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The Role of Management Systems in Distance Education:

An Analysis of the Educational Media Service of Kenya

Wamuya Ngechu

A Thesis

in

The Department

of

Education

Presented in Partial Fulfillment of the Requirements for the
Degree of Master of Arts in Educational Technology
at Concordia University
Montréal, Québec, Canada

June 1983

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ABSTRACT

THE ROLE OF MANAGEMENT SYSTEMS IN DISTANCE EDUCATION: AN ANALYSIS
OF THE EDUCATIONAL MEDIA SERVICE OF KENYA.

Wamuyu Ngechu

The management system of the Educational Media Service of
Kenya was analysed to determine whether the structure of its
controlling subsystem was designed as a viable system that is
able to cope with the educational needs of its dynamic
environment: distance education in Kenya. Three levels of the
control subsystem, Kenya Institute of Education, Educational
Media Service (EMS) and the Radio Section were subjected to
systemic analysis using Beer's propositions about the conceptual
viable system model. Beer's language of viability was chosen
because it offers a powerful programme evaluation tool which
forms a descriptive model of management. The viable system model
emphasized the value of holistic analysis and design of control
mechanisms for organizational variety. The analysis creates a
description of both existing and ideal systems. Mismatches
between the two identify system weaknesses, and sources of
revision. The controlling subsystem of EMS was found to be
missing: major interfaces, both formal, and informal, crucial
media operative components, especially evaluative subunits,

administrative support services, research and development functions, a media approving body, and containing dysfunctional resource-library services. All levels from production to planning and control were assessed, and corrective recommendations made. The current structure of EMS could be improved greatly, according to Beer's approach, if some of the missing dysfunctioning components were incorporated into the management design. This thesis demonstrates a programme evaluation approach which constitutes an essential skill for educational technologists concerned with the effective design and utilization of learning-teaching resources.

could not have written an educational broadcasting management study.

Special thanks go to my colleagues in the Kenya Institute of Education and EMS who supplied me with relevant documents and moral support, Kenya Government for giving me a rare opportunity to extend my knowledge; the World Bank who sponsored the Educational Media Service project, and financed my studies, Professor P. David Mitchell and Stafford Beer whose teaching directed me to managerial cybernetics, Dr Gordon Pask who extended my knowledge of Beer's managerial language, Dr. P. David Mitchell and Dr. Gary Coldevin whose warm welcome and support made it all seem easier.

I am grateful to Dr. Gary Coldevin for arranging my internship which gave me a broader insight into distance education management systems.

My very special thanks and appreciation go to my two supervisors Dr. John S. Daniel and Dr. Richard Schmid to whom I am very grateful for their stimulating supervision, as well as guidance, patience and encouragement during that long and continuous process of writing, supervision, and revising.

Finally I would like to thank Mary and Kimberly for their assistance in typing, Jocelyn Gueuremont to whom I am grateful for being a perfect system-3-star (the word processor was always in perfect working condition) and my friends whose encouragement and support made the process a stimulating enterprise.

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VSM´ means "viable system model

CHAPTER ONE

RATIONALE

Project or programme evaluation is presently in a state of transition. The need for change has come as a result of the growing interdependence of the world community. It is no longer fashionable or scholarly-for the different schools of thought to work in isolation when solving global problems. This is especially significant in evaluation within the field of the management of distance education which is highly interdisciplinary and dependent on team work.

Educational technologists have gradually moved into the field of distance education which includes the design of courses or instructional programmes and the evaluation of their impact on learners. Distance educators are currently placing emphasis on research studies relating to learner problems, both in terms of the appropriateness of course materials and the social environmental factors influencing the learner during the course of learning. Educational technologists have also moved into the field of programme or project evaluation, especially in developing nations where innovations have tended to be perceived as "transfer of technology" from the developed world to the developing nations. The evaluation of such projects has tended to be influenced by the desire to promote the concept of educational

technology, sometimes promoting the success of the innovations and the value of their educational technology at the expense of sound judgement (APA, 1981; Bhat, 1983; Jamison, 1981; Kerr, 1982; Togbor, 1982).

