic observation of conditions

existent in day to day operations. With the diverse types of schools in the Kenyan educational system, this analysis would be essential before the introduction of television on widespread use at any given level.

1.4.5. Identification of Social System Influences

The rules of interpersonal relationships necessary to advance as well as intellectual and aesthetic norms are established by society. In designing instruction, consideration must be given to the socio-economic influences which determine to a large degree the resources to which the learners can be exposed and determine those elements that are familiar to the learner; as well as to identify those elements essential to survival in the society to which the learner needs to be exposed. We must also consider the social-political influences which determine the nature and extent of the individual's function in society. Learners in the target population are characterized by how they are expected to function in the hierarchical order of their social environment. Furthermore, socio-ecological influences that go beyond the interpersonal relationships to include the learners' ability to get along with or contribute to the environment need also to be analyzed. The ethnic characteristics and geographic characteristics in terms of geographic region such as urban and rural have influences that may determine method, medium as well as vocabulary of the learners which must be taken into account (Cavert, 1974; Friesen, 1975).

1.4.6. Identification of Cultural Influences

Education transmits basic cultural values from generation to generation. The cultural community of the learners establishes the moral, aesthetic and intellectual values that determine the societal and academic environments. Instruction must take into account the value system and mores of the learners' society if it is to be relevant. If there is conflict between the communicator's and learners' beliefs and morals, for example, a communication breakdown is likely to result. Even if other factors such as knowledge and skills or attitudes toward them are appropriate but beliefs are negative, problems of serious noise in communication result. The culture's creative art forms such as music, dance, art and so forth may also influence what is included in the instructional process.

These factors must be recognized so that unintended cultural lamination is not imposed on learners during the instructional process. Instruction should reflect the influences of what the community expects products of the instructional system to be like. If the instruction is out of phase with the community influences, then the changes it effects in learners are not likely to occur in any permanent form (Cavert, 1974).

1.4.7. Identification of Other Population Characteristics

There are a number of other learner characteristics that would need to be identified as required by the instruction being designed. They include : physical, age, maturity, sex, dexterity, visual acuity, colour (or other specific) perception, location (dispersed or located in certain areas(s)), access to the medium likely to be used (for example whether television sets are individually owned or shared in community

or learning centres) and so forth. Population analysis can prove exacting, but it is a vital function in the process of planning for any instructional effort, whether by television or other means. If it is not carefully carried out the probability of meaningful and effective communication becomes usually very small.

1.5. Behavioural Analysis

The Behavioral Analysis phase serves the function of synthesizing information obtained at the task analysis and population analysis phases. This synthesis is necessary if meaningful behavioural objectives are to be derived during the next phase of planning.

1.5.1. Determination of Behavioural Type and Level

In order to be able to use tasks listed and described in the task analysis phase as a basis for design, they must first be analyzed in behavioural terms. In this respect the task is analyzed simply in terms of whether it may be classified as cognitive, affective or psycho-motor (or according to other relevant classifications). It is then categorized at the appropriate level within each of these classifications, for example according to categories established by behavioural analysts such as Bloom and associates (1956) and Krathwohl and associates (1964) or in terms of the hierarchy given by Gagné (1965). A documented example of this sort of analysis was carried out as part of the educational reform in El Salvador, using the taxonomy by Bloom (Inghe, 1973).

1.5.2. Determination of the Discrepancy Between Entering and Required Behaviour

Once the behavioural type and level are established, we can determine the behavioural discrepancy between the requirements of the task to be performed and the entering behaviour of the target population as determined in the population analysis phase. If for example the skill required falls in the cognitive domain at the analysis level, we will need to determine not only if the target population is able to perform the skill at all, but also whether the existing discrepancy is due to the fact that the learners are currently only performing at the knowledge, comprehension or application level but have not mastered performance at the analysis level. This latter may often be the problem, particularly where the educational level, due to ill-educated or untrained teachers is still at what Beeby (1966) calls the stages of the "Dame School" and "Formalism". In such a system, emphasis is still on rote knowledge or memorization without any attempt to gear learning to other levels of behaviour. This was, for example, the case in pre-reform Samoa (Beeby, 1966) and El Salvador (Ingle, 1973); and is likely to be true also in parts of the Kenyan educational system, particularly where untrained teachers are still employed (Government of Kenya, 1974; See Appendix L).

The determination of discrepancy must therefore be carried on at these two levels : in terms of the behaviour itself and in terms of the level of performance required. This kind of analysis may be accomplished by the use of diagnostic testing of student behaviour and comparing this to the level of skill required. The discrepancy between the two would define the need-to-know areas of performance. This kind of behavioural

analysis is essential in order to avoid a mismatch between the programme designed and the target population's entering capabilities.

1.5.3. Performance Problem Analysis

Before proceeding on to the statement of objectives based on the identified behavioural discrepancy, it is necessary to ascertain whether the discrepancy that exists can be met only through formal instruction or if the learner can achieve the desired performance by some other course of action or under changed conditions without needing to undergo formal instruction. A performance problem analysis is essential for this purpose.

Mager and Pipe (1970) point out the hazards of considering only one possible solution, such as instruction, to any behavioural problem. For instance in the case of agricultural studies that are being introduced in Kenya, in some cases the students at whom these may be directed are from agricultural and farming areas. But can we assume that the behavioural discrepancy evident among many of them is only a matter of lack of instruction, or are there conditions that make the performance unrewarding or present obstacles to their being able to achieve the behavioural requirements expected? A case in point is one discussed by Stabler (1969) in which he points out that, although one of the finest vocational agriculture programmes was introduced at Chavakali School in the early 1960's, among obstacles it had to face were community attitudes toward what high-school education ought to have been preparing their sons for. This attitude was caused by the fact that following the more academic course of study often led to more rewarding clerical or other employment in the formal economic sector.

This and other kinds of attitudes which make non-performance in the agricultural sector more rewarding (prestigious) for high school graduates, even while they remain unemployed in urban areas, may need to be more the concern of the educational system than merely formal instruction in agricultural skills.

There may be other causes for behavioural discrepancy such as the lack of practice or lack of feedback as to proficiency for a skill that has previously been learned. On the other hand what may be required to bridge the discrepancy in performance may be a slight change in the required task performance such as providing job aids. For example the pilot trainee who may show evidence of behavioural discrepancy in proficient pre-flight routine may not so much need further training, as he might simply require a pre-flight checklist to be able to perform adequately. Other tasks may be more efficiently acquired through on-the-job training than through formal instruction.

For practical reasons, the purpose of the instructional system must remain limited and clearly defined. To make the most efficient use of the system within its limits such a performance problem analysis is necessary, so that those problems which can be solved only through the instructional system become its concern, and where ever possible when the learner can get or will get what he requires to achieve the goal somewhere else or under differing conditions and circumstances, other alternatives ought to be considered. Mager and Pipe (1970) depicts the kind of decision and analysis essential for this process as in Figure nine (9) below.

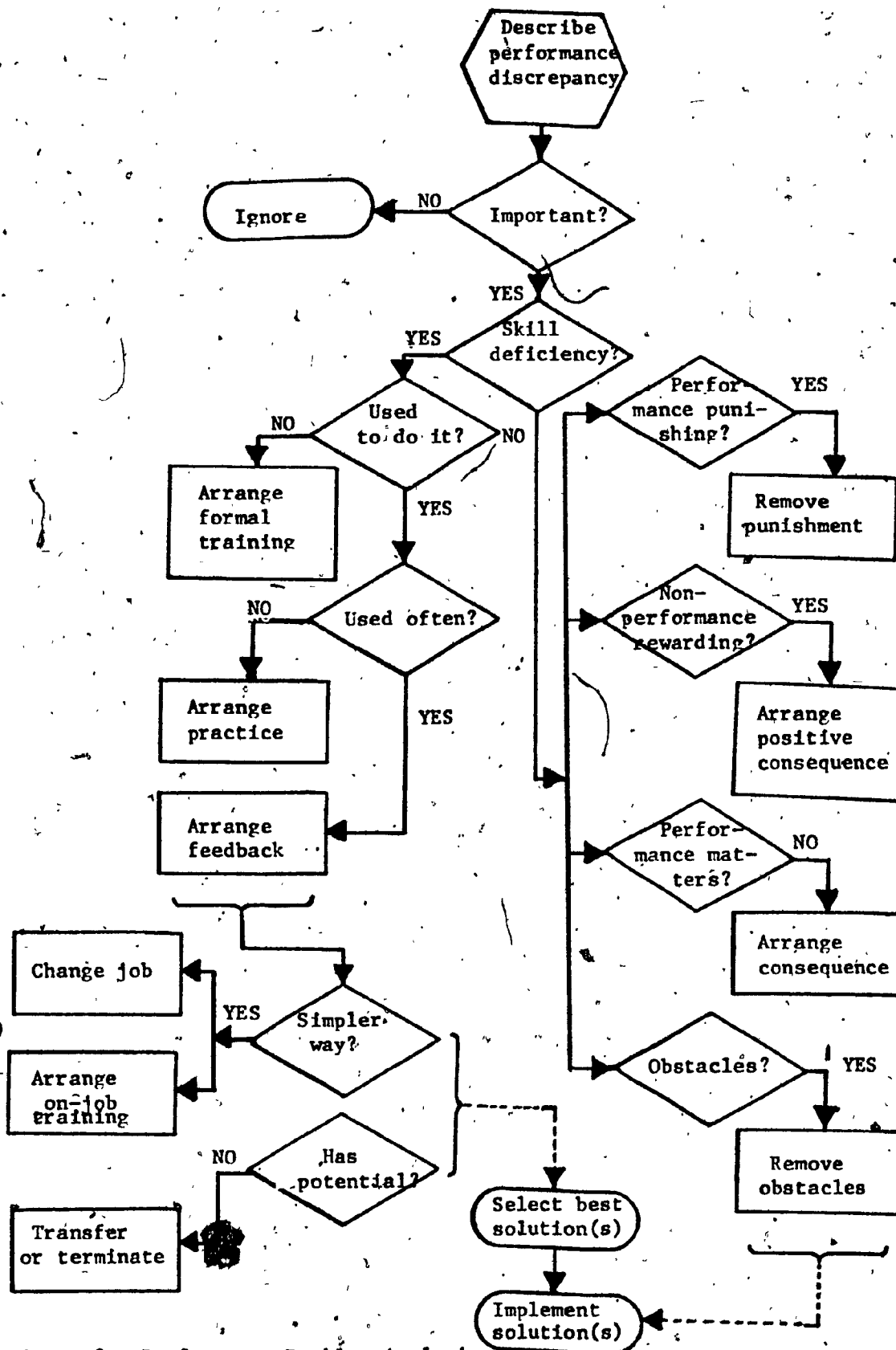


Figure 9: Performance Problem Analysis
Source: Mager and Pipe, 1970.

Once our behavioural analysis for each task is complete, and the performance problem analysis indicates that instruction or training is the best solution for performance of a given task, we are ready to state the objectives of the required instructional programme.

1.6. Formulation of Behavioural Objectives

The formulation of behavioural objectives based on the preceding analyses is a stage of primary importance in design as it becomes the basis for the implementation (in terms of behavioural outcomes, content and structure, teaching and learning methods) and evaluation of the instructional system. The objectives must be formulated in such a manner that both instructors and learners will know what is to be accomplished during the instructional process; and also in such a manner that they are seen to be contributing to the overall system performance goal. They become the basis of accountability of the instructional-learning system.

1.6.1. Statement of Objectives

There are several approaches to the statement of behavioural objectives (Kryspin and Feldman, 1974; Kibler, Barker and Miles, 1970; Mager, 1962), but they all seem to generally agree on certain basic requirements.

1.6.1.1. Identification of the Learner

Well stated objectives identify the learner for whom the learning outcome is intended. This requirement focuses the formulation of objectives on a particular kind of learner and becomes instrumental in determining the appropriateness of the behavioural objective statement

as a whole, taking into account information obtained at the population and behavioural analysis stages.

1.6.1.2. Specification of Behaviour *⁽¹⁾

The most important characteristic of a properly stated objective is that it specifies the kind of performance that will be accepted as evidence that the learner has achieved the objective. This takes into account the performance as determined through task analysis. The performance required should be stated so as to specify the desired behaviour in terms relevant to the task. The specification of behaviour also takes into account the behavioural domain and level determined during behavioural analysis. Ingle (1973) points out for example that with the introduction of the use of behavioural objectives in terms of Bloom's taxonomy in the educational reform in El Salvador, great care had to be taken to avoid keeping the learning outcomes at only the levels of knowledge and comprehension. These levels were not far removed from the traditional information or content centered rote learning. Rather in keeping with the overall goals of the reform effort, the statement of objectives had to be carefully considered to include behaviours designed to achieve outcomes at the application, analysis, synthesis and evaluation levels.

Another consideration in the specification of behaviour is that to be of more utility, the objective should be representative of a class of learner behaviours rather than a single test item (Popham, 1973). The behaviours specified should be those that can generalize across a range of content e.g. "the learner will be able to add correctly any pair of four-digit numbers" or "the student will spell aloud correctly any twenty words randomly drawn from a list of five hundred 'hard' spelling words",

*See footnote (3) page 217.

rather than specifying the particular pair of digits or words as in a test (Popham, 1973).

1.6.1.3. Specification of Results or Products

In addition to the required behaviour, the achievement of some objectives requires other material result, product or object as part of the evidence for accepted performance. Where this occurs the statement of objectives must also specify and adequately describe the desired result, product or object.

1.6.1.4. Specification of Conditions

The statement of objectives should include the specification of conditions indicating how the required performance is to be carried out. This includes the specification of the situation tools and aids, or other limits and allowances that are to be set to the performance. The conditions will be determined by requirements from task description and population analysis- (i.e. the type of learner concerned will influence conditions imposed).

1.6.1.5. Specification of Degree, Standard or Criterion of Performance

The acceptable degree, standard or criteria for required performance must be specified for each given objective. This details how well the learner must do on behavioural measures to achieve the objective. The measures involved may be of quality or quantity or both. These measures set a basis for determining the effectiveness of instruction during evaluation.

1.6.2: Determination of Enabling and Prerequisite Objectives

The final performance in the achievement of an objective may be referred to as the terminal objective. To achieve the terminal objective it is often necessary for the learner to master a number of enroute or enabling behavioural objectives that are prerequisite to the terminal objective performance. We must therefore determine what sub-objectives the learner needs to master before he can be expected to successfully perform for each objective. This will produce several levels of component behaviours, each of which will in turn have enabling sub-objectives. At each level one must keep asking what sub-objectives the learner needs to have mastered first.

This backward analysis continues to the level of sub-objectives at which we can assume mastery by the learners concerned. Mastery of sub-objectives below this may then be established as prerequisite to instruction and the sub-objectives above may be included in the instruction as enabling objectives to terminal objectives achievement. Alternatively, a certain point in the backward analysis of sub-objectives may be reached, at which it is decided that only those who have achieved the enabling sub-objectives to this point may take the programme of instruction. All sub-objectives below this would be established as prerequisite, and only those above would be included as enabling objectives to be mastered as part of the instruction.

Enabling and prerequisite sub-objectives must be determined so that all concerned know at what point instruction is to commence, and what is to be included. Often a problem arises, when mediated instruction is designed in isolation from other on going instruction, of knowing exactly what sub-objectives may be assumed as prerequisite and which as enabling.

When the formulation of objectives for all types of instructional efforts is carried on concurrently, it facilitates the determination of the correct starting point for the mediated sequence.

1.6.3. Analysis of the Curriculum

The terminal and enabling objectives compose a set of learning outcomes (curriculum). The curriculum yields both the behavioural dimension and content areas (topics) for instruction (Briggs, Gagné and May, 1967). To ensure that each content area is given proper balance in emphasis for the included domains of behaviour up to the desired level, an analysis of the curriculum is necessary. This may be accomplished by the use of a table listing the content areas and behavioural levels respectively by row and column, and indicating at each point of confluence when the topic has been covered at the given performance level, by the terminal and enabling objectives. In case of the terminal objectives covered at one of the higher behavioural levels (for example, synthesis or evaluation in terms of Bloom's taxonomy; rule following or problem solving in terms of the learning hierarchy by Gagné), the curriculum analysis should ascertain whether the prerequisite behavioural levels have been included for mastery in the enabling objectives, if they have not previously been mastered by the learners.

The result of curriculum analysis will therefore feed back to the two previous stages of objective formulation, and lead to a statement of further enabling objectives at levels where there may be deficiency, or to an elimination of some enabling objectives at levels where there may be undue weight in emphasis.

Ingle (1973) gives a good illustration of how such analyses are carried out as part of the El Salvador reform (See Appendix N). This has been done to ascertain objectively the types of skills or behaviours the national curriculum emphasizes within each teaching unit, subject matter and grade level. It also forms the interpretive framework for the development of individual tele-lessons, which, while reflecting the informational content of the curriculum, are oriented toward fulfilling specific behavioural objectives within the televised portion of the lesson and the classroom teachers' follow-up activities. Instead of producing programmes based on themes or general goals, the tele-lessons concretely specify what the student should be able to do as a result of the 20 minute television portion and 40 minute period of follow-up classroom activities (Ingle, 1973)

1.7. Développement of Criterion Measures

Criterion measures (tests) must be developed in order to determine whether behavioural change has actually occurred as specified by the objectives. They are derived directly from the performance and standards specified by the objectives and they help to determine the degree to which objectives have been achieved. Developing criterion tests is therefore a natural extension and check on the mapping out of objectives, and must be discussed before going on to design appropriate learning experiences, so that we have a precise idea of the kinds of terminal behaviour to be elicited.

Criterion measures are designed to provide the instructional system developer with a reliable means of determining the effectiveness and quality of the instructional system, as well as providing the learner

with continuous feedback about his progress toward attainment of the objective.

1.7.1.0 Selection of Test Instrument

There are several types of tests/test items that may be used as instruments in measuring learning outcomes. These different types of instruments, which may require oral response, written response or movement and manipulation response, all have certain advantages and disadvantages which make them suitable for use only in certain kinds of testing situations (See Appendix M). They include :

1. Real on-the-job performance
2. Simulation, including:
 - a) Real performance in simulated situation
 - b) Simulated performance in simulated situation
 - c) Verbal description only of performance
3. Objective, including:
 - a) Alternate response (binary choice)
 - b) Multiple choice
 - c) Matching
4. Completion
5. Short answer
6. Essay

(Thorndike and Hagen, 1969).

These different types of instruments may be used in criterion tests alone or in combination, each chosen according to its ability to measure a particular objective.

1.7.2. Objective and Test Item Matching

To ensure that the test item(s) is suitable for testing the achievement of an objective, Mager (1973) suggests a procedure for matching the objective and test item performance and conditions as shown in Figure 10. In this chart, 'main intent' refers to the generalizable behaviour types such as identify, demonstrate, discriminate, choose, classify and so forth. Indicator refers to an activity through which the existence of the main intent can be inferred. For example indicator verbs associated with identifying would include pointing, circling, connecting lines, teaching, speaking, underlining, marking and so forth.

A brief explanation of the flowchart steps listed according to the numbers shown on the flowchart follows:

1. What is the performance stated in the objectives?
2. If there is none, repair or discard the objective.
3. Is the performance a main intent or an indicator?
4. If you cannot tell, revise or discard the objective.
5. If it is an indicator, can you tell what the main intent is?
6. If you cannot, revise or discard the objective.
7. If you can, test the indicator against the main intent to determine whether it is the simplest, most direct indicator, and if it is well within the repertoire of the learner.
8. If the performance is a main intent, is it overt or covert?
9. If covert, add an indicator.
10. Test the indicator for simplicity (as in 7 above).
11. If needed, revise or reject.
12. If the objective performance is overt, does the item performance match?

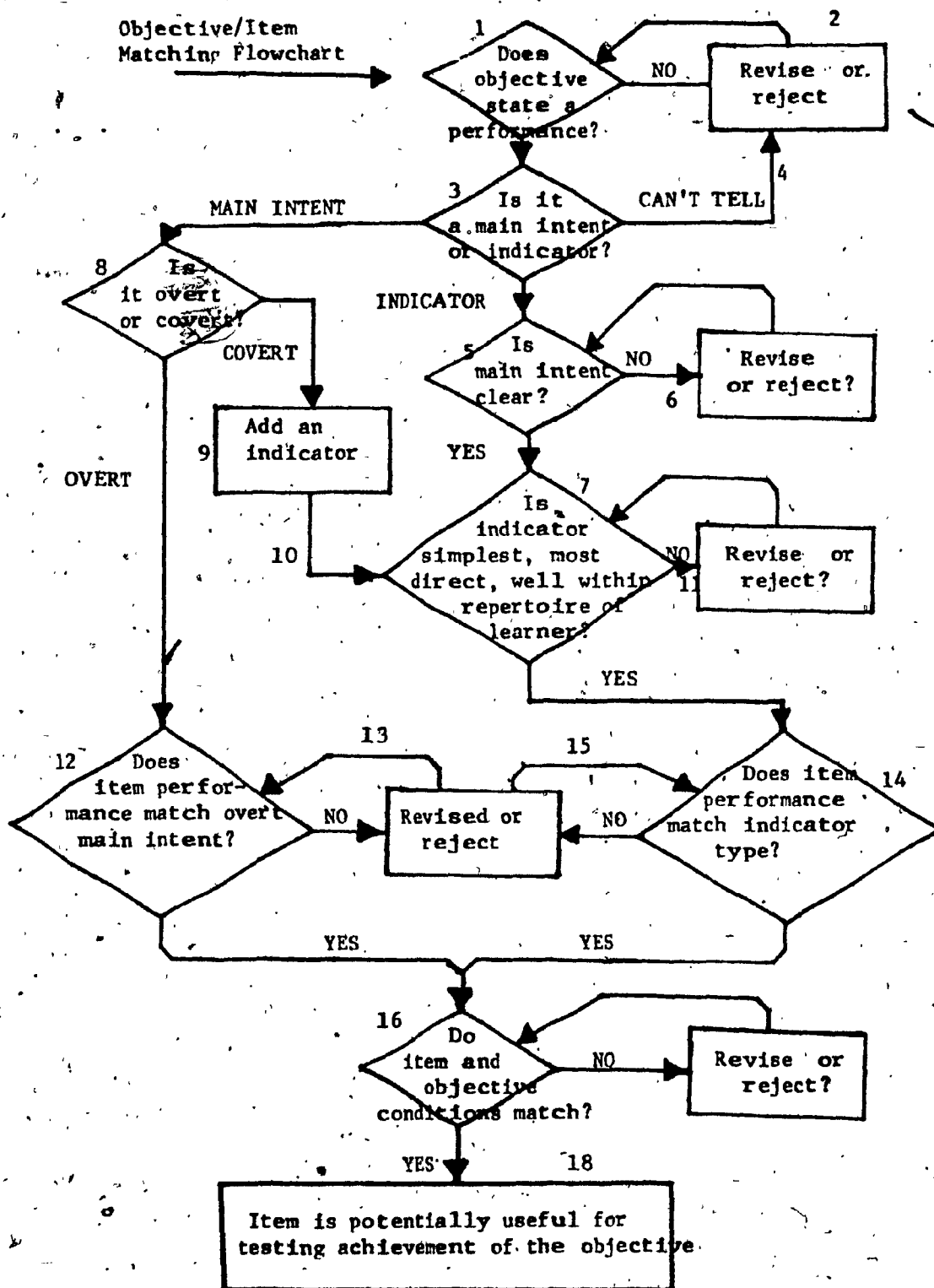


FIGURE 10.. SOURCE: MAGER, 1973.

13. If not, revise or reject item or objective.
 14. If performance is an indicator, does the item performance match?
 15. If not, revise or reject item.
 16. Do the conditions described in the item match those of the objective?
 17. If not, revise them.
 18. If so, item is potentially useful for testing whether the objective has been achieved.
- (Mager, 1973).

The number of test items used to measure the achievement of an objective will depend on the range of stimulus conditions described or implied by the objective, as well as the criterion of acceptable performance stated in the objective.

Once the test items have been matched with the objective and found potentially useful for testing the achievement of the objective, test construction proceeds taking into consideration a number of requirements for appropriate instruments.

1.7.3. Establishment of Test Validity

The validity of a test represents the extent to which the test measures what it purports to measure. This function is partly fulfilled through the objective/item matching procedure. Test validity is also confirmed by relating a test to some actual behaviour of which the test is supposed to be predictive (predictive validity), or by comparing qualities or performance as assessed by that test to the qualities or performance as assessed by another procedure, such as human judges.

(concurrent validity). It may also be confirmed if a proposed relationship between a construct (intervening variable) and derivative behaviour provides a basis by which the validity of such a relationship can be determined (construct validity) (Tuckman, 1972). Validity has implications for both the form of test (oral, written or performance) and its coverage. The form must be appropriate to the required performance, and the test items must cover each individual objective (Tracy, 1971).

Commercial standardized tests or tests constructed for earlier instructional programmes are unlikely to be valid measures of achievement for a new instructional system. Either the test or instructional programme is likely to contain content not included in the other and thus lead to invalidity. Because objectives require a precise statement of what the learner is able to do, rather than merely what he is to know, the use of a greater number of performance tests, that has been heretofore the case, becomes necessary. The kind of intellectual skills and cognitive strategies involved in answering test items and the form of responses the learner is to make, also have bearing. The behaviours taught by the system must match the behaviours measured by the test, otherwise the validity of the system may well be questioned. This necessitates the use of specifically designed tests (Tracy, 1971).

An illustration of the process of establishing validity is found in the development of tests for continuous feedback and extensive attitudinal studies carried out as part of the educational reform in El Salvador (Hornik, 1972; Ingle, 1973); and also in the development of tests used to validate the "Sesame Street" programme experiment (Ball and Bogatz, 1971).

1.7.4. Determination of Test Reliability

A reliable test yields consistent results every time it is used, in identical testing situations. Unreliability may result from a failure to standardize directions, errors in scoring, non-standard testing conditions, errors in sampling of objectives, chance fluctuations in subjects' attention, attitude or physical condition. Normally, establishment of standards for administration, scoring and lengthening the test will increase reliability (Tracy, 1971). There are certain statistics used to estimate how consistently a test measures the performance or skill it is supposed to measure. These include:

1. Coefficient of reliability
 - a) Kuder-Richardson formula 20 and 21
 - b) Spearman-Brown formula
2. The standard error of measurement
(Tuckman, 1972; Tracy, 1971).

1.7.5. Establishment of Test Objectivity

The objectivity of a test is established when the personal judgment or bias of the scorer is eliminated from the measurement. This means that different persons scoring the same performance at different times will arrive at the same score.

1.7.6. Determination of Test Administrability

A test is administrable when it can be given to a learner or group of learners with relative ease, and with excellent possibilities of communicating clearly to the test administrator and learners what is to be done. In some cases this may also be increased by such measures as

the use of separate answer sheets for responses.

1.7.7. Establishment of Standardability of Test

The standardability of a test is established when a systematic sample of performance has been obtained under prescribed conditions and scored according to definite rules. Factors in standardization include: equipment, tools, working aids, materials, arrangement, difficulty of problems and the testing environment (Tracy, 1971). All conditions must be identical for all learners being tested.

1.7.8. Establishment of Test Comprehensiveness

The comprehensiveness of a test is established when it takes liberal and complete samples from whatever it is measuring. In the instructional process a test is only a sample of the behaviours taught by the system. In planning a test therefore, it must be ascertained that it is a representative and comprehensive sample of the objectives of the instructional system.