Programme evaluation refers to "the systematic investigation of worth or merit of some object" (APA, 1981 p. 15). The problem of programme evaluation in distance education has been compounded by many factors. First, the field of programme evaluation is relatively new. This has meant that educational technologists are working in an area lacking in agreed methodologies, standards and criteria as to which levels require rigorous analysis in terms of expected costs. Secondly, the current educational programmes in most universities emphasize instructional design and learning problems rather than teaching the concept of programme evaluation-especially evaluation of the worth or merit of educational innovations in developing nations (Torgbor, 1983). The problems of programme evaluation have been aggravated by strong disagreements related to the concept definitions and evaluation methodologies which have been applied by the various evaluators. For example, economists working in the field of education tended to favour linear goal-models for judging the worth of projects. Educationists and sociologists objected to these models because they felt that the worth of educational projects cannot be judged using a linear goal-model. They argued that education is not an industry with recognizable and measurable inputs and outputs. Education is a social system and cannot separate itself from the influences of the existing social

dynamics. (Instance, 1981; UNESCO, 1977, 1980 , 1982).

Distance education is especially challenging because programme evaluators have yet to answer the fundamental question of what is evaluation. Is it a self-judgemental, quantitative measure of the merit or value of a programme or innovation? Educational technologists have to answer this question in relation to distance education project evaluation. What is being evaluated? Is it the instructional content, design, delivery systems (technology), its impact on learners in terms of measurable learners' acquisition; the management process or the impact on society? Where is the emphasis and who decides? Another fundamental question regards who will do the evaluation, the specialised evaluator (external or internal), generalists (educational technologists), distance educators, laymen (committees), or native peoples who have cultural experience? Answering these fundamental evaluation questions is part of the role of educational technologists, who as problem-solvers are equipped to evaluate the worth of existing programme evaluation tools and techniques. This is done by investigating the tool's appropriateness through empirical replication studies or through rational analysis of contextually specific cases in abstract terms.

The need to evaluate projects became apparent in the 1960s with the growth of public awareness and a demand for accountability and relative decline in educational expenditures (AERA, 1983; UNESCO, 1982; Instance, 1981). At the same time management moved from accepting prescriptive solutions of the

1960s to the adaptive solutions of the 1980s" (Jaap, 1982 p.60). The failure of some educational technology projects, especially in developing nations, created a need for financiers and local management to audit projects in order to account and justify the public expenditure. Funding agencies and policy-makers in developing nations commissioned programme evaluation studies, expecting information for making decisions related to the future of specific distance education projects.

The results of programme evaluation studies varied and differed because evaluators used different evaluation tools and techniques (UNESCO, 1977). Differences also existed because programme evaluation studies are contextual, being highly influenced by social values, individual backgrounds and the evaluators' model of reality. Shaw (1980) pointed out that each person constructs his/her own version of reality using a hierarchical system or lattice of personal constructs. The differences in evaluation studies can be explained in part by various personal realities which are heavily influenced by who sponsored the evaluation, firstly who did the evaluation, who received the information, who was evaluated and what was done with the information. The work of Shaw is especially significant in demonstrating the differences in peoples' judgement of "similar" realities (Shaw, 1980).

The history of evaluation studies in developing nations indicates the need to agree on concept definitions and the resolve of methodological issues. By doing so, policy makers can be provided with data on which to make good judgements about the

benefits of introducing distance education projects or improving existing institutions. Distance education is especially relevant to developing nations where high populations of young, highly motivated students have discontinued schooling due to lack of further educational opportunities. This population represents a key resource for the developing nations: a population which would not need to discontinue learning if distance education designed to suit the learning environments were introduced. The major problem in developing nations is the provision of sound educational materials to all citizens. Such provision has to be based on sound management of distance education projects if developing nations are to witness "an increase in the productivity of educational expenditures (UNESCO, 1982, p.33).

In reviewing the current literature about the effectiveness of distance education in developing nations, clear methodological differences appear in terms of how the evaluation is conducted. North America tends to favour experimental studies with emphasis on internal and external validity while Europe tends to favour case studies (UNESCO, 1980, 1982).

Since 1975, the American Psychological Association and the UNESCO have been working towards establishing programme evaluation standards and methodologies. UNESCO has concentrated on the discussion of methodological issues while APA has concentrated on establishing standards for professional programme evaluators. Once finished, the two documents will resolve some of the existing differences.