One way of establishing test comprehensiveness is by use of a table of specification similar to the one used in analysis of the curriculum (See Section 1.6.3.). The table of specification provides a check on comprehensiveness by ensuring that test items reflect the emphasis given to each behavioural domain and level for each topic covered (Armstrong et al, 1970).

1.7.9. Determination of the Test Standard Performance

In developing test instruments, minimum acceptable standards for the overall test performance must be established. These standards will determine the degree of tolerance acceptable for the validation of the instructional unit being designed. Friesen (1973) suggests that for most instructional programmes the 90/90 standard should be the norm for validation. This standard requires that 90 percent of those instructed during validation testing (and representing the population for whom the instruction was designed), should achieve 90 percent or better on the criterion test. The 10 percent allowance takes into account any probability of error due to random factors affecting the performance of those tested.

In certain cases however, there are critical performances without which the learner cannot function in a given task. For such critical performances 100 percent proficiency may be mandatory. If the test consists of such performance(s), the test standards will be higher. Or if a test consists of some items that test such critical performance(s) and others which are not, then it must be specified that, although 90 percent proficiency will be acceptable for overall performance, particular objectives must be among those achieved with 100 percent accuracy.

1.7.10. Determination of Test Economy

A test is economical when a minimum of time, equipment, materials, finance and personnel is required in administering and scoring. Economy is an important consideration but one which is sometimes difficult to keep within acceptable bounds if the other essential considerations of a test are to be maximized. Generally, it should be taken into account in

developing a test, but should not be unduly emphasized at the expense of the other factors considered in test development and use.

1.7.11. Test Try Out and Improvement

Like other instructional materials, the test/test items will, in each of the considerations discussed above, need to be subjected to empirical developmental (formative) and validation (summative) try out, and improved when necessary after each testing. The try out and improvement of the test before it is put to actual use is important as this becomes the basis on which system effectiveness is determined. When necessary, the tests will also need to be revised, along with other system components once the system is operational and subject to revision after evaluation (see Chapter 4).

1.8. Formulation of Strategies

Following the formulation of objectives and development of criterion measures, strategies must be formulated for the attainment of the objectives as specified. Strategy formulation is directed at creating matches between the treatments and requirements of the learning task. In this process strategy formulation takes into account the sequence of events in the "act of learning". This sequence as depicted diagrammatically by Gagné (1975) involves the learning process from stimulus situation to observed performance, and feedback (Figure 11).

The task of learning thus entails several distinguishable phases. Its purpose is the establishment of internal states of capabilities in the learner. Strategy formulation involves the determination of the arrangement of external conditions to support this process for each

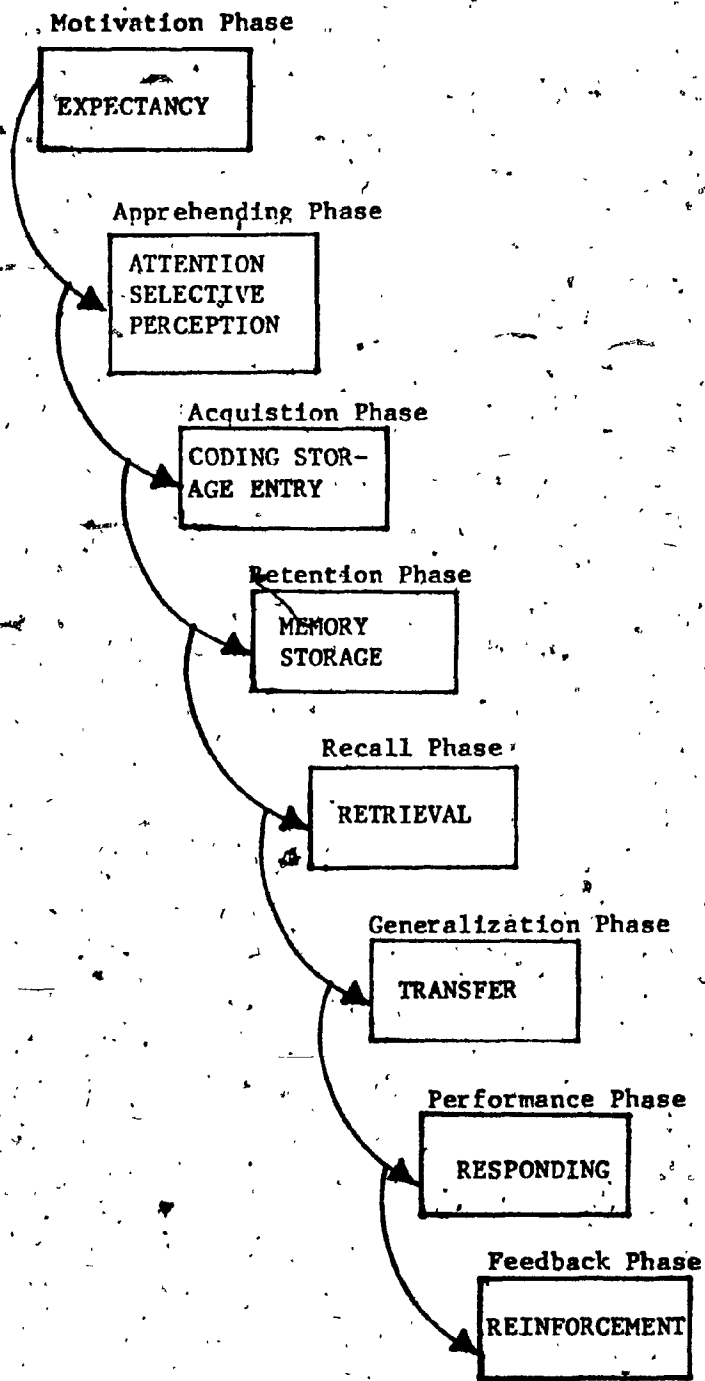


Figure 11: The phases of an act of learning, and the processes associated with them.

Source: Cagné, 1975, p. 28.

specified learning outcome. External conditions must be established to enhance motivation, direct attention, provide the means for coding and retrieval, promote retention and transfer and furnish feedback after performance, to complete the learning act (Gagné, 1975).

1.8.1. Determination of the Conditions of Learning

In strategy formulation, it is important to initially determine the effective learning conditions for each task. These conditions are different for intellectual skills, information, cognitive strategies, attitudes and motor skills (Gagné, 1975). On a micro level, within each of these different types of learned capabilities, the conditions involved on each level from signal learning to problem solving also require certain external conditions to facilitate their learning (Gagné, 1965). In formulating strategies therefore these conditions must first be discerned and each kind of outcome must be considered as a separate kind of problem to be solved. Each one will require different arrangements of events of instruction even though the events follow a common pattern from motivation to feedback. This continuum needs to be taken into consideration in choosing learning experiences in later stages.

The determination of conditions of learning is not restricted to Gagné's type of classification. Wong and Raulerson (1973), and Gerlach and Ely (1971), for example, have used different classifications and have discerned the conditions for learning involved. In mapping out the way toward the achievement of stated objectives, under any given classification therefore, the first step must entail the determination of conditions of learning for the type of behaviour involved, so that the appropriate learning experiences may be discerned (Gagné, 1975).

1.8.2. Determination of Contingent Progressions

Decisions relating to contingent progression, or sequencing of learning tasks must also be made during strategy formulation. Sequencing is the process by which learning experiences are placed in the configuration likely to produce the most effective and efficient learning. This is a particularly important consideration in planning for integrated instructional schemes where various means of communication are to be used. Adequate sequencing must be determined to ensure that component learning tasks have been mastered before the learning behaviour is demonstrated; and also to ensure that prerequisite learning is acquired by learners prior to advanced knowledge and skills. This is for example one of the concerns of the course team in the Open University structure. Bates and Purgh (1975) point out that the course team must ensure proper sequencing so that the broadcast and text materials are not out of phase during use by students.

Reference can be made to task analysis in trying to determine what hierarchical relationship there is between tasks and/or sub-tasks and whether there is a parallel between performance contingency and learning contingency. In strategy formulation we are further concerned with whether the learning contingencies based on these relationships are necessary, or facilitative or whether there is no contingency at all (Gropper, 1974). The hierarchy of skills is an appropriate reference for such decisions, since performance contingencies may also be potentially learning contingencies. The learning contingency between behavioural units may be necessary, facilitative or non-existent depending on four types of relationship between them, as follows:

(1) A superordinate/subordinate relationship:

X needs to be learned before Y - this requires necessary contingencies.

(2) A coordinate output/input relationship: X maybe at the same

level as Y, but X needs to be completed in order to produce a product or output which is a necessary input for Y. The scheduling of one before another may not be necessary but can be facilitative. Rationales have been offered for the desirability of "backward" order where Y is before X in learning, even though it is X before Y in performance (Gilbert, 1971). When X precedes Y in performance the learning of Y before X is not considered necessary but may be order selected because of its anticipated effect.

(3) Shared elements:

X and Y may both involve identical component skills. The component skills maybe hierarchically related to X and Y. They may be thus prerequisite skills for both X and Y, or skills at a coordinate (output/input) level to be found in X and Y. For purposes of instructional efficiency it is important to consider scheduling of shared learning elements before parent activities. If the relationship involves prerequisites, the contingency maybe necessary. If it involves coordinates, the contingency may be merely facilitative.

(4) No relationship:

Separate criterion behaviours or two or more sub-criterion behaviours may be in a superordinate/subordinate relationship with the parent criterion behaviour but have no relationship

to one another. There is no simple guideline in this case to recommend that one should be taught before the other (Gropper, 1974).

The primary criterion in sequencing is that the order of presentation must make sense to the learners. In this respect the contingency progression decisions will need to be based where relevant on the following kinds of ordering considerations:

- (1) Logical order
- (2) Problem-centered organization and sequencing
- (3) Descriptive order
- (4) Task performance order
- (5) Psychological order (e.g. from simple to complex, near to far, familiar to unknown, concrete to abstract).

(Rowntree, 1974; Tracy, 1971).

The design of instruction for the Niger television project made frequent and successful use of the psychological order - familiar to unknown. The sequences presented always started with items familiar to the pupils environment, before progressively introducing related items from the outside world (Egley, 1972).

1.8.3. Determination of Preparatory Progressions

In addition to decisions about sequencing, strategy formulation must take into consideration the size of the learning task and the type and amount of practice required to enable the learner to proceed from initial to final competency.

In formulating preparatory progressions we are concerned with the manipulation of variables which are either continuous or discrete.

Continuous variables such as the amount of behaviour practised or degree of cueing provided are capable of producing a large number of stages in progression. On the other hand discrete treatment variables like alternative stimulus or response modes, generally produce only a small number of stages. The aim in strategy formulation is to create neither too few nor too many stages but rather the right amount. "Right" in this case is defined in terms of three outcomes:

- (1) the difficulty level at each stage is appropriate to the target audience and results in relatively error free performance;
- (2) the type of practice at each stage facilitates positive transfer at the next stage; and
- (3) the cumulative learning experience enables or prepares the learner to exhibit behaviour on a post-instructional test which meets the criterion standards (Gropper, 1974).

The leanest possible preparatory progression which achieves these outcomes is necessary if instruction is to be both effective and efficient (Rowntree, 1974; Tracy, 1971; Gropper, 1974).

The design of suitable learning experiences is influenced by the systematic variations in the size of learning task and the properties of practice.

1.8.3.1. Variations in Amount of Behaviour Practised (Unit Size)

While it is desirable to require the learner to practice as much of the entire behaviour to be learned as possible, when the task is too large in scope or too complex, practice may be easier by reducing requirements:

- (1) By breaking up the total behaviour into fractional parts and

only gradually combining the parts into progressively larger units.

- (2) By initially requiring lower qualitative and quantitative standards and gradually requiring progressively higher standards.
- (3) Initially allowing long time intervals for task completion and gradually requiring progressively shorter intervals, or conversely by initially requiring only short periods of optimum performance and gradually requiring progressively longer periods.

If the size of the practice unit adapted is smaller than necessary, it results in inefficient use of time. If it is larger than what the learner can adequately handle, it is likely to be at the expense of learning effectiveness, and efficiency, since remedial instruction may be required to effect relatively error free practice. Too large a unit may also lead to cumulative difficulties as the learner attempts to proceed from one stage to the next (Groppe, 1974).

Determination of adequate units is particularly important in distant teaching systems such as broadcast educational television, where the television teacher does not have the immediate feedback of the learners to help him adjust as instruction progresses. Even where television is used in conjunction with supportive face-to-face instruction, if learners continually face difficulty, the programmes serve no purpose and learners will be discouraged from using them. Information from population analysis should be closely followed in unit size determination as the learners involved will determine what is appropriate as much as the learning task involved. If instruction is to be designed to teach five year olds or ten year olds the same novel task, for example, the age characteristic may be a determinant of the unit size suitable for each age group respectively. With mediated instruction such as television

programmes, materials must be pretested and validated for unit size to avoid learning difficulties.

1.8.3.2. Variations in the Mode of Behaviour Practised

It is desirable for practice to be in the mode called for in the criterion test - for example, verbal response to visual stimuli. However, modes anticipated to be easier maybe used prior to criterion practice in order to enable the learner to ultimately perform in the criterion mode.

Variations in mode which can potentially reduce learning difficulties in early stages and permit transfer to later stages include:

- (1) recognition/editing/production (e.g. as used in linear programming)
 - (2) visual practice/verbal practice
 - (3) concrete practice/abstract practice
 - (4) practice of procedures/practice of principles about the procedures
- (Gropper, 1974).

In this case, the latter term identifies the criterion mode while the former identifies modes selected to facilitate subsequent and final practice in the criterion mode. This is illustrative of how the stimulus or response mode can be varied as a way of altering learning difficulty at various stages of practice and at the same time allow for transfer from one stage to another. The use of these depends on anticipated difficulty as a result of the knowledge of the target population.

The use of mediated instruction is of particular importance in this consideration. Stimuli such as animated sequences, or real life sequences often facilitate the learning for which the criterion response may be verbal. Or as Bates and Pugh (1975) point out in the case of the

Open University, television sequences may be used to provide concrete illustrations of otherwise abstract learning material.

Television with its capacities can therefore make possible the consideration of a variety of audio-visual stimulus modes that may facilitate learning in progression to the criterion mode.

Variations in both stimulus and response modes present major ways of creating practice sequences which the learner can negotiate progressively. However, to avoid inefficient instruction the criterion mode should be formatively tested and facilitating modes added only when try-out results suggest their necessity.

1.8.3.3. Variations in the Degree of Prompting

Cues are generally visual or verbal stimuli which are used to facilitate the correct practice of responses. They may be varied by degree or type:

1. degree of cueing - identification of stimuli, response, or their properties may be made with varying degrees from full to none. This is for example the case in the continuum of teaching approaches ranging from Exposition (all cues); Directed Discussion (questions as cues); to Discovery (no cues) (Gerlach and Ely, 1971). Generally the provision of cues in an instructional sequence is referred to as "prompting", and their gradual withdrawal (either in number or completeness) as "fading" of cues or prompts.

Prompting/fading progression is meant to make practice easier to start with and progressively make it more difficult until it finally achieves criterion difficulty levels.

Cueing also has bearing on transfer. Over-cueing or under-cueing may result in transfer difficulties- with mediated instruction this must be fully pretested.

2. Types of Cueing

<u>Verbal</u>	or	<u>Non-Verbal</u>
rules		pictures
principles		diagrams
instructions		mock-ups
labels		objects
examples		demonstrations
check lists		marked symbols (diagramming)

Cues which first prompt and which are then faded out, generally accompany unit size progression, mode progression or content progression.

1.8.3.4. Variations in the Content of Practice

It is sometimes possible to facilitate learning of a criterion behaviour if the criterion practice is preceded by practice which represents a deliberate and systematic deviation from it.

(1) Practice of Altered Versions of the Criterion Behaviour

- (a) an exaggeration or distortion of either criterion stimuli or criterion response.
- (b) an incorrect version of either criterion stimulus with criterion response, e.g. pairing correct and incorrect versions of criterion behaviour - the ability to feel the difference between the two criterion practices can provide suitable feedback to the student.

- (2) Practice of criterion components in a non criterion sequence, e.g. the backward chaining approach.
 - (3) Practice of Behaviour different from the Criterion Behaviour:
 - (a) critiquing of a completed sequence
 - (b) principles/procedures (e.g. teaching electronic principles to maintenance personnel)
 - (c) role playing to achieve another point of view/criterion
- (Gropper, 1974).

1.8.3.3. Variations in Frequency and Variety of Practice

1. Repetition and review:

Review may be used as a strategy during the learning experience to ensure retention; and repetition can be used to ensure acquisition.

2. Varied examples:

The transfer of behaviour is a learning requirement which strategies must promote. A widely agreed upon progression to achieve this type of goal is to ensure that the learner practices with a variety of examples prior to criterion practice or criterion testing.

Excessive repetition and variation should be avoided and added only if needed as instruction develops in progress. In the case of mediated sequences the use of repetition, review and varied examples must be pre-tested to ascertain its appropriateness.

Strategy formulation in terms of appropriate learning conditions, sequencing and preparatory progressions precede the design of appropriate learning experiences. They must therefore be determined before the selections of methods and media can be made.

1.9. Selection of Methods

The selection of methods constitutes the first step in fulfilling the function of providing the learning experiences required for the attainment of the stated objectives. It involves careful consideration of the design and management of the learning environment. This requires analyzing and synthesizing previous decisions determined by the formulation of objectives and inherent learning tasks; the formulated strategies in terms of required conditions of learning, sequencing and preparatory progression requirements; the analysis of learner characteristics, as well as consideration of practical constraints.

There are no established procedures for the selection of methods. This process must be based on logical analysis and decisions that match the requirements of conditions needed to present the proper stimulus and to further perform other instructional functions. The functions are necessitated by the events of instruction involved in the teaching of a given learning task. These events as listed by Gagné (1965) include:

1. Gaining and controlling attention
2. Informing the learner of expected outcomes
3. Stimulating recall of relevant prerequisite capabilities
4. Presenting the stimulus inherent to the learning task
5. Offering guidance for learning (by a variety of cues)
6. Providing feedback
7. Appraising performance
8. Making provisions for transferability
9. Insuring retention

In a given learning task, these events progress parallel to the phases of the learning act. Each of these external events of instruction

influences one or more of the internal processes of learning (Figure 12).

LEARNING PHASE

INSTRUCTIONAL EVENTS

Motivational Phase

EXPECTANCY

1. Activating motivation
2. Informing learner of the objective

Apprehending Phase

ATTENTION
SELECTIVE
PERCEPTION

3. Directing attention

Acquisition Phase

CODING; STORAGE
ENTRY

4. Stimulating recall
5. Providing learning guidance

Retention Phase

MEMORY
STORAGE

Recall Phase

RETRIEVAL

6. Enhancing retention

Generalization Phase

TRANSFER

7. Promoting transfer of learning

Performance Phase

RESPONDING

8. Eliciting performance; providing feedback

Feedback Phase

REINFORCEMENT

FIGURE 12: RELATION OF THE PHASES OF LEARNING TO INSTRUCTIONAL EVENTS

Source: Gagné, 1975, Page 119.

This relationship is important to remember in planning learning experiences. Depending on the kind of interaction required during the process of instruction, there are several methods from which a selection can be made:

Basic Methods

1. Demonstration
2. Lecture
3. Conference
4. Performance by the learner
5. Programmed instruction
6. Study Assignment
7. Tutoring
8. Laboratory sessions
9. Recitation
10. Homework: including self-instruction; practice in a variety of previously learned rules; and projects
11. Discussion

Special Participative Methods

1. Role-playing
2. Case study
3. Games, models and simulation
4. Brainstorming
5. Field trips
6. Panels
7. Group interviews

(Tracy, 1971; Gagné, 1965; Gerlach and Ely 1971).

These methods may be used alone or in combination to accomplish a given learning task. In consideration for use, there are three categories of methods:

1. Primary: a method which is objectively judged to be the most effective and efficient means of attaining an instructional objective.
2. Supporting: a method which is objectively judged to be an essential complement to a primary method - i.e. it must be used in conjunction with the primary method to ensure attainment of an instructional objective.
3. Alternative: a method which may be used as a substitute for the primary or supporting method when circumstances do not permit the use of the optimum method. (Tracy, 1971).

Along with the choice of methods, consideration should be given to the choice of instructional techniques which complement a method; for example questioning, handling student responses and using visual and auditory aids (Tracy, 1971). The events of instruction represent what a teacher may do either in face-to-face interaction, or with an instructional medium, to bring about the necessary learning and help students toward the attainment of desired outcomes. In cases where the choice of method for any of these events requires a vicarious or sensory experience in addition to human interaction, the use of media may be considered.

1.10. Media Selection

If educational television is to be an integral part of the instructional system, its consideration for use is part of the final stage of planning: media selection. Media selection is influenced by several factors resulting from decisions in previous stages of planning. The selection of television is not made in isolation. Rather, it becomes part of the selection from alternatives to meet instructional requirements. Its selection is based on the function it is to serve, and is closely co-ordinated with other instructional system components.

1.10.1. Consideration of the Learning Task

An important consideration in media selection is the learning task to be accomplished. This takes into account the fact that educational objectives consist of different kinds of learning. The different kinds of learning are facilitated by different sets of conditions. These conditions as previously indicated are made possible by the manipulation

of learning events. These events in turn are made possible by providing appropriate stimuli. The sensory mode to be stimulated and the detailed characteristics of the needed stimuli together are considered in order to select learning experiences, including media, to be employed in presenting the stimuli (Briggs, 1967).

Along with the type of learning involved, consideration of the learning task also takes into account the instructional strategy decisions regarding practice, response, transfer and feedback requirements. The type of methods selected to fulfill the instructional events will also influence media choice.

1.10.2. Consideration of Media Characteristics

When the learning task stimulus, practice, response, transfer and feedback requirements have been formulated, the essential media characteristics are then considered. This involves examining media capabilities in terms of sensory experience (audio, visual, audio-visual or kinaesthetic) for stimulus and/or response, plus strategy requirements for practice, transfer and feedback.

Optional media characteristics which improve quality of presentation may also be considered. These as listed by Romizowski (1974) include:

- a) choosing media which are attractive to the learner (e.g. use of colour, dramatization, animation, illustration etc.,)
- b) choosing media for a particular application where there is some evidence from previous research that marginal improvements in learning efficiency will result
- c) choosing media which fit teaching skills, habits and preferences

The optional media characteristics should be considered in media selection only when they influence learning in terms of clarity of message as dictated by the nature of the learning task or indicated by conclusive results of experiments.

There are other "media characteristic" considerations which determine their utility and need to be taken into account during media selection. These include:

1. The fixative property: recording, reproduction and play-back capacity
2. The manipulative property: transformation of an event, for example, speed up (time-lapse); slowed down (slow motion); arresting action (e.g. in-still photography); reversal (as in film run backwards); provision for editing.
3. Distributive property: capacity to transport an event through space (for example by transmission via radio waves) (Gerlach and Ely, 1971).

1.10.3. Consideration of Student Characteristics

Student characteristics are an important factor in influencing media selection. These characteristics as outlined, in population analysis (Section 1.4.) should be considered carefully in selecting media. All the characteristics have direct bearing on the clarity and effectiveness of the mediated message. In addition, consideration should be given to whether student use of media is likely to be on an individual basis or as part of a small or large group (Romizowski, 1974; Kemp, 1975).

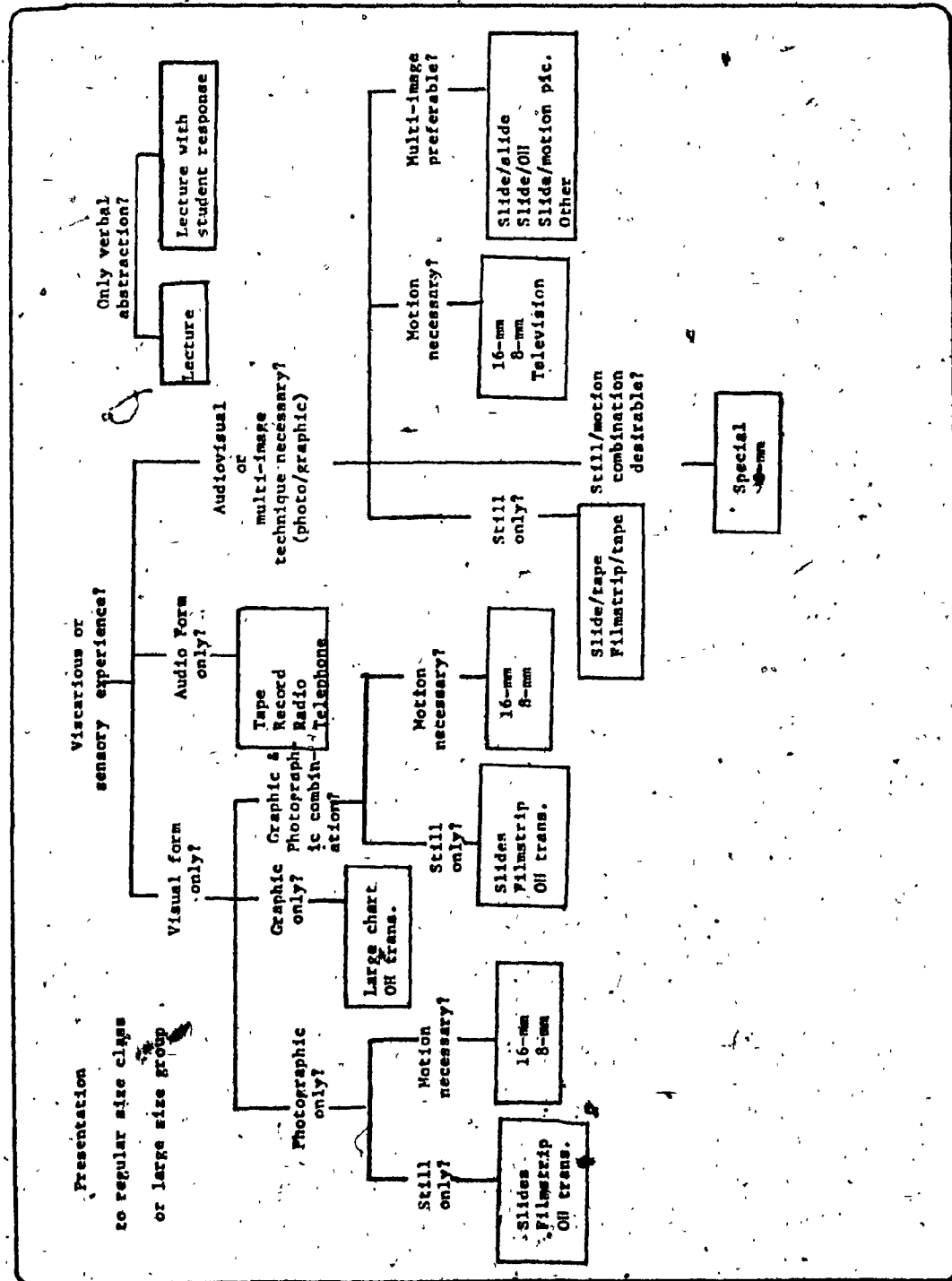


Figure 13: Media Selection for Large groups.

Source: Kern, 1975 page 49

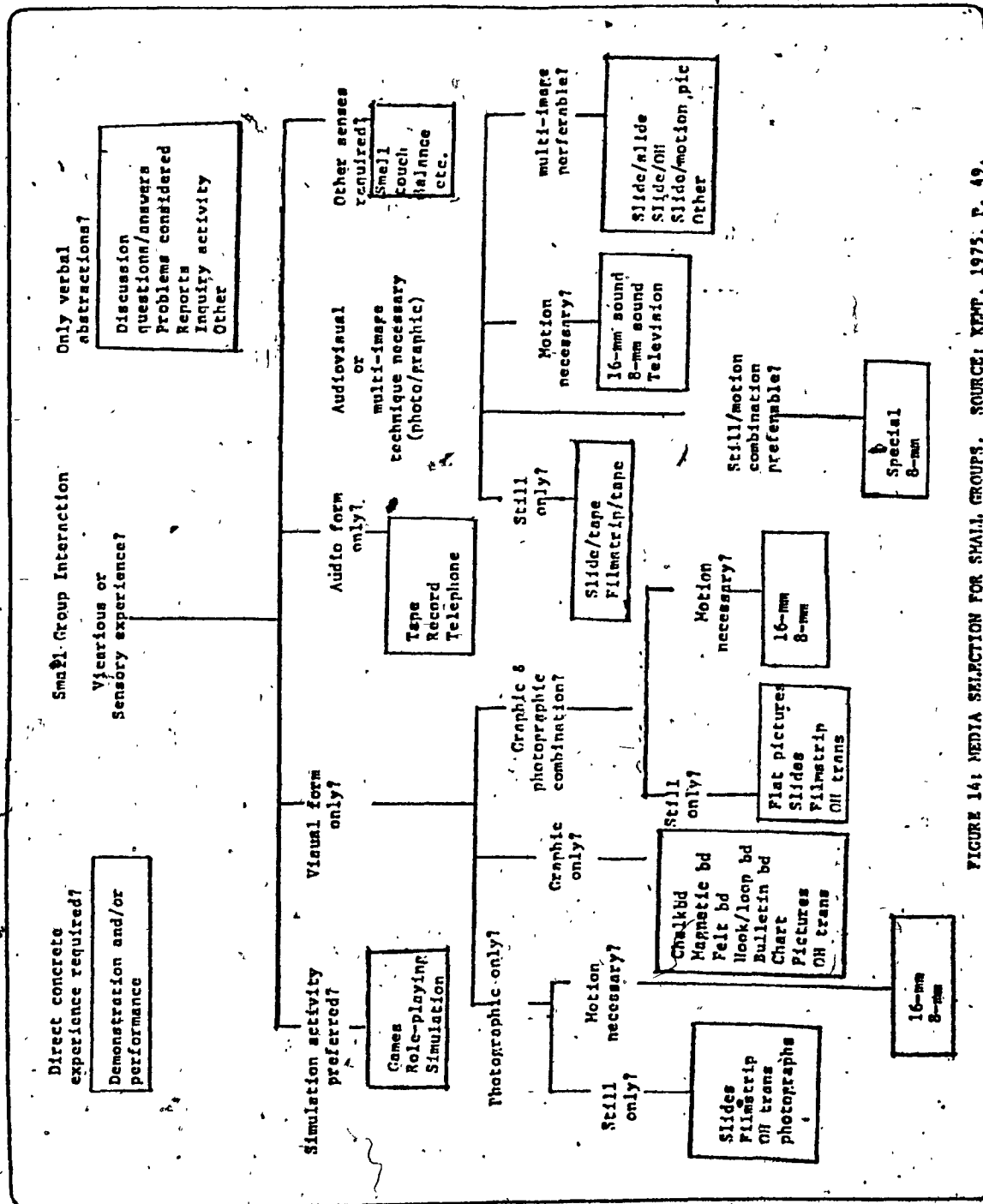


FIGURE 14: MEDIA SELECTION FOR SMALL GROUPS. SOURCE: KEMP, 1975, P. 49.

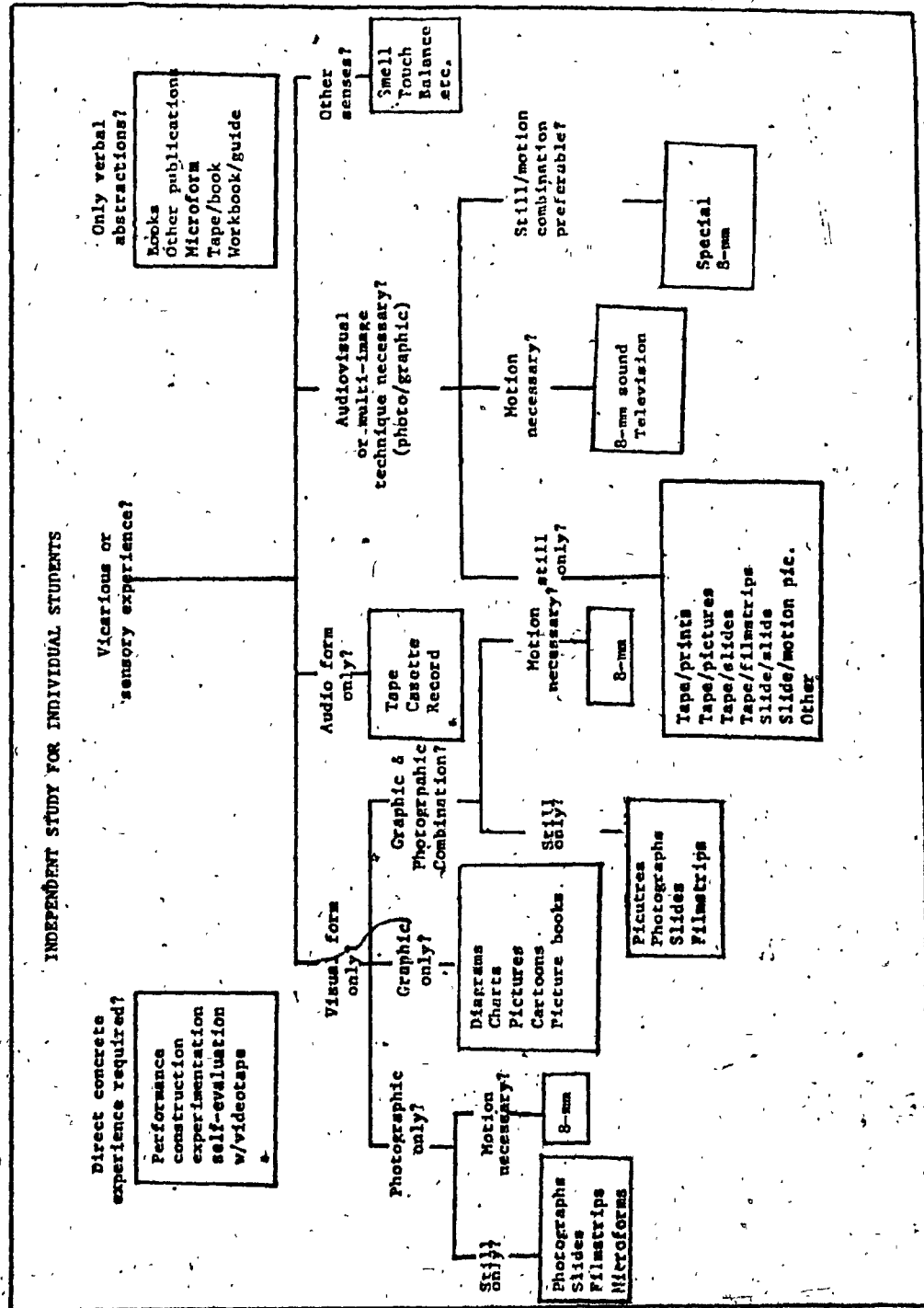


Figure 15: Media Selection for Individual Study.

Source: Kemp 1975, Page 49.

The examination of the learning task, media characteristics and student characteristics constitute the basic considerations in media selection (Kemp, 1975) for individual or varied group size usage: Figures 13, 14, 15.

1.10.4. Consideration of Constraints

The acceptable media options as determined by results from the basic selection must also be considered in terms of existent constraints. Consideration is first given to whether the media selected are available to the learner. Those that are not should be eliminated from consideration and available alternatives should be selected in their place. The choice of media should also be reviewed in terms of such practical matters as how many tasks requiring the same set of learning conditions can be sequenced in a row to provide a sufficient period of use of a given medium to make it economical to produce the materials. This consideration will be influenced by strategy decisions relating to necessary and facilitative sequences. It will also be influenced by preparatory progression considerations in relation to media flexibility; for example, the ease with which we can alternate between presentation of stimuli and required student response, and feedback. Consideration should further be given to the best trade off in respect to effective stimulus display, convenience in changing from medium to medium, and economy in terms of the size of unit in which each sequence is to be prepared in the given media (Briggs, Gagné and May, 1967).

Cost constraints will need to be determined in terms of financial, human and technical resources of a given combination of media, measured against the resources available to the instructional system as a whole.

1.10.5. Consideration of Educational Television

Television, like all media, has a number of advantages and limitations as an educational tool. It can serve not only as a medium in its own right, with capacity to represent reality visually and orally, but also as a carrier medium for other visual form media, with or without sound. This gives it an immense capacity for stimulus presentation. Its distributive power gives it the potential to serve as a learning resource for widely dispersed instructional centres. Of particular value in this respect is television's capacity to mediate inaccessible material. It can also translate undesirable material required by learning experiences but which maybe potentially dangerous, offensive, fragile or expensive. It may further be used to display unavailable material such as special demonstrations required for particular learning tasks. In its capacity to display real and imaginary sequences of events, television can enormously extend the range of stimulus situations that can be brought into the learning centre.

Television can be used as part of highly interactive instructional methods, for example, for presenting problem situations whose solutions are not shown, but which are to be the subject of later class discussion. Its motion picture capacity may also provide prompting needed to learn chains and procedures (Gagné, 1975). It may also communicate to the learner the kinds of terminal performance expected, for example in the case of complex motor skills. Its presentation of sequences of pictures may also be used to provide feedback in certain instances (Gagné, 1975). The presentation of unfolding sequences of events makes television viewing an activity which is inherently motivating for both children and adults. While these motivational features of television programmes are

widely acknowledged, television has other characteristics that should be considered pertaining to its use in instruction.

The motion and abrupt changes possible in television programmes can be of particular use in gaining and controlling attention in the apprehending phase of learning (Gagné, 1975). Depending on the characteristics of the learners involved, this capacity may be used to present brief scenes, with varied content and many abrupt changes, such as is done in "Sesame Street," to capture and hold the attention of young children. The same may be done for older learners with less frequency of abrupt changes.

Television programmes can also perform coding functions effectively. With the capacity to represent actual objects of variety, it can convey new concepts in concrete form. This can be done through various still and animated pictorial forms, and also depicted with versatility in action sequences of real or dramatized events, thus providing systems for the coding of concepts and rules that are to be learned (Gagné, 1975). This capacity is exploited for example in "Sesame Street" programmes to teach concepts such as cooperation; or as Lewis (1972) points out, it is exploited in a number of Open University science courses to provide concrete illustrations that can facilitate the coding process in learning abstract concepts.

Television presentation can also facilitate the learning of organized information, by providing a meaningful context to which the learner can relate new information. This can be accomplished through pictorial presentations of a variety of events using actual objects, diagrams and action in a relatively short period, and thus save the learner time in gaining a context for newly acquired information.

In the learning of attitudes, television can contribute to the coding function through the presentation of human models, such as heroes and heroines of dramatic programmes, historical personalities; political or sports figures, presented in realistic form. The model can be seen making choices of personal action that is to be emulated by the learner (Gagné, 1975). With its visual and audio capacities, television can meet a variety of functions of instruction. It, however, has certain inherent limitations as a medium. One of the major weaknesses lies in its inability to require performance of the learner and to respond to this performance with feedback. This limitation can make watching educational television a passive kind of activity, unless its use is carefully planned to elicit active participation, or integrated with other interactive and object media, or interactive methods which can make up for this limitation. Programmes like "Sesame Street" and "Readalong" (from Ontario Educational Communications Authority), attempt to overcome this by encouraging the viewing children to "talk back" to the screen. With older learners this may be accomplished by the use of printed materials to respond to questions or problems presented on the television screen. An example of this is the use of tele-tests at the end of each unit of instruction in El Salvador (Hornik, 1972; Ingle, 1973).

The cost of using television also presents a major constraint in its choice as a medium. Production costs range from 593 dollars in Chicago Television College, to 1200-2000 dollars for NHK (Japan), El Salvador and American Samoa; and go as high as 8,700 dollars for the German Tellekolleg and 20,000 dollars for the British Open University (Schramm, 1973)*. Even with this great disparity in production costs,

*Figures given refer to costs per programme hour.

the cost of television figured on simple capital and operating expenditures is estimated to be generally five times the cost for radio (Schramm, 1973). These immense costs should, however, be considered against the cost of providing other resources that can accomplish the functions being fulfilled by television. Radio, although cheaper in cost, is greatly limited for the presentation of material other than those requiring only audio stimulus. Operating costs should also take into consideration the size of audience and what it would cost to provide similar instruction by training enough teachers and providing each school or learning centre with all the the material available through television. Generally the cost per student where television has been used for example in American Samoa, the Open University and Japan has been found to be only a fraction of what it would cost to accomplish similar instruction through conventional means (Schramm, 1973; Nishimoto, 1969; Hawkridge, 1973). Nevertheless, the cost of providing learning experiences through television is a factor that must be carefully considered against the cost of providing similar experiences by other means available to the instructional system.

Once the capacities and limitations of television have been considered, and if it has been selected to serve particular functions in the instructional system, specifications may then be prepared to serve as guidelines in the production of the required programmes. Because of its advantages and limitations, the use of educational television must be part of the overall instructional system planning and development. Its use must be carefully planned and integrated with other instructional components. A process of planning such as that elaborated in this study becomes essential if cooperative instructional systems are to develop with television considered and used to serve clearly defined functions, that relate to

educational goals and thus serve identifiable needs. Before this kind of system can become operational, we must ascertain that the planning functions that have been discussed have been carried out so that there is an identifiable mission of which the educational television system is to become an efficient and effective component.

CHAPTER TWO
THE ETV PRODUCTION PROCESS

2.0. INTRODUCTION

The educational planning process culminates in the design and production of suitable learning experiences and materials. When television is selected to mediate specified learning experiences that are not already available, a rather complex set of programme production activities must follow in order to provide the required experiences. The effectiveness of produced programmes is the determinant of the entire educational television project. The educational intentions of the programmes must be therefore clearly defined so that more conscious use can be made of the available means in order to achieve the desired effects.

In addition to other important factors of programming considerations, two elements must be kept in the forefront during production: 1) the pedagogic elements which will distinguish the educational features of the programme from general broadcasting; 2) the innovation, or the new dimension which will be brought by the programme into the educational process, in relation to the traditional instructional approach (Waniewicz, 1972). Educational television programme production therefore requires what Allan (1975) refers to as an appropriate balance between the disciplined specifications and requirements of learning, and the creative production process.

Programme production entails a network of activities which maybe categorized in five main stages: specification, production planning, preparation, studio production and transmission or recording.

2.1. Specification

Educational television production like other creative processes, is largely an individual affair. However, if the programme is to remain part of a coherent instructional design, certain checks are necessary. The function of clarifying the mission of the production process and its sub-phases is accomplished through production specification. This provides a focus for all the creative activities involved in programme production.

2.1.1. Specification of Educational Purpose

It is important that the educational purpose to be served by the programme(s) remains the centre focus for all production activities. To ensure this, the objectives to be met, plus the accompanying subject-matter must be detailed during programme specification. Where applicable these should then be broken down into a number of sequential programme units. The function of the programmes within the instructional system must be specified. Landgren (1972) points out for example, that the Swedish instructional television set up, draws its functional guidelines from principles set forth for practical everyday work of the school's curriculum of Sweden. These include, motivation, activity, concretization, individualization and cooperation; and the instructional television production is guided by the first three. The aim is for the programme to help teachers and pupils put one or more of these fundamental principles into practice, while the ancillary materials and follow up work fulfill the function of individualization and cooperation. These functions are specified for, and guide any given programme.

Meed (1976) also lists a number of functions that are normally specified for the use of broadcasts in the Open University, including:

- to reinforce what has gone before
- to develop an aspect of the text
- to enrich study
- a critical look at the text in form of talks or discussion
- to integrate course material - either to bring together two intellectual approaches or occasionally more global looking back over a section of the course and drawing out the main points
- to illustrate or demonstrate - e.g. case studies or drawing upon existing research in other ways, or present eminent people and decision makers
- assisting students with tasks

Bates and Purgh (1975) state that the function of television and other media can be specified both at the macro- and micro- level. For example in a second-level course in biochemistry at the Open University, the function of television at a macro-level is to demonstrate practical techniques while correspondence texts teach bio-chemical theory. Such a decision at the course level then results in more specific detailing of the purpose of production process which operates at the unit or block level, where the objectives of the unit are considered together with the media available. Bates and Purgh (1975) further point out other functions for which television has been found to be useful: demonstrating applications of theory or principles to the real world situation, to stimulate students to analyze situations, for presenting 'models', or analogies of abstract principles, for demonstrating experimental design, methods and equipment, and so forth. It has been found inefficient to use television merely to present a lecture, which function can usually be carried out efficiently through print.

An ingenious use of television clearly specified from the beginning of the operation of the project was that effected in Niger. Television was assigned the function of providing a context for language instruction

through the presentation of dramatized shows. The shows proved highly effective while the project was in operation (Egley, 1972; Schramm, 1973). The specification of the educational purpose in terms of objectives and function is therefore an important determinant of the success of the ETV production effort.

2.1.2. Specification of Audience and Level

Equally as important as the educational purpose is the specification of the audience and level of programming. The audience should be specified not only in terms of academic standard, but as much relevant detail as possible gathered from the population analysis (See Section 1.4.) should be specified. The level of programming in terms of adult, children's, or various school levels should be indicated. This will guide the production process by indicating the particular need of the audience for whom the programme is meant. The planning of "Sesame Street" is one good example of how audience specification was clearly indicated in terms of age, socio-economic background, learner needs, social environment, communication skills, initial competency, motivation, attention span and so forth (Polsky, 1974; Lesser, 1972). These were and are relevant learner characteristics to which the production process of "Sesame Street" continues to be geared.

The specified audience will have bearing on the treatment given to the programme topic. The audience is the determinant of the rate at which the topic is developed, the vocabulary level for dialogue and captions, the number of examples used, the kinds of involvement and degree of participation of the learner and similar matters (Kemp, 1975). The audience must be explicitly described so that their needs and demands

are met. Those involved in the production process must be in a position to reasonably well define those demands to avoid mismatches, and present the material in such a way that the audience will feel is something that concerns them (Lundgren, 1972).

2.1.3. Relation to Other Media and Agents

By proceeding from the specification of objectives, various media can be used in those areas where they are likely to be most effective. A rationale for their use, and therefore the integrating points of the course, can be discerned. This integration should be detailed during programme specification along three main dimensions;

- a) the components to which they relate
- b) the closeness of this relation
- c) the manner of this relationship, i.e.-
the role the programmes play in the
context of the learners' other instructional
activities (Meed, 1976).

We have seen for example, the case of the Swedish ITV where the relationship of television to other components is very close. While the programmes provide motivation, activity and concretization, pupils printed material and follow up work provide individualization and co-operation, thus completing the whole cycle of activity guidelines for Swedish schools. In other cases such as Ivory Coast and El Salvador the specification goes beyond relationship of only materials, and entails detailing of the relationship of programmes to other educational agents such as teachers (Ingle, 1973; Morser, 1973). In the case of Niger, the supportive role of monitors at the receiving end was

delineated and the programmes produced were shows that could stimulate the children to activity with practice that needed only monitoring (Egley, 1972). The Open University media integration is carried out early in the course production process, by the course team. By the time programme production starts, its relation to the correspondence text and other homestudy materials is usually already elaborated (Lewis, 1972).

Educational television relationship to other media must therefore be specified, so that the production process is orchestrated with the preparation of other materials and agents in the instructional system. Television's limitation for interactive instruction makes this imperative, since the programmes that are produced will need to be co-ordinated with follow-up activities. In particular, ancillary materials that help with preparation for the programme and also accomodate active practice following viewing must be closely connected with the programme production stage as the material should be based on actual shape and format of the programme and on the approaches applied in it.

2.1.4. Specification of Mode of Transmission Frequency

Matters relating to transmission or distribution of the programmes should also be specified. If the programme is to go out for example by open circuit where only one or two transmissions of the same programme are possible, or on a closed circuit system where more frequent transmission is possible so that learners may see the programme more than once if desirable, the approach in production maybe influenced. More significantly however, if the technology is available and programmes are to be distributed by tape to be used by the learners or controlled

by the teachers at the receiving end, the production may be done in such a manner as to allow for active practice to be interspersed with the programme.

The frequency must be specified not only in terms of programme repeats, but in terms of programmes to be transmitted per week, per month or per year in a given series. This will definitely influence the production activity in terms of what can be attempted under the time constraints imposed by this requirement.

2.1.5. Specification of Programme Budget and Standards

Financial resources available for production must be specified. This would include for example specification of whether the production team is to be responsible for only direct costs or if they are to be accountable for indirect costs as well, and how much is allocated for each programme. The programme budget will have an influence on the sort of resources the production process can avail itself of. In the Open University where as much as 8,000 pounds (20,000 dollars) are budgeted for every hour of programming (Schramm, 1973), a wide range of resource material including specially shot overseas film can frequently be incorporated in production. On the other hand a service like Chicago Television College with 593 dollars budgeted for each hour of programming (Schramm, 1973), only inexpensive locally available materials can frequently be used.

Closely related to budgeting specifications, will be the specification of production standards expected. The budget of the Open University programming is reflected in the broadcast standards which have been established. Whatever the case, the programme standards

must be part of the specification brief, if they are not already established and understood. The production effort can then be geared toward attaining the kinds of standards specified. These standards, in any case should not be such that they interfere with the clarity of the message being communicated.

The specification brief provides a guideline for the production effort, and should in addition to the matters discussed above indicate any other requirements relevant to the programming effort concerned.

If a multi-media approach is in force the programme specification should be drafted by representatives of all the concerned media-producing agencies, to ensure complete co-ordination. The demand for fine detailing during specification in systems approaches is much greater than might be the case for an individual medium (Hancock, 1971).

At this stage, those responsible for programme production will have a good idea of what the series will involve, of its relationship to the educational curriculum as a whole, and of the range of resources at their disposal. Once this general brief has been provided, it is left in the hands of the production group to implement it as creatively as possible within bounds of the given guidelines.

2.2. Production Planning

The elaboration of the specification stage must be translated into operational programme production guidelines. This is accomplished through the process of production planning. At this stage the design of the overall format for each series must be effected: the contents of individual programmes must be laid out precisely, their objectives spelled out, utilization patterns developed and the contribution of ancillary media crystallised. Consultation with other media producing agencies is

still essential at this stage to ensure co-ordination of units developed for each stage of utilization.

2.2.1. Production Research

The first step in production planning is research. This is research in the sense referred to by Mielke (1974) as "decision oriented" research. This is carried out to provide the production group with information on how precisely to effect programme specifications. Community and other resources must be explored to determine exactly how they may be incorporated into the production process. Where new techniques are being considered for production, research may need to be carried out to establish their effectiveness, before further production decisions can be made. This has been done with programmes like "Sesame Street" and the "Readalong" programme of the Ontario Educational Communications Authority. The "Readalong" programme which uses sophisticated techniques to teach young children how to read was preceded by extensive research on ocular movements over the television screen before decisions about production techniques were finalised (Personal Notes, Obtained during visit to OECA, Summer, 1976).

Research should also involve exploration for techniques that have been found effective with similar groups, for similar learned outcomes.

An important aspect of such research is to get information that clarifies the subject matter related to the objectives to be covered, so that it is presented as explicitly, simply and lucidly as necessary for the audience involved. In Ivory Coast for example, there is constant give and take between television production and the Applied Linguistic Department of the Abidjan University. The University provides

fundamental information regarding French Language instruction in relation to the sound systems of the two local languages spoken by the majority - Baoulé and Bambara. The difficulties encountered in transition from mother tongue to French are catalogued and made available for production reference for the Educational Television System (Grant, 1974).

Programme input remains the main focus of attention during research at this stage. Basic and applied research relating to the effectiveness of television production variables including presentation/technical variables, content/subject matter organization and performer characteristics (Coldevin, 1976, 1977); or those relating to the incorporation of applicable research on instructional strategy requirements such as practice, repetition and redundancy in television programmes (Coldevin, 1975) should be consulted where relevant at this stage of production. It is apparent that with the exception of a few programmes like "Sesame Street" and "Readalong", television production has not generally taken into account such relevant basic and applied research findings. As a result it has been alleged that television producers "keep reinventing the wheel" (AMTEC Conference, 1976). Basic production research findings need to be incorporated into production in a manner similar to the incorporation of scientific research findings into applied fields like medicine and engineering. The research stage of production planning can provide one avenue for making possible the incorporation of these findings into production. In this respect the Research Unit of the new Mass Media Services in Kenya (Teachers' Service Commission, 1977) needs to direct some effort into making the relevant basic and applied production research findings available for production reference.

Some important considerations to keep in mind regarding good programming have been outlined by Lundgren (1972): It must be borne in mind that television is at its best when it presents unique material, and/or presents well-known material in unique forms. Production planning research should therefore be directed at trying to explore possibilities of how material might be presented in forms that are typical of the medium and different from the forms in which subject matter is otherwise presented to learners. Lundgren further indicates that one of the advantages of television is that it can take learners out of the classroom and bring society and the outside world into the classroom, thus forming as many links as possible between the work of the classroom and life outside. Production planning research should thus be directed at exploring how to make use of the unique possibilities of the medium in this respect, in order to provide students with experiences that they would not otherwise get, using presentation forms that they do not otherwise meet. Research should provide information on how to make use of the variety possible in the medium to repeat something different ways and to provide concretization by linking up the situation presented with the experiences of the audience. Research should be directed at how subject matter that would otherwise be very theoretical can be made concrete through presentations where learners meet people and milieus that are unknown to them. Task analysis is one good reference point for some of this production planning research.

2.2.2. Planning Production Strategies

At this stage of programming, critical decisions have to be made regarding the production strategies to be used to achieve the objectives specified for the programme. Precise kinds of sequences have to be developed which not only answer the specifications provided, but also take into account financial and logistical limitations, in view of results obtained at the production research stage. Taking everything into account, decisions must be made about the most effective and efficient combination of strategies to be employed. There is a wide range of production strategies which maybe considered depending on the learning task involved. These include:

- a) dramatized studio sequences
- b) demonstration (studio) sequences
- c) narration over
 - (i) graphic visual sequences
 - (ii) filmed visual sequences
 - (iii) mimed studio sequences
- d) illustrated lecture
- e) studio interview
- f) live action filmed sequences
- g) animated film sequences
- h) studio discussion
- i) studio sequences using puppets
- j) on location filmed interview sequences
- k) filmed or studio case study sequences

Consideration should also be given to the question of the programme approach in terms of whether it is to be a problem solving or expository one.

Whatever the approach and strategy chosen the main concern must be with the learning task and with the target audience. Care should be taken to avoid becoming too performer and content centered as in general television. The strategies should be selected keeping in mind what happens at the receiving end. Excessive showmanship or too stiff and formal presentation may introduce production noise that may interfere with

learning effectiveness (Bretz, 1971; Lundgren, 1972).

Strategy considerations will also involve decisions on the choice of presenter: whether there is to be one at all, or voice over. If there is to be a presenter, the choice of person should be carefully considered, particularly in terms of personality, communication skills and knowledge of the programme content (Lundgren, 1972; Coldevin, 1977). Other strategy decisions such as the amount and spacing of repetition and review, and the format it is to take will need to be considered, in conjunction with the overall instructional strategy decisions made during the Planning Process (See Section 1.8; Tyler, 1973).

Simplicity of presentation, clear organization of material and motivation of learners are important considerations in the selection of production strategies (Chū and Schramm, 1967). This fact is illustrated by successful projects. Both Niger and Ivory Coast have made use of simple, well organized, dramatized sequences. These have been inherently motivational in presenting a context for language learning which drew from scenes familiar to the children and kept them engaged during the shows. They have gone further in integrating these with skits which provide practice at the receiving end, together with feedback from teachers in Ivory Coast and monitors in Niger (Morser, 1973; Grant, 1974; Egly, 1972). "Sesame Street" which has also proved engaging and successful with young children (Ball and Bogartz, 1971), maintains simplicity in presentation by the use of four basic categories of presentation strategies:

1. Live action and dramatized studio sequences
2. Muppet sequences
3. Animation sequences
4. Live action filmed sequences

These are well organized and clearly presented in a one hour fast paced package, backed by music or background narration where applicable (Feinstein, 1971).

The choice of production strategy is an important aspect of the planning stage, and one that should be carefully considered as much of the success of the production effort hinges on how effectively the strategy selected accomplishes the specified purpose.

2.2.3. Programme Outline

The programme outline is a means of bringing together the production plan in a coherent manner and of indicating to all involved in the production process what means and methods are to be used to realize the programme's objectives.

The outline is a brief statement of intent which states:

- a) the programme's objectives
- b) the target audience
- c) the duration
- d) the relationship of the programme to other media

(Hancock, 1976).

It also summarizes the programme content in note form, accompanied by suggestions for visualization.

The outline may further be refined by breaking it down into film and studio sequences, to facilitate their separate preparation. From the outline the style and intent of the programme can be gauged. It also helps in assessing the financial and logistical requirements of the programme and is a guideline for various booking and budgeting arrangements that must be made (Hancock, 1971, 1976). The outline should be

circulated to all service departments involved in programme production and to all other interested agents, such as other media producers, so that they have a clear idea of what the final programme is likely to entail, and how it fits into their own production plans (Hancock, 1976). If necessary, modifications to the outline can be made before the final specific preparation begins.

Programme production involves complicated co-ordination that makes absolutely efficient organization necessary. The programme outline is an important document in providing the guideline for such organization. The NHK (Japanese Broadcasting) Education Department (1968) points out that since educational programmes are usually simplistic in comparison to entertainment, it is essential to motivate the engineering staff by getting them as involved as possible in the intent of the programme and the importance of the (more simple) transitional techniques to be employed in consideration of the audience. The NHK Education Department further points out that the technical meetings (which take place in later stages of production) are more effective when basic information available through programme outlines, has been considered and understood by all involved. Sometimes, unexpectedly constructive ideas and hints on production are suggested by the engineering staff during consultations. The NHK Education Department indicates that it is worthwhile to encourage such active participation by all concerned with the programme production. They suggest going further than this in later stages to invite engineering staff to watch school children viewing some programmes which they have helped to produce. This way the engineers become more aware of how technical quality could be improved for reception viewing conditions, even though they may have thought it excellent on studio monitors. This may lead to

improvement of technical techniques for presentation.

Clearly then, the earliest and most continuous possible involvement of all concerned in the production process is of prime importance. The programme outline is particularly instrumental in fostering this kind of involvement.

In addition to the basic outline of production requirements, a schedule of deadlines for the activities to be carried out ought to be attached to the programme outline so that all production activities are well orchestrated. The use of methods such as Programme Evaluation Review Technique (PERT) may be considered for this purpose. PERT could be useful in planning both the overall production process, as well as each of the sub-routines within the process that involves meeting its own deadlines to accomplish the job (Wittich and Schuller, 1973).

2.3. Production Preparation

The programme preparation stage involves a complexity of activities which must be accomplished before the final studio production. This necessitates the development of a network outline, spelling out things that must be done in roughly the right order. The sequencing of activities is derived both as a result of experience and insight into what the job entails. It must be done with care to help those involved in production avoid some of the hidden pitfalls. The activities, products (that result from the activities), people (who perform the activities), and time (over which the activities go on) must be taken into account in an operational situation. Figure 16 outlines the kinds of network activities that maybe entailed in an educational television programme preparation situation.

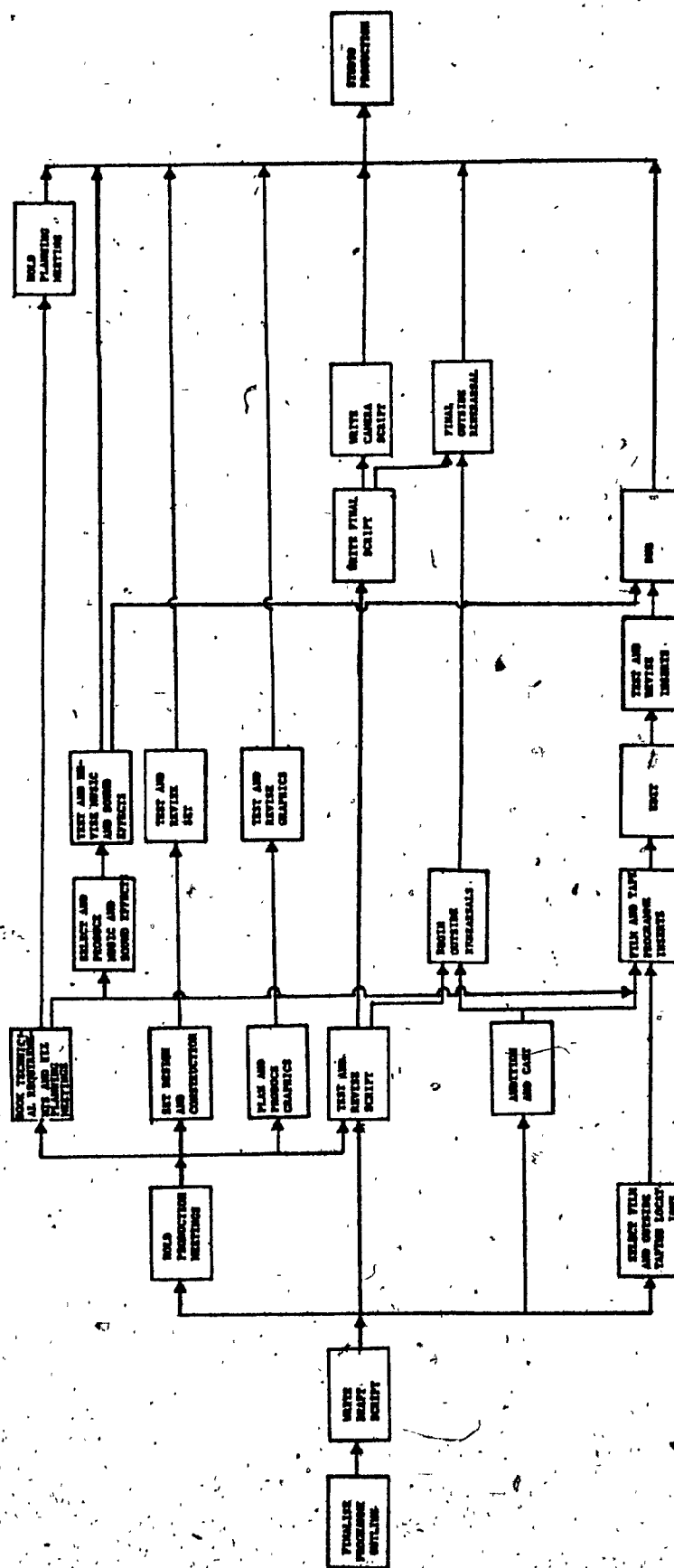


TABLE 14. PRODUCTION REGULATION ACTIVITIES

Most of the activities outlined entail detailed technicalities, which are beyond the scope of the discussion of this study. Only two of the preparatory activities will be briefly discussed: script-writing and developmental testing.

2.3.1. Script-Writing

Script-writing is central to any educational television production. The script develops, reflects and brings together all other strands of activity. It consolidates all visual and aural elements of a programme.

While serving as a blueprint for production the script must also reflect the educational purpose of the programme. It must be written, taking into account the essentials of the learning process and how external events can be ordered in a given learning task to best facilitate this process. This kind of relationship between the learning and influence of external events that must be kept in consideration during script-writing is well illustrated by Gagné (1975) as in Table 2.

Script-writing must thus keep in consideration requirements of effective instructional communication, but imagination and creativity should not be lost in a routine search for didactic accuracy.

In the process of the production preparation stage the script development follows several independent stages:

2.3.1.1. The Draft Script

This is an expansion of the programme outline into a continuous text approximately as long as the final programme. It elaborates as much as is known at this stage of anticipated studio and film sequences. It also attempts to do the following: a) provide a full sense of what the final

Table 2: Process of Learning and the Influence of External Events

LEARNING PHASE	PROCESS	INFLUENCING EXTERNAL EVENTS
Motivation	Expectancy	1. Communicating the goal to be achieved; or 2. Prior confirmation of expectancy through successful experience
Apprehending	Attention; Selective Perception	1. Change in stimulation to activate attention; 2. Prior perceptual learning, or 3. Added differential cues for perception
Acquisition	Coding Storage Entry	Suggested schemes for coding
Retention	Storage	Not known
Recall	Retrieval	1. Suggested schemes for retrieval; 2. Cues for retrieval
Generalization	Transfer	Variety of contexts for retrieval cueing
Performance	Responding	Instances of the performance ("examples")
Feedback	Reinforcement	Informational feedback providing verification or comparison with a standard

Source: Gagné, 1975, p. 45.

programme will contain; b) provide illustration and guidance about what processes and concepts have to be illustrated; c) provide a proper working base for presenters and actors; d) guide other media producers working on related materials (Hancock, 1976; Zettl, 1968; Waniewicz, 1972).

The script narration or dialogue should create a sense of personal and direct contact with the target audience. A conversational, simple tone, in the natural and informal style of the culture of the target audience may be more appropriate in broadcast, than a stiff formally structured lecture. Writing in a manner that shares a problem with the learner will be more effective than preaching at him (Lundgren, 1972). The more the learner is involved the less likely that his attention will wander during presentation. Evoking the dramatic intensity of personal conversation can prove instrumental in this respect. Clarity of ideas and simplicity of words are requirements of effective teaching in any situation and should be reflected in the script of an educational television programme. The script should be tailored to the personal style of the person or people who are to present it (Hancock, 1976; Waniewicz, 1972; Zettl, 1968).

2.3.1.2. The Revised Script

This is a new version of the draft script reflecting external comments and recent production decisions. The revision may be induced by part or all of the script having had to undergo developmental testing with a sample of the target audience. This may be necessary especially with new programme series or with programmes to new audiences whose communication, intellectual and language skills have not previously been succinctly identified. Some of the work done by the Research and Evaluation

Unit of the Ontario Educational Communication Authority is particularly exemplary in this respect.

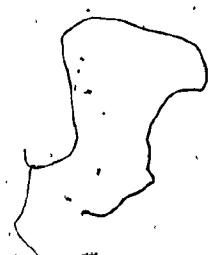
The revised script may include text and commentary of film sequences, a more detailed explanation of graphic animated effects, and incorporate criticisms and suggestions of those who have read the draft version (Hancock, 1976). The revised script may undergo further revision especially if it is found to be still inappropriate when retested with the target audience.

2.3.1.3. The Final Script

Once the snags have been ironed out of the revised script, a final script is prepared. The final script contains a description of what the programme will contain before technical instructions and the minutiae of production organization have been added. This version of the script is used by presenters and other performers during the final outside rehearsal period.

2.3.1.4. The Camera Script

This is the final format and blueprint for performers and technicians once they enter in studio. It includes comprehensive instructions to programme personnel and technicians of what is demanded of them during studio production. This script may be revised after the technical "run-through", before final camera rehearsal.



2.3.2. Developmental (Formative) Testing

One of the most important activities that must be incorporated in the production process is that of developmental testing. Developmental testing involves the evaluation of materials during their stages of formulation and development, in order to obtain both descriptive and judgemental information regarding the worthiness or adequacy of the material. Given the array of components in the educational television programme, developmental testing focuses upon various aspects of the educational programme so that data is provided regarding both anticipated and unanticipated effects of these elements (Lawson, 1974). All the elements of the production preparation stage should ideally undergo developmental testing. The diagnostic information obtained is invaluable as it serves to redefine or improve the various programme components while they are being developed, and is likely to save time and effort of producing an end product with inadequate components.

Developmental testing may be carried out by the production of selected prototype materials which are tested with sample audiences, and modifications made before resources are invested in final production. In addition any of the elements being prepared may be tested for technical adequacy singly. Graphics may for example be tested on-camera in studio during preparation, to ensure that they are clear and that they meet the requirement of being clearly read from distances likely to be existent under utilization conditions. Film sequences can also be tested by showing them to a sample of the audience to ensure that they convey the intended message clearly. Elements like set design must also be tested. If they are incongruent with the programme objectives or distracting, the set and properties will cause noise in the message. They need to be

artistic as well as directed to the main aim of the programme without distraction. To ensure this, the set must undergo developmental testing. This may be done simply by testing it in front of a camera to determine the effect of the set elements; or where time and money permit, a sequence of the intended programme may be produced on the set and tested with the target audience to determine its effect.

Other production elements such as musical background and effects may also need to undergo testing. If the music is unnecessary or too aggressive it may detract attention from the programme. If sound effects used are not understood by the target audience, they may prove equally distracting. All programme elements, including production strategies and the script which it has previously been indicated may require revision, should be considered for developmental testing. This is particularly the case in the development of new programmes, but should by no means be discounted even with established programme series.

Developmental testing can help those involved in production to learn from their inevitable mistakes in a context where they are relatively inexpensive. Creativity may thus be encouraged if those involved are assured that they will have the opportunity to test new creative ideas and insure that the ideas work, before they are displayed publicly. Human and material resources can be saved in the long run if snags are ironed out of the programme material in advance, before the costly processes of final production and distribution or transmission are committed.

Where developmental testing has been applied, as in the case of "Sesame Street" and the "Readalong" programme of the Ontario Educational Communications Authority, the end products have proved highly effective with the target audiences (Ball and Bogatz, 1972; Feinstein, 1971;

OECA, Evaluation Report Readalong Programs, July, 1975). Lewis (1971b) indicates that developmental testing at the Open University is effected during course production, with products of course team members tried out on volunteer students, to reveal defects that stand in need of correction. Developmental testing is therefore an important aspect of the production process. If it is conscientiously and properly applied it can contribute to making programmes more responsive to target audience characteristics and hence more effective.

2.4. Studio Production

Production specification, planning and preparation all culminate in the studio production of the programme. At this stage all components that have been planned and prepared are brought together into an integrated programme. Generally, studio production complies with standard operational requirements for any television programme. A certain order of activities must be accomplished as indicated in Figure 17.

While the studio production also adheres to the basic precepts of visualization and picturization, the educational purpose and target audience need to remain central considerations in all decisions made. Extra caution should be exercised to avoid becoming performer centered in visualization, at the expense of learning effectiveness. Objects should be presented in such a manner that they are easily identified by the audience, and also in clear connection, or from the point of view of the intended learning outcomes. Distracting backgrounds in shots of objects being presented will detract attention and affect learning effectiveness. Coombes and Tiffin (1971) suggest the use of the "cross-shooting" technique to avoid getting presenters as distracting backgrounds

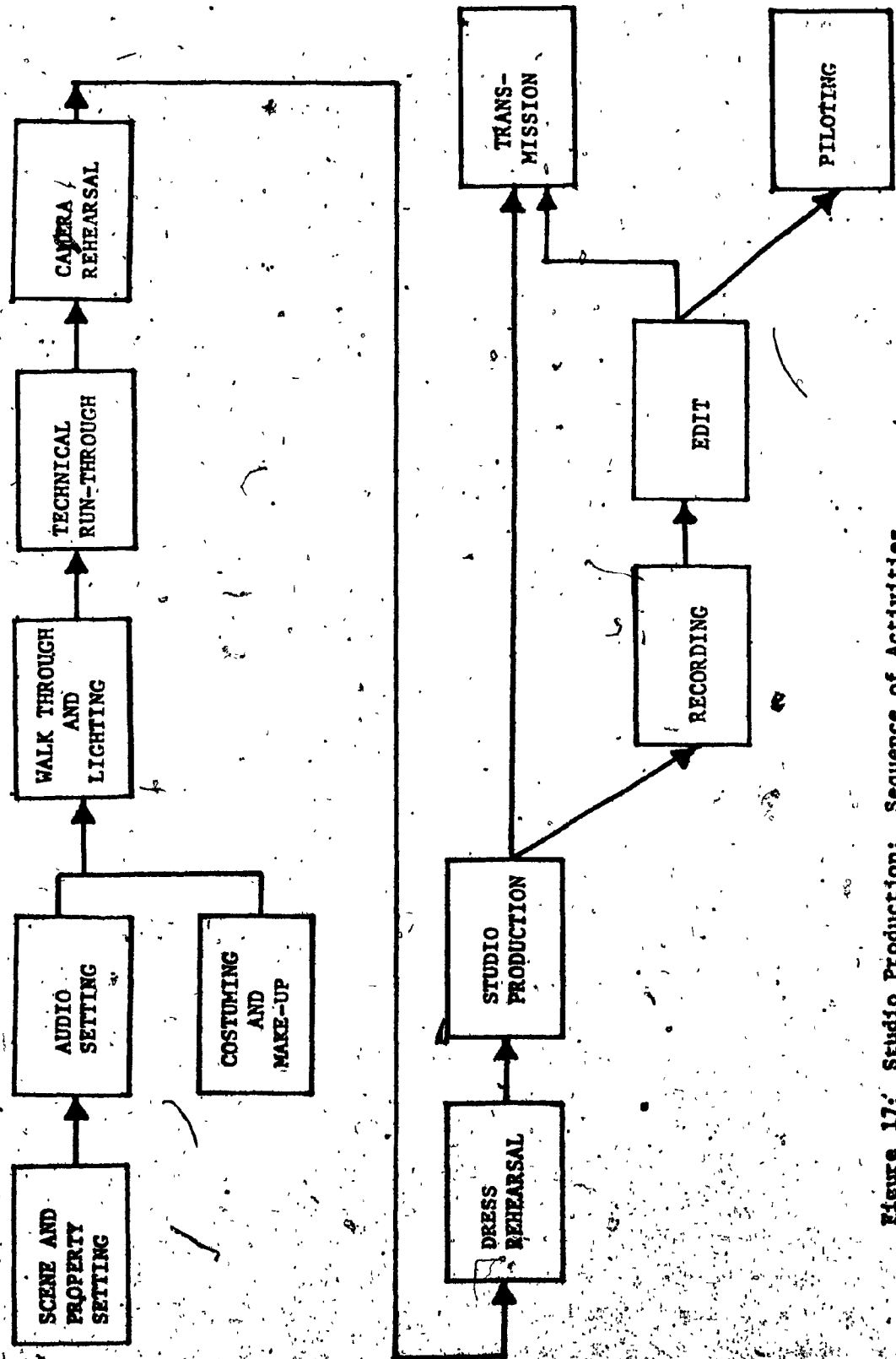


Figure 17: Studio Production: Sequence of Activities

in demonstrations. Duck and Baggle (1975) also caution about the use of techniques such as edited cutaways that are likely to influence viewer attitudes regarding programme participants, unintentionally. Again Duck and Baggle (1975 b) indicate the importance of picturization techniques that often take the place of non-verbal communication in conveying impressions about programme participants, and their credibility in communicating the information presented. The lack of well established presenter credibility may create noise that interferes with programme effectiveness. The possible sources of bias should be identified, so that the range of options available can be used to control them.

Another important consideration during studio production is the need for someone to monitor programme output during rehearsal and recording, so that didactic errors are spotted and corrected. If this is not done, Coombes and Tiffin (1971) point out that the unnoticed didactic errors can cause a lot of harm, as they invalidate the worth of the programme in the view of the users. To avoid this, it may be necessary to have both producer and director for each programme, so that the producer may be left free to observe objectively during studio production. Where this is not possible, enough time should be devoted to rehearsal in studio, so that there are at least two rehearsals before the final recording is made. With each rehearsal, the programme will normally become more fluent and more identifiable as a whole, so that the director will be able, as the rehearsal progresses, to detach himself more from the mechanical operation in order to pay more attention to the output of the finished programme (Hancock, 1971).

During production, it is necessary also to keep in mind that the programme will be gauged both in terms of real time and psychological time. The programme psychological time relates to the pace, tempo and rhythm of presentation and must be commensurate both with programme content and learner attention, acquisition and retention capabilities.

This section has discussed briefly a few of the considerations that are required during studio production. This is a complex activity that requires close attention and vigilance throughout so that any other factors likely to have bearing on programme effectiveness can be detected. Here again reference may be made to relevant research findings regarding studio production techniques and variables and their relation to learning effectiveness.

2.5. Transmission / Distribution

Programme transmission or distribution forms the link between production and utilization. As previously mentioned, the mode of transmission should be specified along with other production requirements, as this may influence the production approach adopted. Transmission/distribution also has important implications for utilization, which will be discussed in the next chapter. It is a matter that requires close cooperation between the programme originating and receiving agents, if the educational television purpose is to be realized.

There are now several possible ways of effecting educational television programme transmission/distribution:

I. Wireless Techniques

a) VHF and UHF Broadcast Band

- c) Microwave (point to point beam)
- d) Satellite transmission

2. Wired Techniques

- a) RF - CCTV (Closed circuit systems capable of multiplexing many channels on a single coaxial cable)
- b) Video - CCTV (Closed circuit systems which can "coax" single channel video signals of very high quality over relatively short distances)

(Breitenfeld, 1970; de Mercado and DaSilva, 1975).

In addition to transmission techniques, recording and playback technology now makes possible a variety of means for distribution of recorded television programmes. These include:

1. Broadcast Standard and small format videotape
2. EVR
3. Selecta-Vision
4. Video Cassettes and Cartridges

(De Mercado and DaSilva, 1975; Hancock, 1971).

These techniques may be used singly or in combination to allow for more flexible patterns of transmission and distribution as indicated in Figure 18.

Educational television programmes' production is a complex process. It requires a careful balance between educational requirements, creativity, and technical consideration. It must be well organized, and closely co-ordinated with other media production, in order to provide effective learning experiences. The educational television production process is a major determinant of the success of the educational television programme.

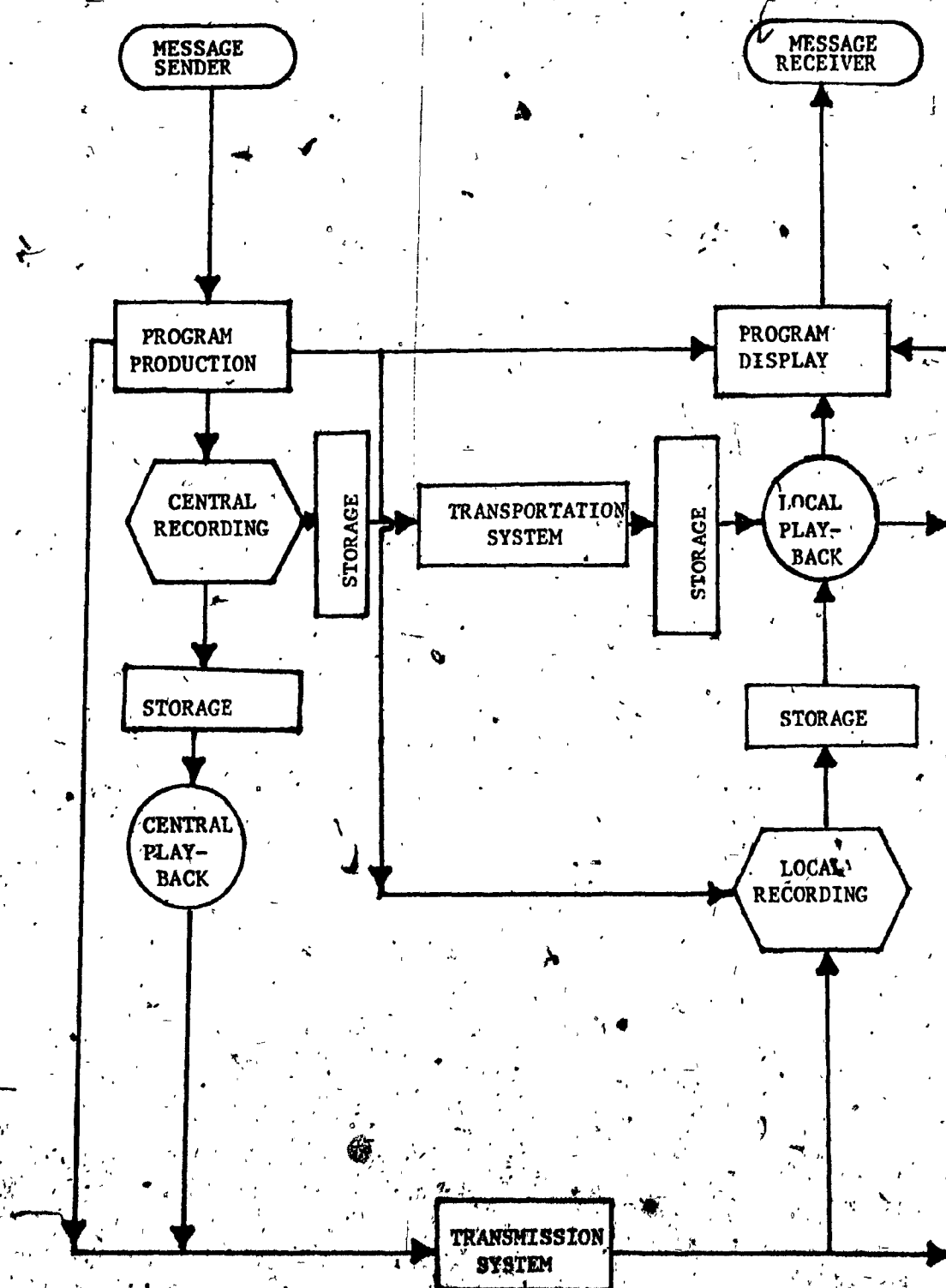


Figure 18: Possible Transmission/Distribution Patterns,
Adapted from Bretz, 1971.

is during this process that the system outputs are designed and developed. If these products are not effective the system cannot be justified and is unlikely to survive.

CHAPTER THREE

EDUCATIONAL TELEVISION UTILIZATION

3.0. INTRODUCTION

Utilization concerns what happens at the receiving end of the educational television system, and what conditions are required to make this a successful process. The utilization process is the "receiving system" for the system products (programmes) which are developed during the production process. It is in this "receiving system" that the value of the educational television system as a part of the educational fabric is gauged. All the time, effort, care and money put into the planning and production of programmes will be wasted unless they are properly utilized by the target audience. Donald Grattan, controller of Educational Broadcasting, BBC, interviewed by Edward Walton (1973) points out that many people setting up an educational broadcasting service think more in terms of concentrating on the processes of production and transmission, not recognizing the crucial importance of utilization in also determining the success of the projects. This often yields unsatisfactory results. In planning for an educational television system (and in its operational state) the process of utilization demands close attention as it is in this area that weaknesses in the system invariably occur (Commonwealth Secretariat and CEDO, 1974).

3.1. Establishment of Appropriate Physical Environment

The physical environment in which utilization takes place is of importance if the programmes are to be seen and heard properly. The appropriateness of the physical environment depends on a number of factors including the viewing room, the television receiver, seating arrangements and timetabling.

3.1.1. Assuring Effective Viewing Room Conditions

Ideally, a viewing room should be specifically designed for viewing when educational television is introduced. However, this is unlikely to be practical in a system-wide introduction of television throughout a nation like Kenya. More likely we can assume that viewing will be taking place in one or a few selected rooms in established learning centres, with only slight modification at minimal expense possible.

In selecting a room for television viewing there are a number of considerations that should be taken into account: the viewing room should be large enough to accommodate the audience utilizing programmes with comfort. The acoustics must be checked to ascertain that if there is reverberancy in the room, it does not interfere with the clarity of the sound from the receiver. Similarly the room must be as isolated as possible from extraneous sounds such as traffic, noisy passageways or workshops that are likely to cause distraction during programme viewing. Within the room, where possible, sound conditioning, materials and sound absorbing floor covering maybe used to help eliminate noisemakers (Chapman, 1960).

Although lighting is generally not a problem with television, care should be taken to place the receiver where glare and reflection can be avoided. Generally the light level in the area immediately surrounding the television receiver should be at a level slightly lower than that of the picture to avoid excessive contrast (Hancock, 1971; Chapman, 1960).

Adequate ventilation in the viewing room should also be ascertained, as learners will become distracted with lack of comfort in a stuffy room.

3.1.2. Placement of the Receiver

The screen size should not be less than 21 inches except for small-group viewing; 23 inches is the standard size for classroom viewing (Hancock, 1976).

The receiver should be located away from moisture or dust, and in tropical areas, must be turned on for at least an hour a day. In American Samoa, for example, the receivers are on continuously because of the extreme climate (UNESCO, 1967). Alternatively only receivers which are specially built for tropical areas should be purchased, to avoid damage due to climatic conditions.

Security of the receivers is essential. They should be kept where they are securely locked up after school-hours; and where they are not likely to be easily damaged.

Positioning of the set in the room may have an effect on the clarity of reception. This was the case for example in some classrooms in American Samoa where receivers would not work in one part of the room, but worked excellently when shifted (UNESCO, 1967). When installing the set, it should therefore be tried in several places in the room to determine which area(s) are best for its placement.

Front speakers on the set are essential for large group classroom viewing. For maximum visibility, the television receivers need to be raised high in the viewing room (See Section 3.1.3.), so that students in front do not cause obstruction for those behind them (Chapman, 1960).

3.1.3. Seating Arrangements

The ability to see images on the television screen is affected by the size of the screen in use, the distance of the viewer from the screen, the horizontal and vertical angle of vision, the disposition of chairs and desks, the size of the smallest print or figures used on the screen, the resolution of the picture, and the transmission bandwidth employed (Hancock, 1971; Chapman, 1960). All these factors are interdependent and for analysis they need to be taken as a group. Certain guidelines have been established (Chapman, 1960), which maybe useful in considering these factors during viewing:

1. 30 degrees above eye level is the maximum vertical angle for receiver placement; and this may necessitate tilting the set downwards
2. The horizontal, off centre viewing angle should not exceed 45 degrees, and preferably be 30 degrees, to avoid image distortion
3. The minimum viewing distance will grow greater as the screen size enlarges, but will generally average 4 to 5 feet. Table 3 below gives the general minimum range.

TABLE 3: MINIMUM VIEWING DISTANCE

SCREEN SIZE	CHAIRS CLOSE TOGETHER	CHAIRS WIDER APART	DESKS AND CHAIRS
17"	5' 6"	4' 2"	3' 9"
19"	5' 8"	4' 4"	3' 10"
21"	7' 1"	5' 5"	4' 10"
23"	7' 2"	5' 6"	4' 11"
24"	8' 0"	6' 1"	5' 5"

Source: Chapman, 1960.

4. The print size used on the TV screen is an important consideration. The minimum character height ratio to the total display height is as little as 1/33. This requires a minimum of eighteen scanning lines on the European CCLR 625 line standard to accomodate each character. This minimum is calculated for a controlled viewing situation with receivers perfectly adjusted. In practice the safest minimum is a 1/25 ratio, and 1/10 is preferable. This utilization requirement must be taken into account in the design of graphics and in shooting visuals during studio production.
5. Taking the above information into account, the maximum viewing distance can then be calculated, since this depends on the size of the screen and the smallest detail required on the screen. Assuming a minimum character height of 1/25 total picture height. Table 4 below provides a range of maximum viewing distances for a variety of screen sizes.

TABLE 4: MAXIMUM VIEWING DISTANCE

SCREEN SIZE	MAXIMUM VIEWING DISTANCE
17 in	14 ft 9 in
19 in	15 ft 2 in
21 in	19 ft 0 in
23 in	19 ft 4 in
24 in	21 ft 5 in

Source: Chapman, 1960.

6. Taking the minimum and maximum viewing distances into account, and assuming a 45 degree maximum viewing angle, the number of possible seating places can be calculated. Table 5 below gives the number of viewers that can be accommodated using plain chairs; chairs with working armrests; desks and chairs.

TABLE 5: NUMBER OF VIEWERS

SCREEN SIZE	CHAIRS 3 ft SPACING	ARMCHAIRS 3ft SPACING	ARMCHAIRS 4 ft 4 IN SPACING	DESK 5 ft 2 IN SPACING
17 in	32-34	21	20-23	16-18
19 in	36-39	22	20-26	20-21
21 in	52-59	31	31-36	24-29
23 in	54-56	31	36-38	24-29
24 in	64-72	39	41-52	33-34

Source: Chapman, 1960, p. 35.

7. The vertical placement of the television receiver is affected by the closeness of the seat spacing. The closer the seat spacing, the higher the receiver will need to be positioned; and the more it will also need to be angled for viewing comfort. Table 6 shows the height from eye level, when seated, to the bottom of the TV image, for a range of screen sizes and student densities. The mounting of a television receiver is important; flexible mounts which can be angled at will are preferable.

TABLE 6*: TELEVISION RECEIVER HEIGHT*

SCREEN SIZE	ROW SPACING 3 ft	ROW SPACING 4 ft 4 in	ROW SPACING 5 ft 2 in
17 in	26 in	17 in	14 in
19 in	27 in	18 in	15 in
21 in	34 in	22 1/2 in	18 1/2 in
23 in	35 in	23 in	19 in
24 in	38 1/2 in	25 in	21 in

Source: Chapman, 1960, p. 36.

* Height of TV image above eye-level only. Average distance eye-level to floor is added to obtain total height.

All the factors related to the physical environment, and particularly to set placement and seat arrangement are exacting and the educational television service needs to establish a means of advising users on what is appropriate. Chu and Schramm (1967) point out for example that sitting out of the optimum wide angle viewing area reduces accuracy of perception and can interfere with learning when perception is important. If users are not advised of such matters the effectiveness of the programmes maybe affected by these various factors.

3.2. Establishment of Appropriate Psychological Environment

No matter how carefully educational television programmes have been designed, if learners are not exposed to them under favourable psychological conditions, little confidence can be placed in achieving the desired results. The psychological environment is influenced by a number of factors.

As it has been indicated, quiet conditions free from noise or sudden distraction are necessary. Note-taking during a programme should be avoided, unless it has been specifically requested by the production agency in the teachers guides or students pamphlets.

The attitude of the class teacher or monitor is extremely important. Chu and Schramm (1967) point out that whenever television has been introduced, resistance to a certain extent must be expected. Because educational television ends the privacy of the classroom and requires a teacher to learn new roles and procedures, it may seem to threaten the teacher's position and security or to denigrate his importance by turning over much of the lecturing and demonstrating to an outsider. The need to conform to central television broadcast schedules also leads to

uneasiness and either overt or covert opposition, especially where teachers set greater store by their own subject matter expertise and their ability to lecture, for example, in secondary school or college. Attitudes are less likely to be favourable where students have also had a number of years of face-to-face teaching, and have become more articulate and verbal than in lower grades (Chu and Schramm, 1976).

In planning for an educational television system it is important to recognize such sources of likely resistance so that ways of establishing more favourable attitudes can be considered as part of the planning for effective utilization from the beginning.

Chu and Schramm point out that in general studies show that teachers are likely to become more favourable toward instructional television if they are actively involved in using it and determining how it is used. This was, for example, the case in American Samoa, Hagerstown and Chicago Television College. Hong Kong and Singapore have also maintained involvement by using surveys of teachers before the service to determine what use was to be made of television, and also by the use teachers' committees and teachers as presenters and producers in the operation of the educational television systems. Hong Kong and Singapore are particularly noteworthy for their regular seminars and review committees that keep teachers continuously involved with the educational television service (Commonwealth Secretariat and CEDO, 1974; Hays, 1972). Ivory Coast and El Salvador have also instituted involvement particularly through training and in-service training. In their case, the television production studios are located at the central teacher training facilities, so that student-teachers have an early and continuous exposure to the workings of television, and regard its use as part of their professional

development (Morser, 1943; Nuss and McAnany, 1972; Hornik, 1972).

Chu and Schramm (1967) point out that in experimental studies, teachers who had taught with television were more favourable toward its use than those who had not. Those who had observed a television course being produced over a year by their colleagues became more favourable while those who took part in production were significantly more favourable toward television than others.

Generally then, the more involved and familiar teachers are with the educational television system operation, the more likely they are to overcome fear and distrust of the medium, and have more positive attitudes toward its utilization. Positive teacher attitudes are important as they influence learner attitudes toward programmes. If the teacher's attention lapses, or if he leaves the room during transmission, the attitude of the viewing class will deteriorate rapidly; especially with younger children, where there is a tendency to accept a programme at the valuation of the teacher present (Hancock, 1971). If cues are offered during a programme requesting overt responses from students, there is likely to be hesitation unless the teacher is involved enough to initiate or encourage the response.

Involvement and training are key elements in making teachers more favourable. If teachers can have part in planning what is taught by television and what classroom activities are built around it, and if they are given help in learning their new roles, they develop more favourable attitudes, and utilize television better. Once they have a perceived purpose for a programme they are likely to communicate this to the learners and create a psychological environment conducive to more effective learning.

In addition to teacher attitudes, those of the school administrators are a significant factor in effecting appropriate utilization.

Soremekun (1973) reports for example that although teachers attitudes toward television in Zambia were generally positive, the conservatism of school heads often proved a stumbling block to effective utilization.

In American Samoa, it proved necessary to have to dismiss school administrators who were opposed to the introduction of educational television before it could be effectively instituted (UNESCO, 1967). Where administration attitudes have been positive, such as in Haggerstown, El Salvador or Ivory Coast, ways and means of encouraging better utilization have been given priority (UNESCO, 1967; Nuss and McAnany, 1971; Grant, 1975). The involvement of school administrators is therefore an important consideration in planning for utilization in schools.

In addition to attitudes, adjusting the transmission or use of programmes as much as possible to the routine of the school will contribute to a better psychological environment. It is distracting to view a programme during period changes. Equally as disconcerting is the split-second timetabling which brings a viewing class late into the television room, or takes it on to its next lesson immediately after the end of transmission. This is not conducive to constructive preparation and follow-up for the programme and is likely to affect learning effectiveness (Hancock, 1971).

These are some of the factors contributing to a suitable psychological environment for utilization. Unless care is taken to ensure that such factors are conducive to learning, the effectiveness in the educational television programmes is likely to be less than expected.

3.3. Establishment of the Disciplined Use of Programmes

The physical and psychological environment are important but ultimately, effective utilization depends on the disciplined use of programmes within the instructional system. The interdependence of the disciplined use and these factors is however inseparable in determining the success of the utilization process.

The disciplined use of programmes is dependent on a number of pre-conditions, if it is to be successful.

3.3.1. Teacher Training

The training of teachers (supervisors or monitors) is central to appropriate utilization. In systems that have established successful patterns of utilization, such as Hong Kong, Singapore, Ivory Coast and El Salvador, teacher training has been a major consideration in planning for the establishment of the educational television system. Once the systems have been put into operation, training has continued to be carried on through seminars or by broadcast of special programmes, multi-media approaches and the press, directed at teachers, regarding the use of programmes (Commonwealth Secretariat and CEDO, 1974; Haye, 1972; Grant, 1975; Schramm, 1973; Nuss and McAnany, 1971). In the case of Niger where monitors were used, they underwent utilization training before being used in the very successful pilot project (Schramm, 1973; Egly, 1968, 1972). In American Samoa where the introduction of educational television was so swift and extensive, there was no time for training teachers before utilization began. The need for training was soon felt however and seminars, summer workshops and other forms of in-service training were instituted immediately after the first cycle of transmission (Schramm,

1973).

Training as previously pointed out, fosters positive attitudes that create a climate conducive to learning. To achieve this, teachers need to be given a firm grounding in the theoretical and practical aspects of instructional technology so that they can play an active and critical role in the development of new instructional communication techniques. This should include the clarification of the theoretical background to educational television - what it offers; how it is used generally in the world; and what specific contribution it will make to the local situation. The methodology and rationale for a systems approach will also need to be clarified and demonstrated. Teachers should be given the opportunity, in training, to apply the systems approach by practicing with instructional units in which educational television is incorporated. The more practice allowed, the better, so that teachers can feel confident with the new methodology before attempting to apply it in a classroom situation.

During training, the physical demands of using educational television will also need to be explained - receiver placement, the use of simple controls on the set, the selection of viewing rooms, seating arrangements. As much practice as possible should also be allowed for these, so that their implications for effective utilization are comprehended.

Most importantly, training and practice in the techniques of classroom usage, in terms of pre-broadcast activities and preparation, conditions and response during transmission, and activities following broadcast must be given. In this respect teachers should be given supervised opportunities to practice procedures relating to the principles of motivation, learner responding, practice and reinforcement (Barnack, 1971).

Wittich and Schuller (1973) point out that the lack of effective utilization of new media such as television in schools can be largely traced to the lack of appropriate training. Many who administer and teach in pre-service training programmes neither emphasize nor demonstrate adequately the selection, use and evaluation of new media learning resource materials as a means of improving education of the young. The findings of Carré (1973) corroborate this view. He reports on a project with student teachers at Portsmouth College of Education (Britain) in the use of television materials along with other instructional activities. Those who gained experience in the handling and organization of a number of audio-visual aids in the classroom developed more positive attitudes and gained appreciation of the potential use of BBC programmes as a learning resource, than had been previously the case. They began to actively seek and consider the use of television broadcasts and integrated them with their schemes of work.

A major starting point for effective utilization is therefore related to teacher (supervision or monitor) training, before the television service comes into operation; and continuous in-service training as the need arises.

3.3.2. Support Materials

Educational television programmes rarely suffice for use by themselves. They must be integrated with other instructional activities. For this integration to be effected, substantial advance information is required. Various kinds of support materials must be prepared to fulfill this function.

At the time when the school (or other relevant instructional) curriculum is being planned, full information must be circulated about projected Educational Television series, stating their objectives and target audiences, and outlining their overall contents. This may be done in the form of a special bulletin or published in an in-house magazine as a pull-out supplement (Hancock, 1971). This kind of advance publicity is carried out through various utilization promotion techniques by the Alberta Educational Communications Corporation (ACCESS) and the Ontario Educational Communications Authority (OECA). ACCESS further sends a subscription card, so that users who are interested in particular series may indicate their interest in receiving further related information. Further support material is then prepared and sent to only those who subscribe. OECA in addition to sending advance information makes available their in-house utilization workshop, and also provides utilization field staff to demonstrate programmes to potential users.

At a later stage, but still well in advance of actual transmission, teachers' notes are essential to allow individual teachers to plan their lesson. Where applicable, Study Guides, Workbooks and Pupils' Pamphlets for students to use, as well as other related material, should also be delivered well in advance to allow any necessary preparation. Other materials may include: specially conceived films, wall charts, resource folders, programmed texts, radio-vision, multi-media packages and so forth (Mann, 1970; Hancock, 1971). Singapore, has in addition to support material, built an Instructional materials library as part of the educational television service, to provide teachers with a variety of other material they may require as part of utilization, so that they do not have to spend valuable time producing such materials for them-

selves if they are otherwise available. In view of the need for instructional materials in Kenyan schools, the establishment of such instructional resource libraries possibly as part of the district-level Teacher' Advisory Centers (See Section 0.5.10.) should be considered as part of the educational television programmes utilization service. Findings such as that by Jengo (1973) to the effect that the availability and use of other media appears to be highly related to the use of instructional television by teachers, indicate that the establishment of such complementary instructional materials service may have positive effects for ETV utilization.

The type and form of materials will be tailored to suit each series, and should receive close attention during the production planning phase to ensure their co-ordination with the television programmes. Teacher notes, however, should generally contain at least the following:

1. a clear statement of the programme objectives
2. a specification of the primary target audience, level and ability range of the series
3. an explanatory introduction, describing in detail what the programmes hope to achieve and the form of presentation they will adopt
4. suggestions for preparatory and follow-up activity for broadcasts, including possible correlations with the overall scheme of work, and other media
5. background information on individual programme topics which may not necessarily be within the programme, but maybe useful in preparatory and follow-up work

6. as much detail as is available of individual programme formats and contents.
 7. suggestions for supplementary reading, appropriate visual aids, etc.
 8. a list of recommended activities for the teacher to organize in the event of power or technical failure.
- (Hancock, 1971; Commonwealth Secretariat, 1974; Grant, 1975; Hornik, 1972)

The last requirement has been found particularly essential in developing countries, such as Ivory Coast and El Salvador, and should prove equally so for Kenya.

In providing an outline of activities related to programme utilization, consideration should be given to means of providing motivation, practice, transfer and feedback/reinforcement. These will need to take into account learner differences as determined by age, various communication, research and creative skills, out of school cultural background and exposure or lack of exposure to an in-school climate conducive to inquiry and creativity (McMahan, 1968). The stimulus of the programme may suggest avenues for project work, creative writing, oral practice or discussion; individual or group research; or experimentation and problem-solving, which teachers should be advised to encourage where possible.

The importance of follow-up and preparatory work should be stressed, as this is essential to make up for the limitations of television as a one-way communications channel. In addition, criterion tests should

be provided with teachers notes, for samples of viewing groups to take after programme viewing. This will keep the system monitored for effectiveness in terms of learner performance.

3.3.3. Utilization Support Service

In addition to support materials, the use of utilization field staff in services such as El Salvador, Ivory Coast, O.E.C.A. (Ontario) and ACCESS (Alberta) has been instituted to help in more effective utilization. In El Salvador the supervisors are trained in methods of modern supervision. Their function is not only to enhance the effectiveness of telecasts, but as a service to the teacher as a utilizer of instructional television, and as a classroom teacher in his own right (Nuss and McNany, 1971). In Ivory Coast a cadre of 50 pedagogical advisors are stationed throughout the country as television classroom observers (Grant, 1974). In both cases, utilization field staff provide a vital link between the users and the service and deal with any problems they can on the spot. This helps to foster the feeling of give and take between the service and users, and provides a sense of involvement especially for isolated teachers.

The O.E.C.A. and ACCESS use their field staff both to serve the function of liaison between the service and users, and also to demonstrate possible ways of utilizing new programmes along with other activities. In addition the O.E.C.A. staff carry out a "screen education" programme to help users and other community members to understand how television works, in order to encourage them to make use of it and provide constructive criticism and input for new programming material.

These patterns of utilization staff deployment are worthy of con-

sideration in establishing a new service, as problems that come up in the field can be catered for on an individual basis. Otherwise, if users feel cut off from the service they may become discouraged in the use of programmes. Utilization field staff are therefore valuable in keeping the service responsive to user needs. This again could possibly be established as part of the Teacher Advisory Centers in Kenya, as these are fairly accessible to all schools within the district.

3.3.4. Scheduling

One of the biggest problems in educational television utilization is that of scheduling. The problem of trying to match school schedules and broadcast schedules has yet to be solved. Some attempts can be made however to minimize its effects. In the first place rather than choosing an arbitrary set of programme timings to suit the routine of the service, some attempt can be made, through consultation and research, to allocate times which suit whatever is known of school practice. This is simpler in a centralised system where schools will be following a common programme and also where suitable in-school times are allocated for school telecasts. This has been possible for example in Hong Kong, El Salvador, Ivory Coast and American Samoa. In other systems, for example the British Open University, with time allocated only during broadcast periods not required for prime time programming, users must adjust to the transmission inflexibility.

Repeat transmission are often used to also deal with this problem, by making the programme available at alternative times. On broadcast channels, however, the number of possible repeats is usually limited to

one or two at most.

A solution that is becoming increasingly adopted in systems such as O.E.C.A. (Ontario) and ACCESS (Alberta) is that of using small format videotapes. Users, with recording and playback facilities can then either record programmes off-air during transmission, or they may obtain taped copies of programmes from the service to use, as convenient to their timetables. This capability as has been indicated in the discussion on transmission (Section 2.5.) makes possible more flexible patterns for programme utilization by users. The initial cost for such facilities is more expensive than that of a regular receiver alone, however, the dividends in helping to overcome scheduling problems, and making utilization easier for users, are probably worth the initial investment. If such equipment is to be used on a wide scale in an educational television system, care must be taken to purchase one standard model as this will make maintenance and copying service easier.

3.4. Technical and Logistical Considerations

Problems of logistics and technical aspects have direct bearing on effective utilization, particularly in developing countries. The provision of receiving sets is for example a necessary consideration for the ETV service before planning to produce programmes. Because they are expensive, in most developing countries such as Ivory Coast, El Salvador, Hong Kong, American Samoa and Zambia, the provision of receiving sets is a direct concern of the educational television service. Furthermore in areas where electric power is not available, as was the case in rural areas of Niger, and Ivory Coast (Grant, 1974; Egly, 1972), provision must be made for battery operated sets. Technical installation and maintenance

also has to be planned for by the educational television system, in view of the lack of a widespread electronics industry. Zambia, Hong Kong, and Ivory Coast have for example entered contracts with companies to install sets and provide maintenance service for which the educational television service pays (Soremekun, 1973; Haye, 1972; Grant, 1974).

In American Samoa, the educational television service provides technicians who answer repair calls in a jeep or small truck. These requirements are likely to be similar in Kenya and systematic ways of dealing with them are likely to develop along similar lines. They must be planned for, as otherwise, non-functioning sets are likely to cripple the educational television service.

Equally as important are problems related to the logistics of providing users with support and complementary materials for educational television. Unless the necessary materials reach users in time to be incorporated into their instructional plans, programme utilization may again not prove as effective as intended. In this case, what appears essential is to develop a regular pattern for distributing materials. In Hong Kong, for example, materials related to programmes are made available six weeks before the programme transmission date (Haye, 1972; Commonwealth Secretariat and CEDO, 1974). Ivory Coast provides a distribution service by truck every three months for materials to be used with programmes in the intervening period (Grant, 1974). It is important that users know when to expect materials and that they are there on time if confidence in the service is to be maintained. For this reason, the educational television service must be also concerned with providing an efficient materials delivery system, as part of an effective utilization service.

This chapter has attempted to present some of the factors and problems affecting the utilization of educational television programmes. These are some of the factors and problems that appear to be common to educational services everywhere. Reference has been made to how these are being handled in a number of systems, as this can provide indications of likely directions to take in new educational television systems such as Kenya's. In addition to the problems discussed here, the educational television system must remain responsive to factors and problems that are particular to Kenya, and which are likely to affect utilization. Systematic ways of handling them must be developed so that the system is not crippled in trying to achieve its purpose due to insufficient organization of this vital area of utilization.

CHAPTER FOUR

EDUCATIONAL TELEVISION EVALUATION

4.0. INTRODUCTION

Educational programmes are the output of the educational television system. The programmes are produced with the intention of bringing about specified behavioural change(s) in the target audience. The educational television system consists of a number of interacting parts that determine how faithfully its educational goals will be achieved by the programmes. Evaluation in the educational television system is therefore concerned with the collection, interpretation and use of information to assess and make decisions about the educational television programmes, and hence about the whole process of their design, development, dissemination and utilization.

Evaluation is an important element in the systems approach to the organization of educational television. It is a means of keeping the system goal-oriented and controlling its processes by feeding back information about its progress, compared to objectives and criterion standards. This information (feedback) becomes instrumental in identifying changes needed in the programmes. Discrepancies between the intent and outcome identify needs and reactivate the examination and necessary adjustment of the entire educational television process from needs assessment through all the stages of planning, production, utilization and evaluation procedures.

Evaluation in the sense it is used in this discussion is therefore a process which is designed to answer specifics about the operational educational television system and its products (programmes). Although it may use statistical techniques it does not attempt to answer any of the basic questions about the medium as might be the case in basic and applied research.

The variety of evaluation questions that need to be answered at different stages of the ETV process necessitate the use of different types of evaluation approaches.

4.1. Formative Evaluation

Formative evaluation (developmental testing) has been briefly discussed as part of the production process (Section 2.3.2). This type of evaluation as indicated is used to determine the adequacy of programme components, with the results being fed back into programme development.

The concern in the formative evaluation of educational television programmes is with the adequacy of individual sequences or components in view of the objectives to be achieved, and the target audience concerned. It must be determined whether the sequences are consistent, clear, logical and comprehensible to the target audience; and whether the learners' performance on related test items matches the desired outcomes. The materials are therefore tested for adequacy in terms of their suitability for the communication skills of target audiences; desired learner attitudes toward the materials; the materials' interest and their command of learners' attention; their suitability for use under the given learning conditions; and other relevant factors. At this stage it must be particularly ascertained that the production techniques and strategies used do not interfere with the clarity of the message for the target audience.

These factors may be determined by various evaluative techniques, including observation, questionnaires to students and teachers involved, interviews, and so forth. Quantitative data are necessary in interpreting results of the formative evaluation. Briggs and Gagné (1974) point out that while formative evaluation is generally characterized by informality

of data collection procedures, this should not be permitted to affect the precision of the data themselves. Properly designed instruments must be used to gather the required information. If the materials being developed are found to be adequate and appropriate in terms of the factors discussed above, the related criterion test items may also be given to the sample target audience. If such criterion testing is used during formative evaluation, students cannot be expected to perform up to validation criterion standards. This is due to the fact that the different sequences are not being tested in the exact context for which they are designed - i.e. they are being tested in isolation from the complete unit of instruction. Taking such factors into account, Tracy (1971) suggests the allowance of a greater degree of tolerance than that of the 90/90 criterion test standard in validation. When a statistically large enough sample of learners is used, overall test performance of 90/75 (90 percent of the learners score at least 75 percent) can be accepted in confirmation of adequacy.

Gagné and Briggs (1974) have suggested that as part of formative evaluation, an initial step, and one which should be repeated on later occasions when other evidence becomes available, is that the essential accuracy of the content must be reviewed by a subject-matter expert. In the educational television production process this can be a particularly essential aspect of the different stages of script writing and revision. All the other elements such as graphics, and various programme sequences may also be subjected to subject-matter expert review, in addition to testing with the target audience.

The advantage of the formative evaluation process is that any segment of the programme can be designed, tested and modified or improved be-

fore the final production decisions have been made. This allows for corrective action for any of the innumerable assumptions about the audience's attention, comprehension and other reactions which must be made during the complex educational television programmes production. Mielke (1974) notes that experience has shown that expert judgments alone (i.e. expert predictions of audience reactions) are frequently wrong; and ultimately there is no substitute for the actual try-out of programme material with a representative target audience. Mielke further suggests that top priority for evaluation resources should go to formative aspects which should be performed by the educational television system's in-house staff, and must relate to things that a producer can change - i.e. programme design and production. Ingle (1973), in discussing the process of evaluation in the educational reform in El Salvador corroborates this view. He indicates that formative evaluation is a much more powerful tool for improvement than summative evaluation of the full production. This is due to the fact that once resources have been committed to producing a whole programme, it becomes impractical to redo it all over again. Furthermore with a completed programme it becomes more difficult to pinpoint exactly what components are inadequate if they have not undergone developmental testing. If the inadequacies can be determined during summative evaluation, all that can be done in most cases is to try and improve the succeeding programme production cycle, rather than recommitting resources to redesigning and redeveloping the completed product under evaluation. Ingle further explains that formative evaluation, in contrast, provides information for more feasible modification of non-productive approaches. It is continuous and serves to refine and optimize the programme design through iterative feedback. For this reason, Ingle reports that in El Salvador experimentation with more frequent and alternative types of evaluation

activities are designed to provide much more specific and corrective feedback to the individual components of the system, rather than wait until the end of term test performance.

For formative evaluation findings to be of more utility, Mielke (1974) emphasizes that good will must be maintained between researchers and producers. They should co-operate in establishing the research agenda, and there should be more enlightenment between research and production so that they can better understand each others' expertise and how to use it. The jargon used to report evaluation findings should be comprehensible to producers and not to other researchers only.

A good example of where this has been put into effect is in the Children's Television Workshop's development of "Sesame Street". An in-house group was established from the out-set to carry out formative research. Its work has included, among other things, the co-ordinating of inputs by informing the production staff of the needs, interests and abilities of the target audience; trying out specific materials as they are produced; and reporting on their impact with samples of 3-5 year old children (Polsky, 1974). An example of the research group's response to production questions was the use of the "distractor" (e.g. a slide projector perpendicular to the television screen) during the testing of "Sesame Street" materials. This was to determine how well the different programme segments were holding the children's attention, as assumed in the materials development by producers (Feinstein, 1971).

Polsky (1974) notes that not only was the Sesame Street formative research influenced by production decisions, but occasionally, producers would become intrigued by some particular technique and tailor certain programme segments to facilitate its use for formative evaluation. There has therefore developed a fruitful give and take between these two

functions in the Children's Television Workshop.

In order to determine whether the production procedures or components of the programmes are effective, the detailed analysis relating to the learning task (e.g. stimulus, response and instructional strategy requirements), learner characteristics, the contextual situation (e.g. cultural, social, institutional) in which it occurs, and the various effects produced by the programme (e.g. cognitive, psychomotor or affective) must all be considered during the formative research process (Lawson, 1974).

4.2. Summative Evaluation (Piloting)

Whereas formative evaluation is carried out during the production process when the programme is being developed, summative evaluation is the systematic attempt to determine the effectiveness of the fully developed programme in meeting its objectives. The programme is validated when it gives enough consistent results to establish confidence that it can facilitate the achievement of intended learning outcomes, when used under appropriate conditions, for a specific target population. Programme validation is an important consideration in the design of mediated instruction. Since the instruction is presented to the learner without the advantage of the immediate feedback possible in face-to-face interaction, it must be ascertained that the programmes are "bug-free" and that they work before they are released for use.

4.2.1. Criteria for Validation

Before educational television programmes are validated by performance measures with the target audience, there are certain criteria which they must meet.

4.2.1.1. Empirical Validity

Empirical validity entails face value evaluation for internal consistency which contributes ultimately to validation. This determines whether the basic specifications of an operational nature have been met. The final programme should adhere to all display specifications and meet minimum technical standards if it is to be seen, heard, read and comprehended by the target audience. In the past this type of assessment has been almost the exclusive concern. However as it has increasingly come to be recognized that validation must go beyond the ascertaining of technical quality, this has become a functional part of a planned sequence of assessment along with other important factors.

Production standards must also adhere to display specifications and meet adequate visualization and picturization requirements.

Design standards must be confirmed by evaluating whether the objectives are consistent within a learning domain and relevant to the production approach. Objectives from one segment of the programme to the next must be sequential, taking into account the instructional strategy specifications. The development of the programme should be clear concise, precise and logical.

The design, display and technical standards should be determined prior to the evaluation of the total effort in terms of performance validity (Cavert, 1974, Wen, 1976).

4.2.1.2 Absolute Validity

Absolute validity may be established by getting reaction of relevant experts about the appropriateness of the educational television programme to the total instructional setting. It must be established that the

programme is consistent with known learning theory, the goals and philosophy of the instructional system(s) in which it is to be used, and that it is consistent with other successful past experiences with mediated or conventional instruction.

The evaluation of learning consistency should take into account whether the programme is designed to produce outcomes that can actually be tested in an operational situation. If environmental changes are to be effected along with the introduction of the use of educational television programmes, it must be determined if instruction through television can be isolated from other factors that may cause behavioral changes to take place. Instructional consistency can be established by ascertaining that there are no specific gaps in the sequential progression which will cause the television programme to be out of phase with other related media and agents in the learning centre. Educational consistency can be determined by seeking empirical judgments on the degree to which the programmes are consistent with the goals and philosophy of the instructional system that supports the effort and/or in which it was designed to be used (Cavert, 1974).

4.2.1.3 Relative Validity

The final judgment on the educational television programme is made by measuring, assessing or observing the responses and performance of the learners after exposure to the programme. The relative validity is determined by predicting the operational success on the basis of consistency in results of actual achievement compared with criterion standards and responses.

Performance adequacy is demonstrated by the consistency of the programme in providing effective conditions for achieving the objective.

The response of a statistically large enough target audience sample can be extrapolated with relative confidence to that of the target population under similar conditions. The responses made during summative evaluation must approximate the achievement of the goal, and should fall within the established degree of tolerance, for the programme to be validated.

Content appropriateness is determined by the display of stimulus that can elicit the desired response. It should also be determined during summative evaluation whether the television programme provides the time and opportunity necessary for complementary interaction with a teacher, in a discussion group or in other instructional activities for the retention, practice and transfer of the knowledge and skills acquired.

4.2.2. Validation Methods

Validation testing (summative evaluation) should take place in situations and under conditions closely resembling those in which the educational television programmes are to be used. All the planned preparatory and follow-up activities must accompany exposure to the programme in order to determine its effect in the context planned for use.

Certain knowledge and skills are assumed to be within the learners repertoire when he is exposed to the programmes during actual use. Before validation testing, a diagnostic test is necessary to determine whether the learners have the prerequisite knowledge and skills; and also to determine whether they have already mastered some of the objectives and sub-objectives covered by the programme(s). If this is not determined, these two factors are likely to confound the validation results (Mager and Beach 1967, Cavert 1974).

During summative evaluation it may not be possible to measure the achievement of every objective and sub-objective incorporated in the programme(s). Rather the measurement will be based on a judgment of which objectives are critical to the intent of the programme and which objectives function as indicators of the ability to respond to other objectives or sub-objectives. In this respect, one approach to the evaluation of educational television programmes is the use of prototype programmes during validation testing. This process is frequently referred to as piloting. It is based on the premise that the validation results of a few prototype programmes can be generally extrapolated in the development of other programmes in the same series (Hancock, 1976; Wen, 1976).

Generally the structure of the test instrument in summative testing is more general than the criterion test used in formative testing (Cavert, 1974). However, if programme weaknesses are evident by the persistent failure of learners to respond as expected, the full criterion test may have to be administered to locate and isolate the trouble spots.

There are a number of methods (Cavert, 1974) by which the summative testing of educational television may be carried out.

4.2.2.1 Closed Distribution for testing

Closed distribution entails exposure to the test programmes in ways other than the planned operational situation. For example, a closed circuit system may be used to test programmes that will be broadcast by open circuit. When such is the case, it must be recognized that any mode other than that planned for actual operational use may introduce variables that could affect the reliability of results. These must be accounted for in reporting test findings. There are two ways in which

closed distribution can be used for testing and yield relatively reliable data that can be extrapolated to the total population.

(1) In-House Distribution: a representative sample of the target population can be brought to a central location for exposure and testing. The advantage in this is that all performance and environmental conditions can be directly controlled to assure that the situation in which testing occurs, or the environmental changes expected are as close as possible to those planned for actual use. This also facilitates the obtaining of test results immediately. However it has the disadvantage of creating an artificial environment which emphasizes that an experimental situation exists, and the degree of the "Hawthorne effect" will have on the final results becomes difficult to determine.

(2) Field Distribution: In this approach the closed distribution testing is carried out with selected target audience samples in the actual learning environment. A videotape may be played back or a closed circuit television may be used for testing in the normal learning centre situation. In El Salvador, for example, prototype television lessons are tested by means of a portable videotape recorder which is transported to schools throughout the country. (Ingle, 1973; Hornik, 1972). This method has also been used by the OECA in evaluating pilot programmes of "Readalong"

(OECA, Evaluation Report: Readalong Pilot Programs, July, 1975)

The field distribution method has the advantage of reducing to a minimum the effect of foreign variables in the learning environment. The manner in which the teacher manages the environment can also be examined and taken into account in analysing results.

This method, however, has the disadvantage of allowing the evaluator little direct control over the elements of the situation so that only

programme effects can be isolated. There may also be a time-lag in obtaining results from field distribution.

Despite its shortcomings however, field distribution presents a favorable balance by allowing for manageable studies to be carried out in an operational situation, without exposing the whole target audience to unvalidated materials.

As cable and videotape technology become cheaper and more manageable, this method may increasingly become adopted as a means of carrying out summative evaluation studies. In Kenya where cable technology is not widespread, the adoption of the videotape technology, as has been done in El Salvador, would appear to be a more viable option in this respect.

4.2.2.2 Open distribution for testing

This method entails exposure to the programmes using a similar utilization and dissemination situation as that designed for actual use by the target population, although test results may be compiled only for a selected sample of the total population exposed to the programmes.

(1) Non-scheduled distribution: Availability of the test programmes may be made known only to the selected groups. With broadcast television, however, it can not be insured that other groups from the target population will not see the programme(s). This may result in the attempt to use the incomplete product by unknowing learner groups and may lead to a negative attitude toward the instruction before it is revised and released for general consumption. This method has an advantage, however, when it is desired to efficiently reach the test sample in a wide geographic area.

Non-scheduled open distribution was used for example in the pre-broadcasting period to test "Sesame Street", and also during its first

season. Five months before national broadcasts, prototype shows were shown on a regular broadcast channel in Philadelphia. Reactions of a preselected group of three-, four- and five-year olds were closely studied, and on the basis of these observations certain adjustments were made in the programme. (Polsky, 1974; Feinstein, 1971). During the show's first season, in order to validate the learning gains among viewers, as opposed to non-viewers, only selected samples of target audience were encouraged to watch while control groups were not encouraged (Ball and Bogartz, 1970).

The first three years of educational television in El Salvador also made use of this method. While programmes were broadcast on a regular broadcast channel, only a small sample of students were used for systematic validation studies before the programmes were officially released for use at each grade level. (Nuss and McAnany, 1971).

(2) **Scheduled Distribution:** the programmes to be tested may be included as part of the normal transmission or distribution schedule. This may be necessary where the target population has been identified as the test group. This is the method most frequently used. It is employed in systems like Hong Kong, Singapore, American Samoa, Ivory Coast, The British Open University, Niger, and others. While it has the logistical advantage of testing over a widely based target group, it displays the product to the users before its effectiveness has been demonstrated. Although the results obtained are used to revise the programme(s), the same learners do not have the opportunity to benefit from the revised version. In this distribution method, in fact, the first or even the second year of learners may not benefit from a fully validated attempt to achieve the objectives.

One way of dealing with such a problem has been adopted in El Salvador. Because only prototype programmes are prevalidated an attempt is

made to ensure that all others in the series are also achieving their specified objectives adequately. At the end of each unit of instruction, tele-tests are conducted for the whole target population to evaluate key objectives. On the basis of results obtained, review television programmes are produced and transmitted within 48 hours after the tele-tests. These programmes emphasize objectives which have not been fulfilled with an adequate level of mastery. Utilization supervisory personnel also use results of the televised tests and give attention to the problem areas before learners go on to the next unit (Ingle, 1973; Hornik, 1972).

The Open University in Britain also deals with this kind of problem by using frequent and continuous computerized student assessment, as well as tutor marked assignments. When students are having difficulty with objectives covered in broadcasts, these are spotted, and time can be devoted to reviewing them in tutorial sessions.

Summative evaluation is an exacting process that requires the consideration of a number of factors. The validation of programmes is important, if users are to continue having confidence in what the system can accomplish. The closed distribution methods, though having certain disadvantages appear to render themselves more favorable in terms of avoiding unvalidated materials reaching the audience, while still allowing for the tryout to take place in a realistic context. As the experience of El Salvador points out, however, these methods are not mutually exclusive, and may be used in combination, each being used when it is the most advantageous in a given situation.

4.3 Illuminative Evaluation

Formative and summative evaluation are primarily concerned with the

television programme and its effect on learning outcomes. Learning outcomes are, however, affected by other factors in the educational setting besides the programme itself. Illuminative evaluation (Wen, 1976) entails a systematic study and analysis of such other factors within the receiving system and its environment which influence the efficacy of the educational television system.

Illuminative evaluation examines the educational television programmes in the context of the learning milieu. It is primarily concerned with process and support variables (Briggs and Gagné, 1974) that affect the programme's effectiveness directly or indirectly. Process variables concerning matters of sequence, events of instruction, practice requirements and other operational variables that take place during programme utilization directly influence learning outcomes and must receive close attention during evaluation. Illuminative evaluation is concerned with gathering information about whether the process variables are effected, as specified in the formulation of instructional strategies and other stages of the planning process. If these are not effected as specified, illuminative evaluation becomes concerned with finding information about factors that hinder their being carried out.

Support variables are those occurring in the learners' home, community or school environment which are potentially influential upon the outcomes of an educational programme. These include such factors as the availability of materials, the physical conditions and psychological climate of the learning environment, and other variables which indirectly affect the opportunities for learning.

Illuminative studies have been carried out as part of a number of systems using educational television. In El Salvador and as part of the

"Sesame Street" research efforts, extensive studies have been carried out to answer a variety of questions, including those relating to: parental aspiration for the learner; learner and parent affluence indices; parental and community attitudes toward education; teacher and learner attitudes; socio-economic status of the family; and the "intellectual climate" in the home (Hornik, 1972; Ball and Bogartz, 1970). These have been carried out with specific reference to the pattern of learning outcomes achieved by the learners.

In the Ivory Coast extensive illuminative studies are being carried out in conjunction with other evaluation activities. These include studies dealing with the pattern of pupil performance in ETV schools, in traditional classrooms and in schools elsewhere. Some of the areas under examination are: space orientation, time organization, mathematical logic development, code learning and teacher-pupil interaction analysis (Grant, 1975).

A good example of such evaluation studies was that carried out by the Radio/correspondence course unit in Kenya to find out environmental and pedagogic difficulties affecting the performance of students enrolled in the Kenya Junior Secondary Examination Radiocorrespondence course (Kinyanjui, 1973).

Illuminative evaluation is carried out with the intent of making the educational television system more sensitive to the strengths and weaknesses of the receiving system that should be taken into account in redesigning or revising further educational materials. A combination of strategies including observation, interviews with participants and community members, questionnaires, analysis of documents and background information are employed for this purpose. Illuminative evaluation may be carried out independently or it may be done in conjunction with summative,

formative or follow-up evaluation.

4.4 Follow-Up Evaluation (Monitoring)

Once the use of the educational television programmes is implemented, it is necessary to continually evaluate or monitor their effectiveness. This is because the operational environment of which they are to be a part is seldom static and unchanging. Any of the numerous factors - learner characteristics, support and process variables, or subject-matter may change and require adjustments within the system. Follow-up evaluation should be instituted to keep the educational television system responsive to such changes.

Part of the follow-up process should be a continuous process of validating programme effectiveness. This may be done by including the programme validation test among the necessary follow up activities and continually sampling student performance every time the programme is utilized. In addition a variety of other evaluative measures may be put into effect including:

- (1) Weekly and occasional reports from teachers, supervisors, monitors
- (2) Reports from field officers on specific problems
- (3) Sampling surveys
- (4) Correspondence from users
- (5) Review of programmes by designers, subject matter experts and producers
- (6) Regular comments from students
- (7) Visits and observation by the ETV Service

4.5 Revision and Recycling

All the information gathered through the various evaluation

approaches becomes instrumental in keeping the educational television system goal-oriented. Once the information is gathered, it must be analysed and interpreted. When discrepancies are found between expectations and the actual system performance, a process of revision follows. Formative evaluation results are used in the revision of the production process which is its primary concern. Summative, illuminative and follow-up evaluation results are of a more general nature, and are frequently fed back at various stages throughout the entire system. This entails the reexamination of all processes throughout the planning, production and evaluation processes. The results of such revision may be used to recycle the products undergoing evaluation, or they may be used to make future system performance more responsive to the areas that have been found wanting. This process if carried out conscientiously and systematically can lead to the improvement and effective functioning of the educational television system.

SUMMARY
AND
CONCLUSION

The effective organization of an educational television system as an integral part of an instructional system is a complex and exacting process. The historical development of efforts to establish effective use of educational television has therefore not been without controversy. The results of early efforts to use educational television plus a new demand for accountability has resulted in some recent goal-oriented systems.

New educational needs and expectations have, in the cases referred to in this study, necessitated the use of television as part of educational reform; as a means to improve the quality of instruction; to extend educational opportunities; and to serve as one of the means of meeting a variety of educational communication requirements. This has resulted in a number of systems that make co-ordination between the educational and broadcasting functions essential.

There are certain general requirements in organization that seem common to most successful efforts that use educational television as an integral part of the instructional system. In such cases, television has not been planned in isolation. Rather, its planning has originated in the effort to respond to recognizable needs, and has been part of the overall curriculum and instructional planning. The use of television has been planned to serve a particular function within the educational system. This approach to educational television organization necessitates the co-ordination of a number of interrelated and interactive activities into an organized complex system. This requires the use of new techniques of organizational planning and management. One technique that has become generally accepted in the organization of such complex processes is the systems approach.

This study has proceeded on the premise that in planning for a new educational television system, Kenya can gain by drawing from past experiences in the development of such systems elsewhere and by further taking into consideration new approaches to systems organization. The systems approach is particularly recommended as a viable method of organizing an educational television system for the Kenyan situation.

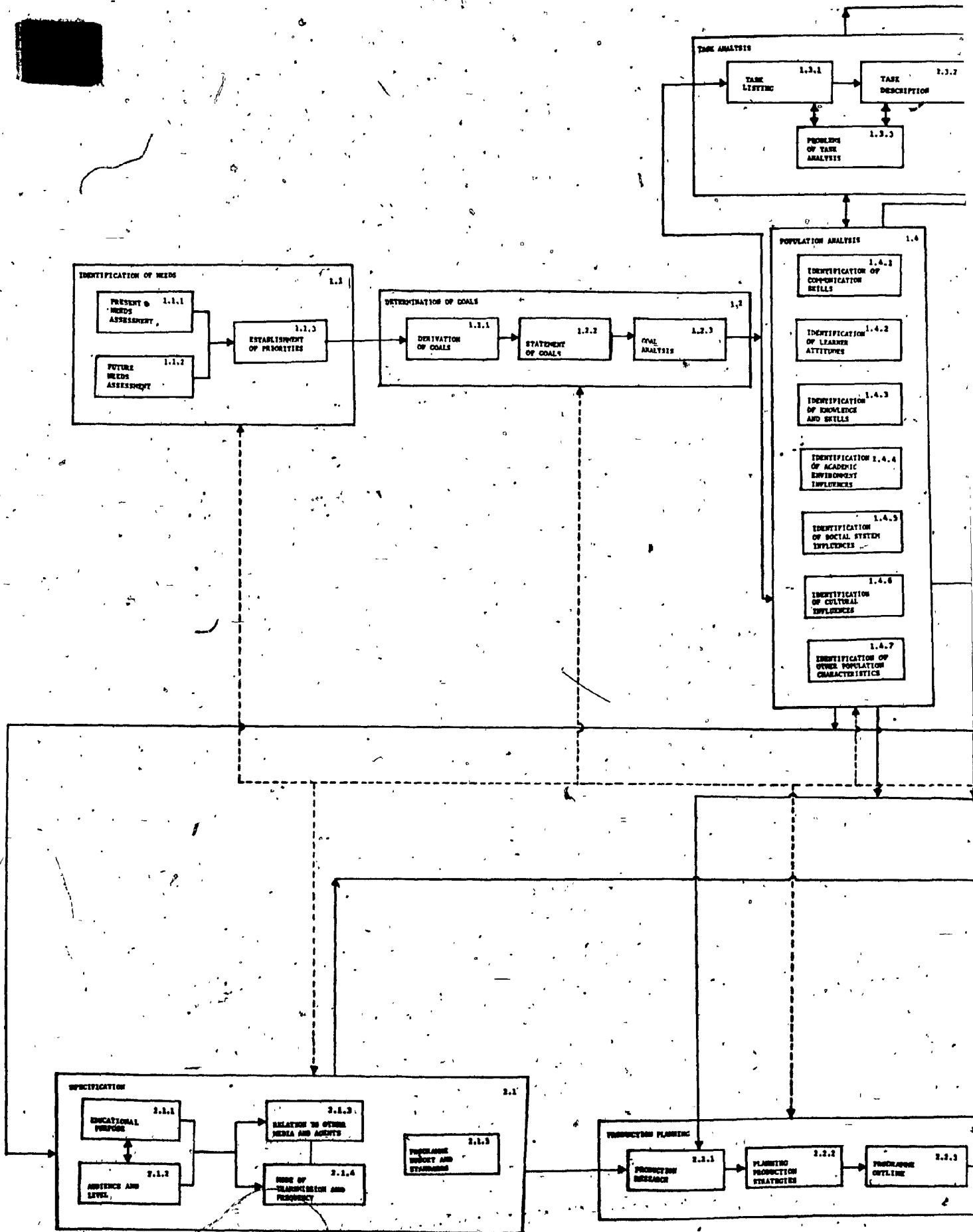
This study has looked at the four educational television organizational processes of planning, production, utilization and evaluation. These processes are all essential and interdependent in the development and operation of an effective educational television system. An attempt has been made to outline how the problem solving (systems) approach may be applied to the organization of these processes in educational television. An analysis has been carried out starting with a problem (need), analysing what is required for its solution, choosing among alternative ways (including television) to solve it, implementing the solution(s) and assessing the effectiveness of the solution(s) chosen. If the solution does not suffice, the problem, and all the processes required for its solution are re-examined, revised or modified and re-implemented; or a new solution is applied. Each new or modified solution undergoes the same process until a satisfactory one is found, and then it must be constantly monitored to ascertain that it continues to be effective when variables and factors related to the problem change. Such a process is applicable in the planning, production, utilization and evaluation of educational television.

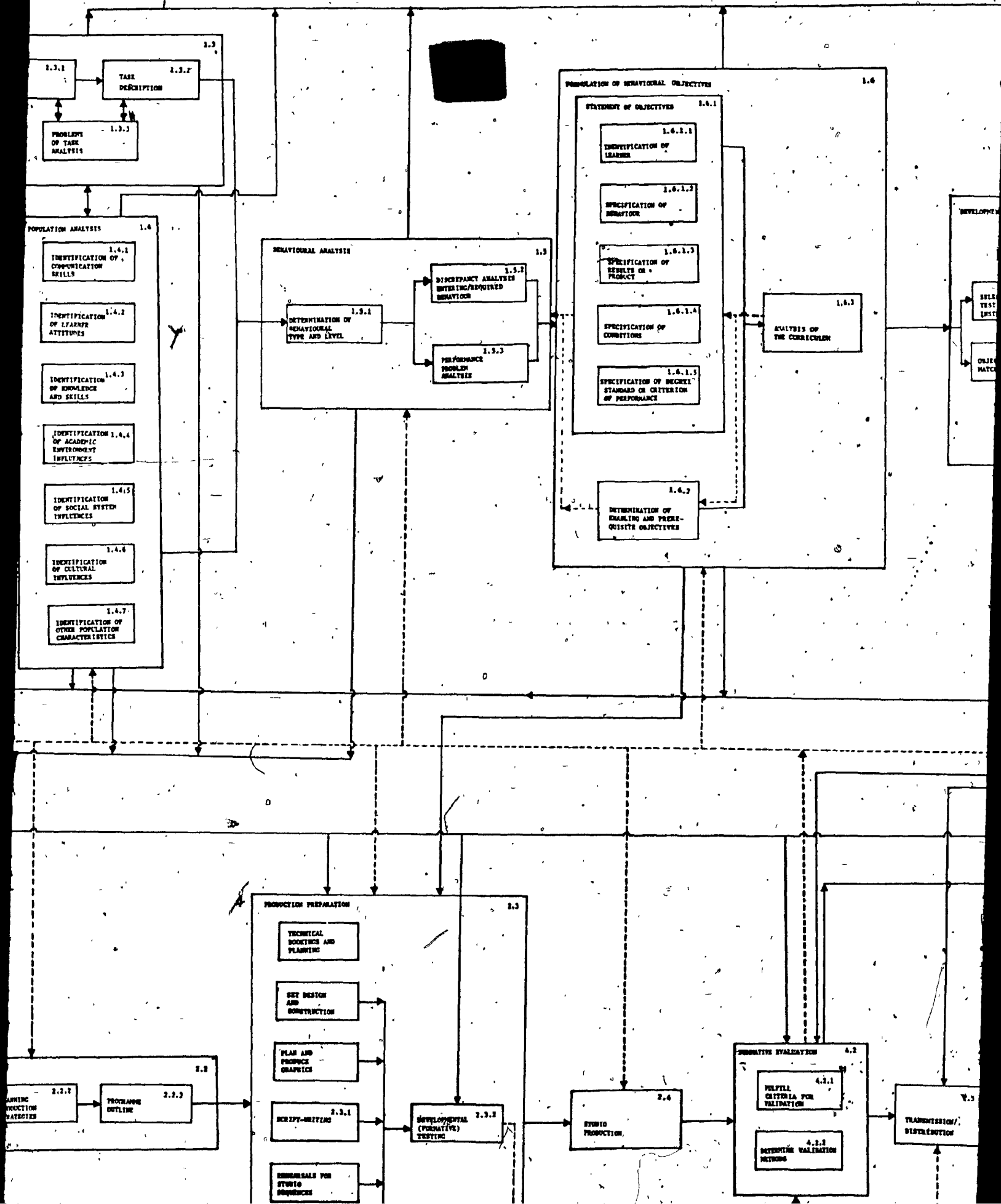
From the discussion presented in this thesis it is possible to develop a model for the organizational processes of an educational

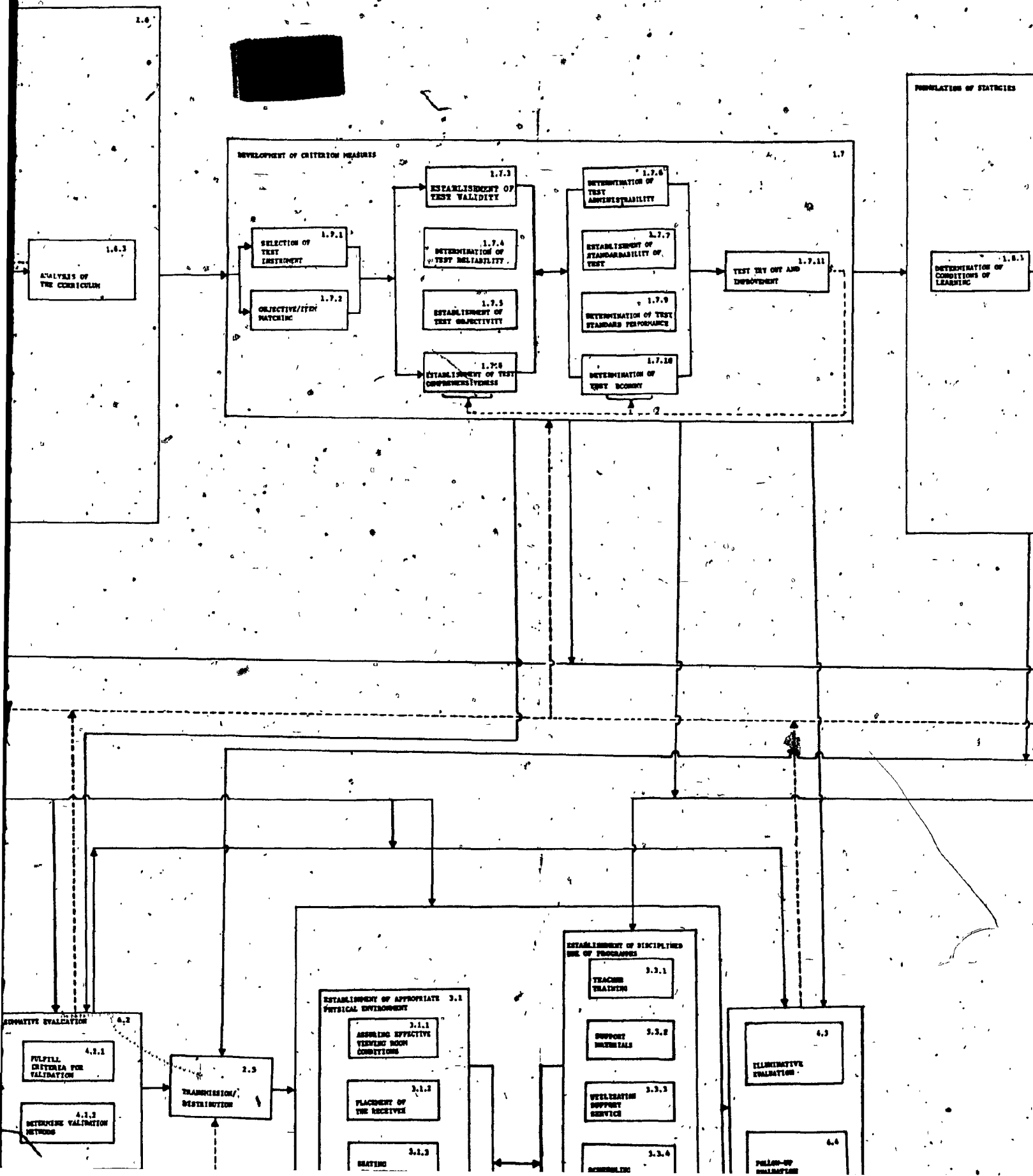
television system which can operate as a component of an instructional system. The concern has been to outline the functions that must be fulfilled if such a system is to be both effective and efficient.

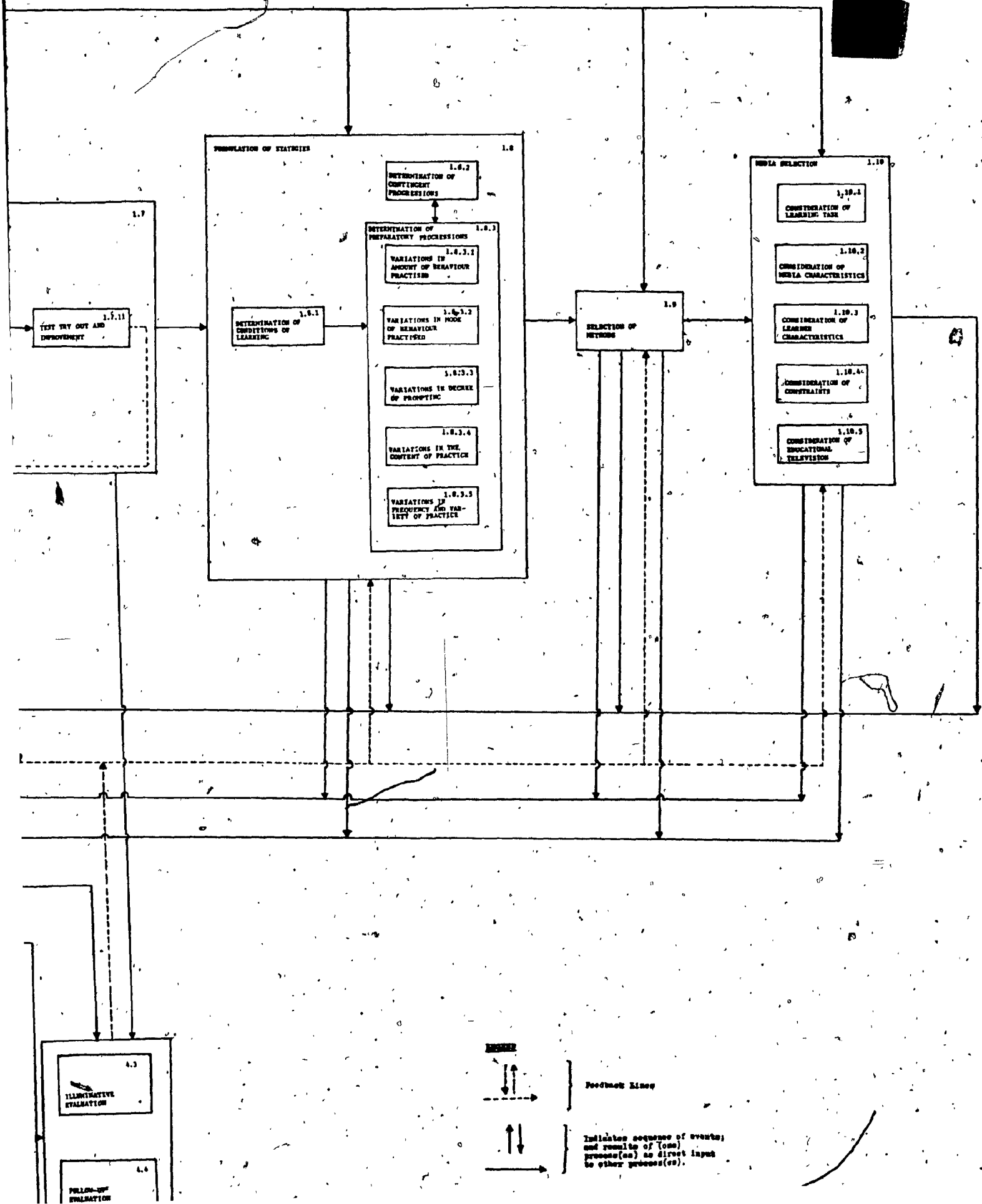
One of the basic premises of this study is that to develop an effective ETV system the organizational processes and the functions which each process entails must first be discerned. Once these have been specified and the interrelationships understood, it becomes easy to proceed and plan for the necessary system inputs, such as personnel and technical components for the operational system. This study therefore presents only the first in a series of planning stages necessary before an effective educational television system is established.

The model presented (figure 19) serves as a basis for planning the organization of an effective and efficient educational television system within the Kenyan Educational Mass Media Service. It is an adaptive model which can prove flexible enough to cater for the planning of an educational television system to help meet the variety of educational needs in Kenya.









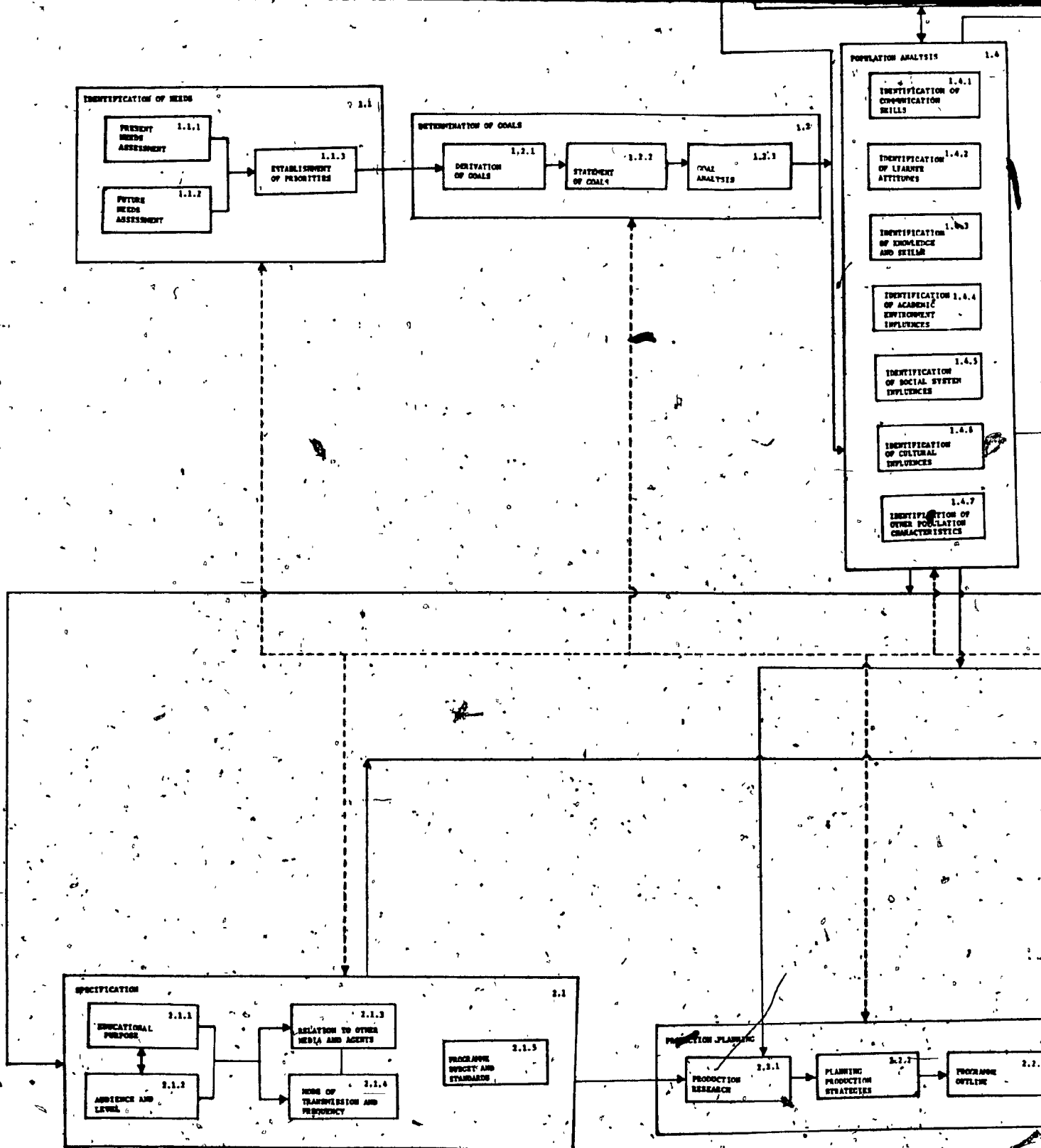
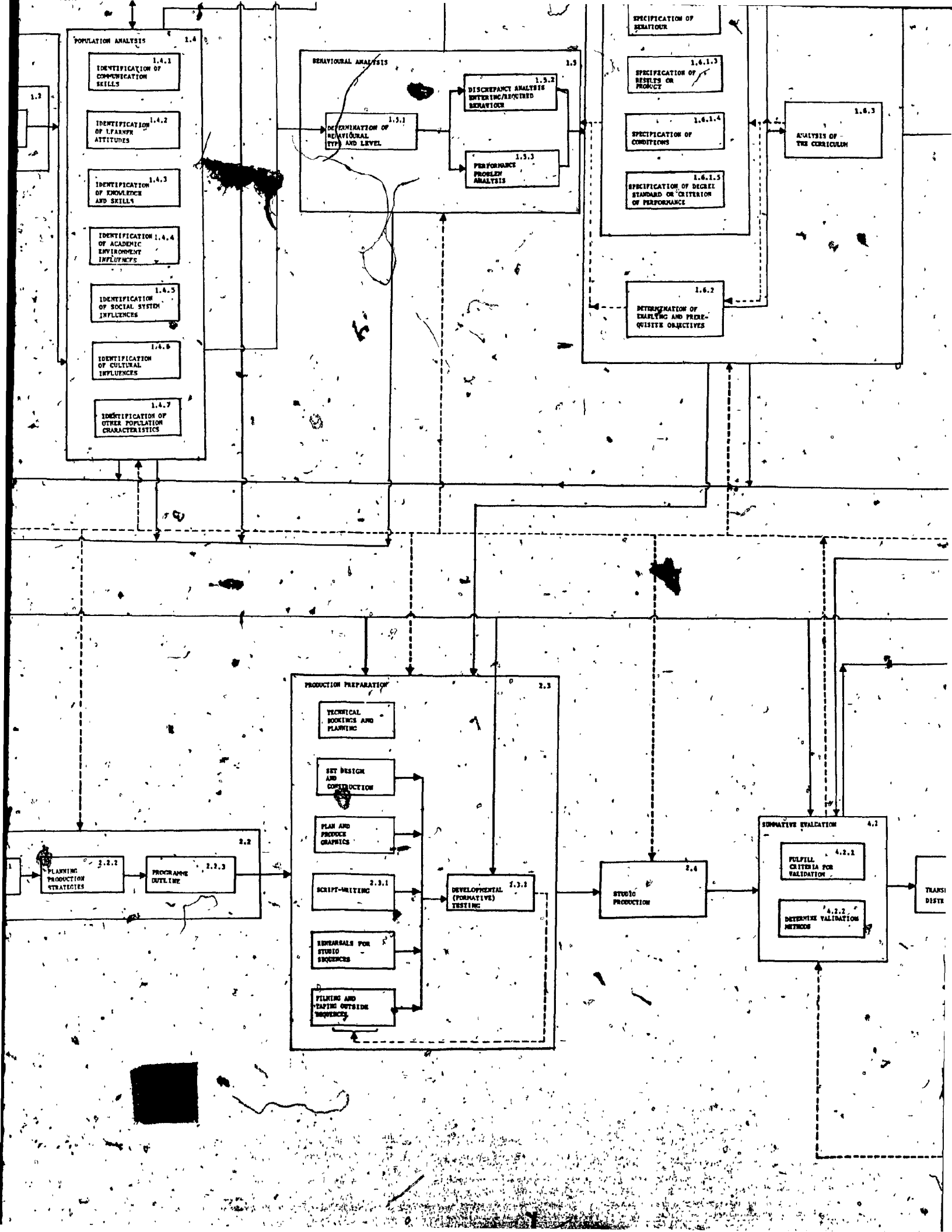
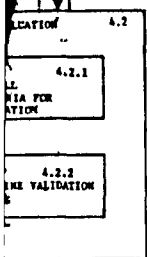
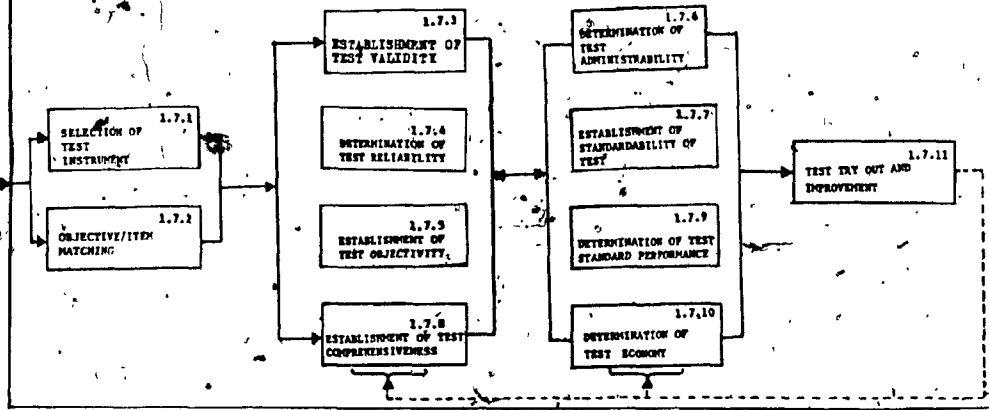
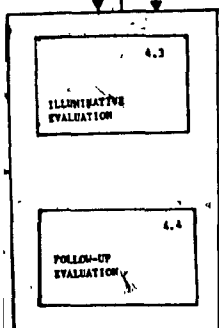
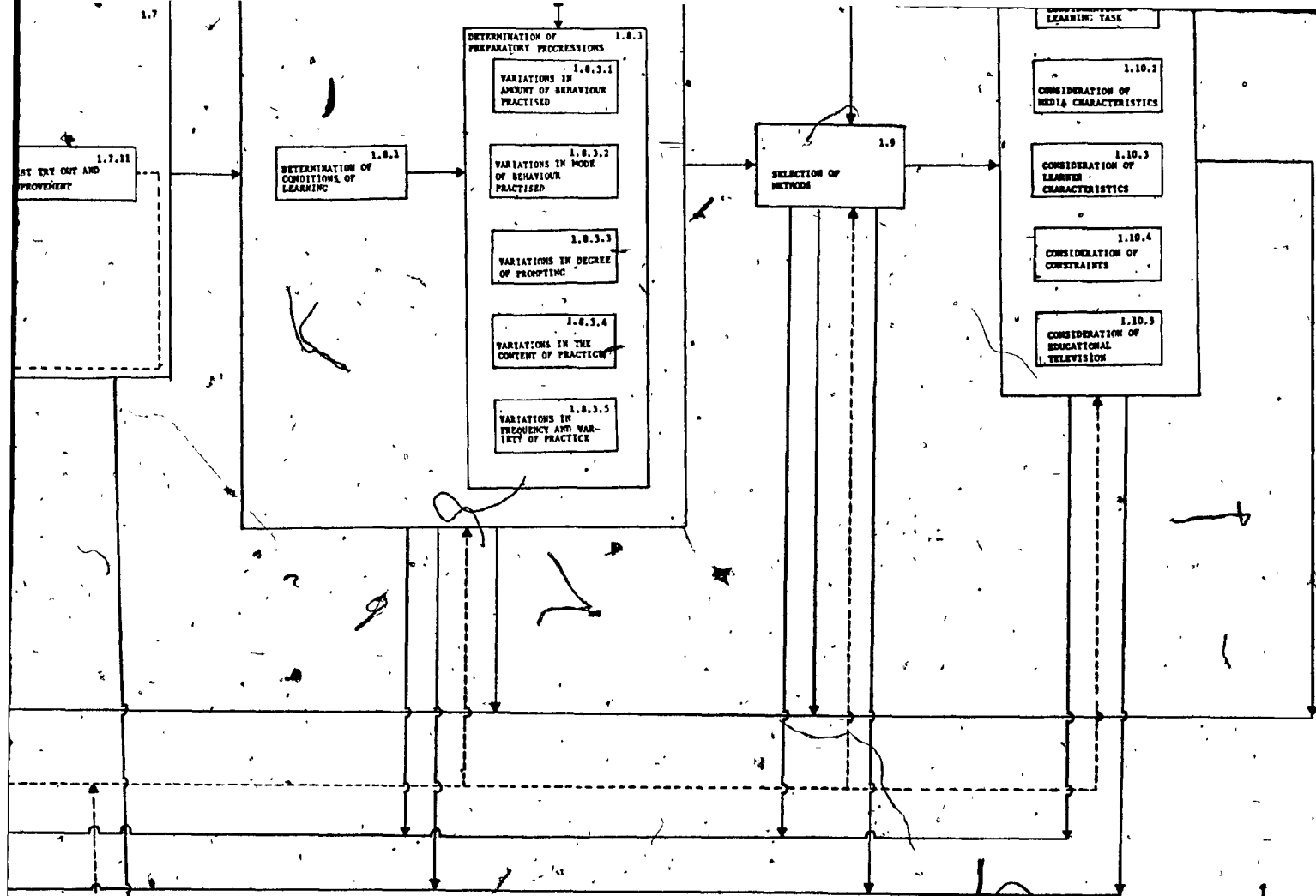


FIGURE 1.1. MODEL FOR TV ORGANIZATIONAL PROCESSES

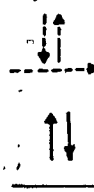


DEVELOPMENT OF CRITERION MEASURES





NOTED



Feedback lines

Indicates sequence of events;
and results of (one
process(es) as direct input
to other process(es))

Footnotes

1. The term 'effective', as used in discussion in this study, refers to the capability of a course of action to produce the desired outcomes (effects). As such the amount (cost) of human, time and material resources invested, expended or consumed need not necessarily be a consideration in determining the effectiveness of a given course of action, as long as the specified goals is achieved (course of action is effective) or not achieved (course of action is ineffective). This is the sense in which effectiveness is generally discussed in the literature to which reference was made for this study (McManama, 1971; Schramm et al, 1967; Davis, Yelon and Alexander, 1974; Thompson, 1971; Tracey, 1971; Palmer, 1972).
2. Human, time and material resources become a consideration when the efficiency of a given course of action is taken into account in the process of achieving or producing the desired effects. Efficiency, as used in this study, refers to the cost (i.e. amount invested, expended or consumed) of human, time and material resources required for a given course of action to obtain the specified outcomes. This is a general manner of referring to efficiency. It should be noted, however, that there are a number of distinctions possible in the consideration of efficiency for various problem situations. Ackoff (1962 pp. 34-35) distinguishes four types of measures of efficiency, depending on the specification of input and/or output included in the definition of the desired outcome:
 - (a) Specified (or irrelevant) outputs and inputs:-
The measure of efficiency only takes into consideration the probability that the desired outcome will occur. Consideration of resources is not relevant. This is the case when consideration is given only to the effectiveness of a given course of action, as indicated in the discussion (1) above,
 - (b) Specified outputs and variable inputs:-
Alternative courses of action are evaluated in terms of inputs required to obtain a specified outcome. The course of action requiring a minimal (combination) of resources (inputs) could be considered as the most efficient.
 - (c) Variable outputs and specified inputs:-
When alternative courses of action with specified fixed inputs are evaluated in terms of the amount of output, the course of action that yields the most product per unit of (specified) resources is considered the most efficient.
 - (d) Variable inputs or outputs:-
As in the measure of profit, neither input nor output

is specified, but their difference or ratio is used as a measure of efficiency. The course of action yielding the greatest difference between output and input can be considered to be the most efficient.

Ackoff further points out that since a course of action may yield different inputs and/or outputs in different trials in most situations, the efficiency function is determined only after many trials, taking into account any variations in outcome.

3. In discussing objectives, this study makes reference only to behavioural objectives which are commonly advocated in the literature dealing with the formulation of instructional objectives (for example, Kryspin and Feldhussen, 1974; Kibler, Baker and Miles, 1970; Mager, 1962; to name just a few). There are indications, however, that consideration needs to be given to other kinds of possible educational objectives. Mitchell (1975), for example, discusses a variety of other possible fuzzy, rudimentary and activity objectives. He proposes the use of capability as more appropriate than behavior. Capability may be manifested in various forms: latent capability, dynamic capability, dormant capability and potential capability. In this case behavioural objectives permit observation or measurement of dynamic capability only; they may also serve as indicators of latent or dormant capability.

Evans (1968) on the other suggests that behavioural objectives are a snare and a delusion. He has contention with their use as the basis of instruction and suggests that properly constructed criterion tests provide "the necessary and sufficient conditions to accomplish what we deluded ourselves into thinking we were accomplishing in the days of old when we tried to write behavioral objectives" (Evans, 1968 p. 43)

Errata:

The following should be included as part of the bibliography and references:

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Evans, James, "Behavioral Objectives Are No Damn Good", in Aerospace Education Foundation, Technology and Innovation in Education, New York: Fredrick A. Praeger, 1968.

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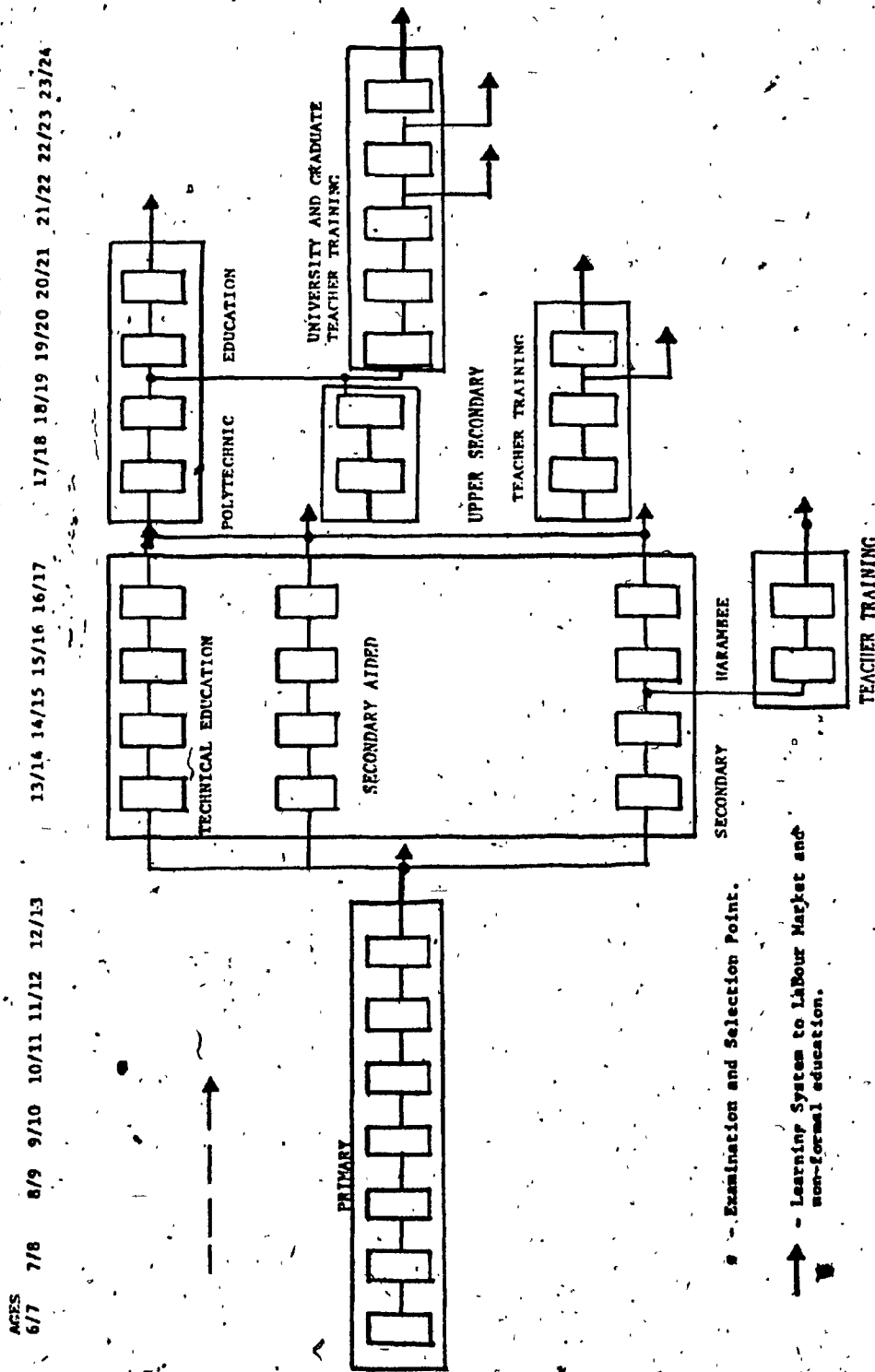
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APPENDIX A
THE KENYAN FORMAL EDUCATION SYSTEM 1963-1973.

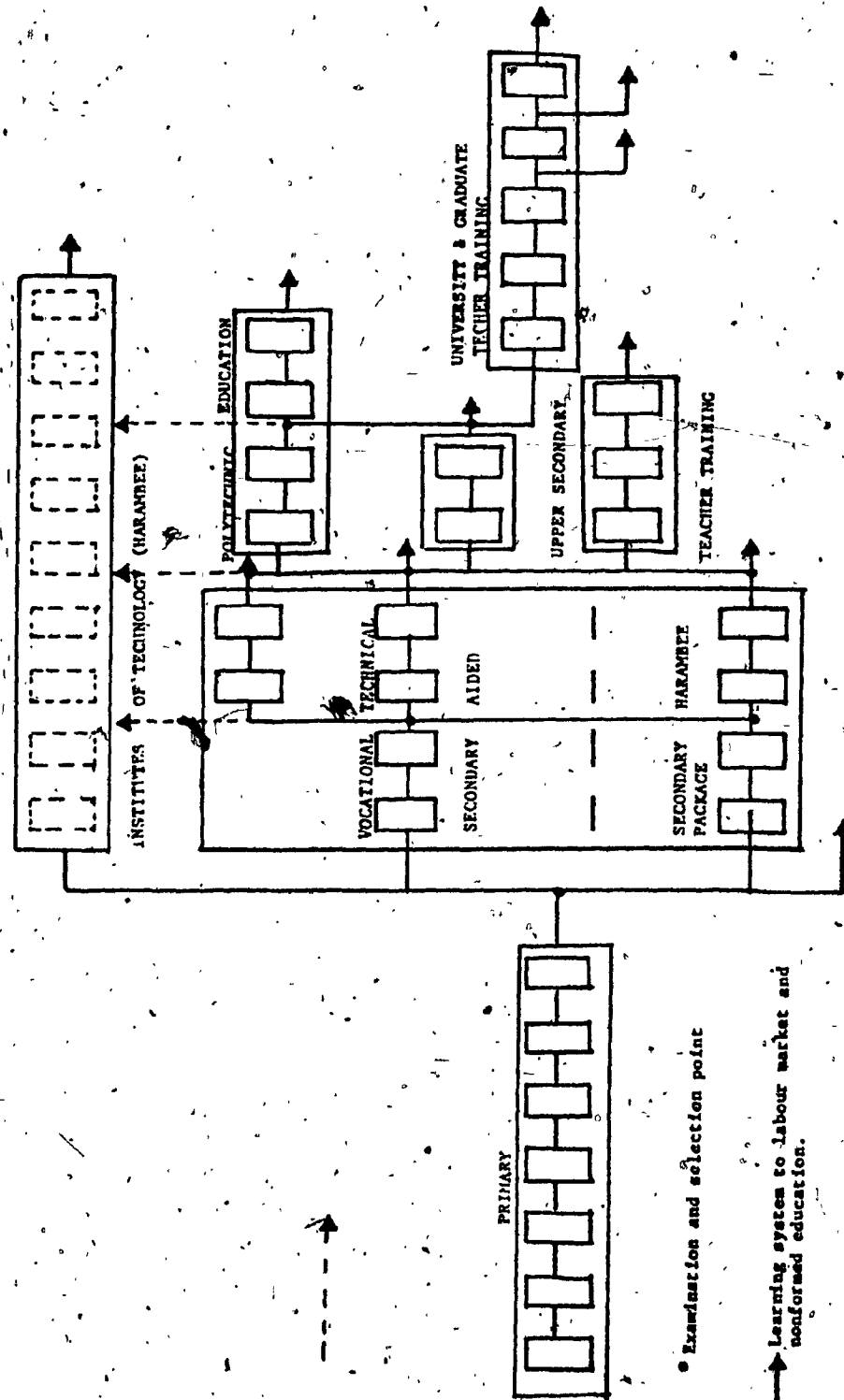


APPENDIX B

PLANNED KENYAN EDUCATIONAL SYSTEM 1974-1978

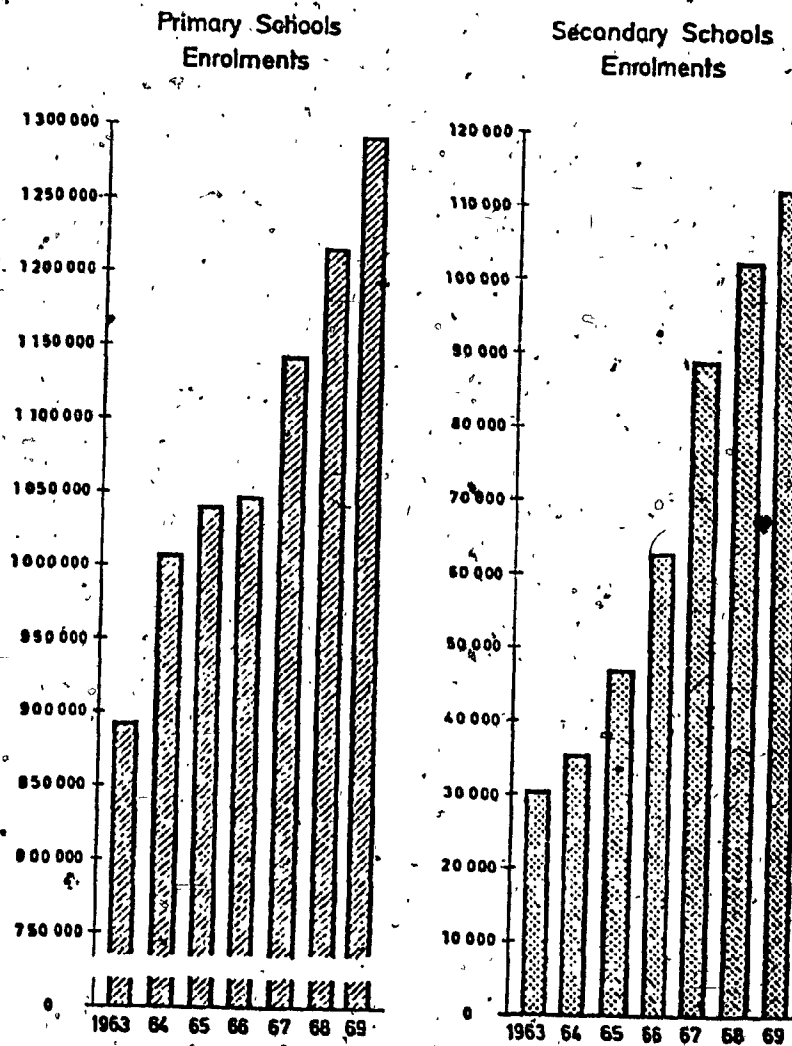
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APPENDIX C:

Enrolment in primary and secondary schools from 1963 to 1969



Source: Meck, 1971

APPENDIX D

First-level school-leavers, 1960-69

Year	Standard VII	Standard VIII	Total
1960	---	17 153	17 153
1961	7 376	22 494	29 870
1962	10 219	27 373	37 592
1963	28 640	31 753	60 393
1964	88 372	33 870	122 240
1965	120 829	36 036	156 865
1966	146 192	440	146 632
1967	147 544	---	147 544
1968	146 784	---	146 784
1969	149 793	---	149 793 ⁽¹⁾

1. Provisional figure.

Source: Anderson, 1973

APPENDIX E

Number of Schools by Province, 1973-1974

	Numbers									
	Primary Schools					Secondary Schools				
	Maintained		Assisted		Total	Unaided		Total		All Schools
	1973	1974*	1973	1974*		1973	1974*	1973	1974*	
Central	1,065	1,092	90	92	1	1	150	184	241	277
Coast	525	618	24	25	3	3	33	35	60	63
Eastern	1,573	1,853	65	70	-	-	81	140	146	210
Nairobi	110	112	16	17	12	12	38	17	66	46
North-Eastern	39	43	3	4	-	-	1	-	4	4
Nyanza	1,399	1,457	60	65	-	-	80	86	140	151
Rift Valley	1,285	1,453	53	54	1	1	69	65	123	120
Western	932	1,040	52	48	-	-	70	52	122	100
Total	6,928	7,668	363	375	17	17	522	579	902	971
Pupils per School	262	356	254	238	432	536	144	152	196	192
										254
										338

Source: Government of Kenya, Economic Survey, 1975.

*Provisional

APPENDIX F:

ENROLMENT IN PRIMARY SCHOOLS BY STANDARD, 1969-1974

	Numbers						Percentage Increase	
	1969	1970	1971	1972	1973	1974*	1972/73	1973/74*
Standard 1	253,298	296,459	306,896	357,366	379,370	958,940	6	153
Standard 2	224,645	241,458	261,660	279,696	316,936	437,375	13	38
Standard 3	197,699	221,235	230,988	256,870	274,081	360,386	7	31
Standard 4	171,573	191,901	207,711	220,994	244,324	301,884	11	24
Standard 5	142,680	158,082	177,547	192,329	206,558	233,003	7	13
Standard 6	141,785	154,603	167,536	185,424	199,873	223,260	8	12
Standard 7	150,647	163,851	173,240	183,240	194,875	219,550	6	13
TOTAL	1,282,297	1,427,589	1,525,498	1,675,919	1,816,017	2,734,398	8	51

*Provisional

Source: Government of Kenya, Economic Survey, 1975.

APPENDIX GPrimary School Enrolments by Province, 1972-1974

		Enrolments 000's			Enrolments as Percentage of:			
		1972	1973	1974**	Available School Places*		Population # Aged 6-12	
					1973	1974**	1973	1974**
Central	..	407.8	443.5	540.8	93	93	114	134
Coast	..	96.1	103.1	152.0	75	87	54	77
Eastern	..	339.6	370.6	521.8	86	90	88	120
Nairobi	..	71.8	76.4	81.4	103	82	87	89
North Eastern..		5.0	6.4	8.7	81	90	13	18
Nyanza	..	269.8	291.1	573.0	78	100	58	110
Rift Valley	..	250.9	279.1	456.7	81	93	55	87
Western	..	234.9	245.8	400.0	92	90	77	122
TOTAL	..	1,675.9	1816.0	2,734.4	86	92	73	107

* Assuming 40 places per existing primary class.

** Provisional

Using population estimates from 'Kenya Statistical Digest' Sept, 1972.

Source: Government of Kenya, Economic Survey, 1975.

APPENDIX HSecondary School Enrolments by Province and Sex, 1971-1974

		Enrolments '000s				Form 1 enrolment as percentage of previous years's Standard 7			
		1971	1972	1973	1974*	1971	1972	1973	1974*
Central	..	32.1	37.1	41.7	51.4	27	33	36	39
Coast	..	13.5	14.4	15.4	17.4	47	47	45	45
Eastern	..	19.4	23.5	24.7	35.4	24	24	25	31
Nairobi	..	24.3	25.3	25.6	21.1	104	106	100	71
North-Eastern	..	0.2	0.3	0.4	0.4	51	57	47	33
Nyanza	..	18.5	22.3	23.0	28.8	19	23	23	23
Rift Valley	..	18.0	20.4	22.3	21.4	27	29	29	29
Western	..	14.8	18.6	21.7	20.2	22	26	28	26
TOTAL	..	140.7	161.9	174.8	195.8	28	31	32	33
Girls	..	42.7	50.6	57.5	68.6	28	30	32	35
Boys	..	98.0	111.3	117.2	127.2	28	31	32	33

*Provisional

Source: Government of Kenya, Economic Survey, 1975

APPENDIX IUniversity of Nairobi: Projected Enrolment by Faculty

Faculty		1972/73 Total Enrolment	1978/79 Total Enrolment
Agriculture	..	144	471
Architecture	..	389	420
Arts (non B.E.d.)	..	500	500
Commerce	..	344	570
Education	..	400	Transferred to K.U.C.
Engineering	..	497	548
Law	..	139	230
Medicine	..	353	569
Science	..	391	842
Veterinary Medicine	..	290	363
Journalism	...	22	85

Source: Government of Kenya, Development Plan, 1974-78

APPENDIX J

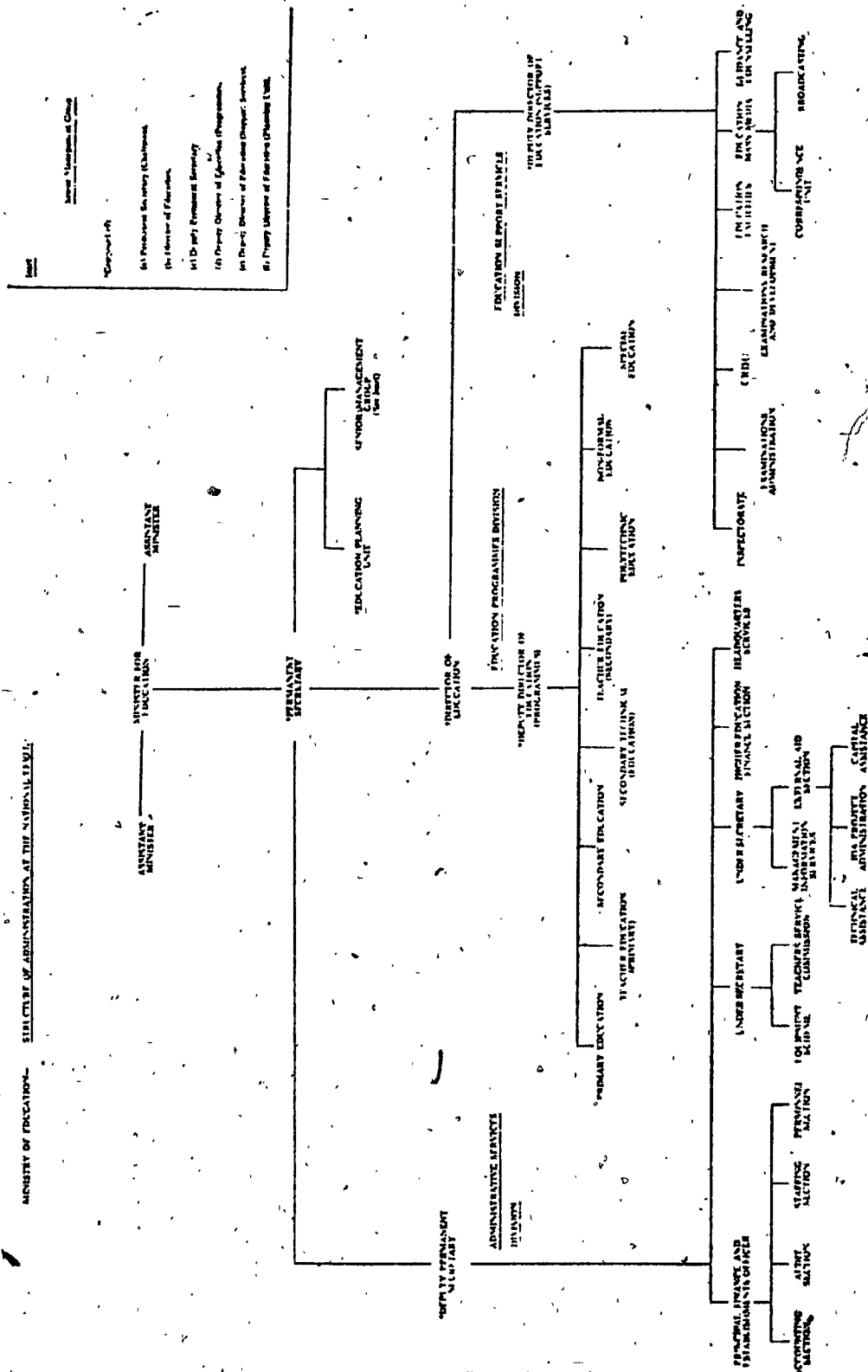
ETV MODEL

	Traditional Educational----- Forms	Traditional Forms-----	Educational Innovation
Educational Methodology	Classroom--- and teacher	Development--- of Audio- Visual and Technology Curriculum Renewal	Integrated Teaching Schemes
Educational Organization	Centralized or Decentralized---	Relaxation of System---	Marriage of Centralized Decentralized Forms, with Feedback
ETV Philosophy	Direct Teaching or--- Enrichment	Visualized Syllabus----- Programming	Component of Instructional System
ETV Organization	Broadcasting or Education--- Controlled	Broadcasting/ Education--- Partnership	Specially Trained Ambidextrous Personnel.
ETV Production	Electronic Studio-----	Electronic Studio with--- Film Inserts and Visualization	Electronic and film Techniques
ETV Distribution	Open Broadcast----- or CCTV	Combination of Forms----- with Recording Off TK	Recorder or Casse- tte Distribution Dial and Computer Access
ETV Utilization	Single Medium/----- Audio-Visual Aid	Multi- Media-----	Systems Approach

Source: Hancock, 1971b

APPENDIX K:

MINISTRY OF EDUCATION—
SERIES OF ADMINISTRATION AT THE NATIONAL LEVEL.



Source: Government of Kerya Development Plan 1974-78

APPENDIX L

School Teachers by Qualification and Citizenship, 1973-1974

	Numbers				Percentage of Kenya Citizens	
	Kenya Citizens	Non-Citizens	Total		1973	1974*
	1973	1974*	1973	1974*	1973	1974*
Primary Schools---						
Professionally Qualified	43,269	51,500	656	632	43,925	52,132
Not Professionally Qualified	12,561	26,156	57	52	12,618	26,208
Total Primary	55,830	77,656	713	684	56,543	78,340
Percentage Professionally Qualified	78	66	92	92	78	66
Secondary Schools---						
Professionally Qualified	3,070	3,313	1,680	1,303	4,750	4,616
Not Professionally Qualified	1,794	2,191	844	762	2,638	2,953
Total Secondary	4,864	5,504	2,524	2,065	7,388	7,569
Percentage Professionally Qualified	63	60	67	63	64	61
Total Teachers	60,694	83,160	3,237	2,749	63,931	85,909
					95	97

Source: Government of Kenya, Economic Survey, 1975.

*Provisional

APPENDIX N: MEASURING INSTRUMENTS

TYPE OF TEST/ TEST ITEM	ADVANTAGE(S)	DISADVANTAGE(S)	TESTING SITUATION	EXAMPLE
1. REAL ON THE JOB PERFORMANCE	-Can observe that trainee does, how he does in actual job conditions	-Danger if high risk associated with job conditions -Observer bias possible -Checklist quality -Trainee stress	Mastery of job performance checked (Application & transfer of learned skills to novel situations)	-Typing letter, -Splicing cable, -Repairing TV set, -Filling-in of forms
2. SIMULATION				
(a) Real performance in simulated situation	-Reduces consequence(s) of mistakes -Reduces stress on trainees	-Rater bias -Quality of checklist	Pilot training; Barber training -Job skills	-Landing & take-off practice on flight simulator; -Shaving a balloon, -Styling hair on a dummy
(b) SIMULATED Performance in simulated situation	-No risk attendant on mistake -Little stress on trainee	-Far removed from real conditions (validity?) -Difficult to generalize from results	Physicians, surgeons -job skills	-Games: in-basket, role-plays, -Business games; -Lunar landing simulation via computer
(c) Verbal description only of performance	-Easy to set up	-No knowledge (assurance) that trainee can really perform what he has been describing	Any of above; atomic reactor technician job skill, etc.	Trainee tells what, where, when, how

TYPE OF TEST/ TEST ITEM	ADVANTAGE(S)	DISADVANTAGE(S)	TESTING SITUATION	EXAMPLE
3. OBJECTIVE				
(a) Alternate response (binary choice)	<ul style="list-style-type: none"> -Easy to construct -Wide sampling of course content possible-permits coverage of many points -Economical of testing & scoring time 	<ul style="list-style-type: none"> -Possibility of guessing the answer (reliability?) -Memorization of unrelated facts is encouraged -Can't tell whether student has learned or not 	<p>Recognition Recall Discrimination</p>	<p>TRUE-FALSE TEST:</p> <ul style="list-style-type: none"> -Sequence of work operation -Meaning of techn. terms.
(b) Multiple choice	<ul style="list-style-type: none"> -If carefully constructed can measure student's ability to make judgments of predetermined exactness -Easy to score -Comparatively free from guessing -Kinds of answers are controlled. 	<ul style="list-style-type: none"> -Susceptible to clues (within construction of item, item choices) -Time-consuming and somewhat difficult to construct 	<p>Problem solving Concept learning Discrimination Theory base</p>	<ul style="list-style-type: none"> -Choosing particular procedure to use for given problem situation. -Verifying possible outcomes of e.g. computational method, work method.
(c) Matching	<ul style="list-style-type: none"> -Measures ability to recognize relationships and make associations -Economical -Requires less construction time than multiple choice items of equal quality 	<ul style="list-style-type: none"> -Inferior to multiple choice in measuring fine discrimination understanding and judgement -Can provide clues, esp. if homogeneity of materials is not respected, and the no. choices is limited to the no. of items to be matched. 	<p>Recognition Recall</p>	<ul style="list-style-type: none"> -Technical terms & their definitions -Positions & associated responsibilities -Repair problem and remedy -Diagram and real part(s).

TYPE OF TEST/ TEST ITEM	ADVANTAGE(S)	DISADVANTAGE(S)	TESTING SITUATION	EXAMPLE
4. COMPLETION	<ul style="list-style-type: none"> -Particularly suitable to measuring recall of factual information; may be used widely -Good for diagnostic & formative tests, since guessing is lower than in 3(a-c) -Fairly easy to construct 	<ul style="list-style-type: none"> -Equivalent or similar answers must be anticipated (scoring evaluation difficulty) -Scoring in time - consuming (relatively) 	<ul style="list-style-type: none"> Recall Recognition 	<ul style="list-style-type: none"> -Where to report particular problem situations -Filling-in of given information on proper place of form -Cf. # type 3(c)
5. SHORT ANSWER	<ul style="list-style-type: none"> -Chances of guessing are minimized -Easy to construct -Widely applicable 	<ul style="list-style-type: none"> -Scoring becomes less objective (rater bias) -Danger of measuring discrete facts, not <u>integrated knowledge</u> 	<ul style="list-style-type: none"> Problem solving Concept learning Rule learning Discrimination Theory content 	<ul style="list-style-type: none"> -Cf. type # 6
6. ESSAY	<ul style="list-style-type: none"> -Documents student ability to organize information, note relationships -Guessing of answers are minimized -Little time required for writing items. 	<ul style="list-style-type: none"> -Not as useful where emphasis placed on achievement of specific skill -Rater bias (scoring influenced by subjective factors) -Much time required to answer -Long time taken to score -Dependent on learner's verbal skills. 	<ul style="list-style-type: none"> Problem solving Almost anything Concept learning Procedure to follow in solving Rule learning Discrimination Theory content... Theory behind use of OZ test set -Describing use of form E-6024 -Explaining meaning of USOC code. 	

SUMMARY OF EVALUATION OF TEST TYPES

"**" indicates test item is superior in relation to the consideration;
 "*" indicates a slight advantage;
 "-" indicates a slight disadvantage;
 "--" indicates a marked disadvantage.

TESTING CONSIDERATION	REAL JOB PERFORM.	SIMULATION		OBJECTIVE		SHORT COMPLE- TION	ESSAY
		R./S.C.	S.P./S.C.	VERBAL	ALT./RES	M.CHOICE	MATCH
Can measure ability to solve novel problems.	**	**	**	--	--	**	**
Can measure ability to organize, integrate, or synthesize.	**	**	*	*	--	--	**
Can measure originality or innovative approaches to problems.	**	**	*	*	--	--	**
Can isolate specific abilities in subject areas from general skills of writing, spelling, and language usage.	*	*	--	--	**	**	--
Has potential value for diagnosis.	**	**	*	*	--	**	*
Can sample adequately the objectives of instruction.	**	**	*	--	--	**	--
Is free from opportunities for guessing answer.	-	*	*	*	--	*	**
Gives consistent scores from scorer to scorer.	-	-	-	--	**	**	--
Is accurate in differentiating levels of competency among examinees.	**	**	-	--	--	**	--
Can be scored by unskilled clerk or machine.	-	-	-	--	**	**	--
Can be scored quickly.	-	-	-	--	**	**	--
Takes little time for writing items.	-	-	-	--	**	**	*
Can sample adequately the content of instruction.	**	**	*	--	--	**	--

Source: Adapted from Thorndike & Hagen: Measurement and Evaluation in Psychology and Education.

(3rd edition, 1969), p. 71.

Appendix N: Analysis of the curriculum in behavioral terms
Curriculum Content Analysis (El Salvador)
Plan Basico-1972

Subject: Science
9th grade

Teaching Unit No. 1: Let's protect
Cognitive Domain Behaviours

	Know- ledge	Compre- hension	Appli- cation	Analy- sis	Syn- thesis	Evalua- tion
1. Digestion of foods in the human organism	*	*	*		*	
2. Infectious diseases; prevention; immunization and vaccination	*	*	*		*	
3. Drug addiction: consequences for the individual and society	*		*	*		*
4. Social diseases; hereditary effects	*			*	*	*
5. Mental hygiene, diseases of the nervous system, their prevention	*		*	*	*	
6. Community hygiene; self-help community efforts in the public health sector	*		*	*		
7. Social security	*			*		*
8. First aid in case of poisoning caused by toxic substances and insecticides	*	*	*	*	*	*
9. Mother and child care. Institutions which advise on maternal child care problems	*		*	*	*	

In the example, we see the results of an analysis based on behavioral objectives and the cognitive domain of the Bloom Taxonomy. The analysis has been performed on the first teaching unit of 9th grade science. In the left-hand column is a listing of the principal topics which are included in National Curriculum for that teaching unit. The six levels of the cognitive domain (knowledge to evaluation) are listed in columns on the right-hand side. A careful study of the activities and teaching techniques suggested for each topic by the curriculum writers permits one to classify the types of learning behaviors which are being emphasized. Each "*" indicates the particular behavior which the topic in the teaching unit should help the student to develop.

Source: Ingle, 1973.