The most significant work in this field has been the

contributions made by Cronbach (1980), and economists working in the field of education in developing nations Schramm, 1967, 1977; Jamison, 1977; Jamison, Klees and Wells, 1978; Orivel, 1980; Wagner, 1980; and UNESCO, 1977, 1980, and 1982). Most of these reviewed studies concentrated on showing how distance education projects in developing nations increased or influenced indices like pupils' inquisitiveness, rate of attendance and truancy, enrollment rate, reduction in repetition and dropout rates, cognitive development in terms of increased performance of teachers, criterion, and norm-referenced examinations, enrichment of formal learning-teaching, increased education-learning through extension of educational and learning opportunities, and increased social mobility as a result of equality in scholastic achievement and marketability of distance education graduates (UNESCO, 1977, 1980, 1982). Whilst it is important to evaluate the worth of distance education products and processes in terms of the above qualitative indices, it is also important to assess the effectiveness and efficiency of the management systems at the level of the organization as a whole, i.e., in terms of the overall management design.

Therefore, significant evaluation gaps will continue to exist if programme evaluators fail to consider methodologies for evaluating the management systems, especially the design of the management process. UNESCO recommended the worth of the management process evaluation, "A better process evaluation, i.e. a careful description of the actual functioning of the project in the course of its operation, might help better to identify

important contextual factors and therefore help to increase generalizability of experiences" (UNESCO, 1982, p.132-133). Management evaluation studies are crucial because they are concerned with the staff who execute distance education policy decisions in terms of designing, developing and producing instructional materials, and execution of various administrative support duties related to distance education institutional activities, such as planning, designing regulations and procedures to enhance work performances, leadership or the executive functions, measuring of learner performances, and evaluation of the overall distance education activities.

Holistic organization-oriented evaluation.

The work of educational technologists has been challenged by sociologists who have argued that education is a social activity whose impact, both short and long-term, cannot be evaluated using a quantifiable criterion-based paradigm. These challenges have led to the current search for a theoretical framework on which interdisciplinary teams can evaluate distance education projects. The dilemma facing distance education programme evaluators has led to the recognition of the worth of holistic analysis and the perception of institutional activities from a systemic viewpoint, i.e., understanding organisations in their entirety and as a dynamic body interacting to produce end-products.

The work of Stafford Beer is especially significant in this field. Beer has provided a conceptual framework which is also a tool for analysing management systems (Beer, 1970, 1972, 1979,

1981, 1982). The analytical tool is a form of managerial language for evaluating the design of the management process. Beer's tool is powerful because it assesses the management process rather than the product. The conceptual tool subsumes other methodologies like naturalistic case study approaches and experimental design. The tool is able to do so because Beer's language is multi-dimensional and holistic. The language has drawn heavily from the concepts of management (execution, regulations), General Systems Theory (system's organizational theory), Conversation Theory (client-consultant agreement on concept definition for interaction), and cybernetics (control of the flow of information).

____ The object of the evaluation in the present study was the Educational Media Service (EMS) of Kenya. EMS is a branch of the distance education system of Kenya. Of particular interest was the management system, and Beer's conceptual tool was considered highly appropriate for completing the task. This tool was chosen because of its specific relevance to a distance education broadcasting system. The conceptual tool emphasises control of information, team work, interdependence of management functions and the design of the total organisation in terms of creating essential interfaces. The tool was used to find out what or which parts of the management process were missing or dysfunctioning (disfunctiooning) in terms of Beer's descriptive model. The nonexistence of such processes reduces the effectiveness of the system and therefore its efficiency in terms of work performance.

Beer's conceptual model was judged to be suitable in terms

of evaluating the management process because it is broad, holistic and accomodates different viewpoints, making the tool interdisciplinary, value free, and therefore applicable to many management situations. The tool is also powerful because it offers a holistic methodology for evaluating management functions and recommending ideal management design systems. The tool is comparable to the diagnostic conceptual tools which are used in medicine and law to determine patients' states of health or clients' legal problems. In Beer's language, the client and consultant can interact because the conceptual model has defined five essential components of any management system. Thus the learning evaluation process is based on agreed definitions of concepts which constitute the management language. However, unlike medicine or law's diagnostic tools, Beer's language allows the "client" to make the final implementation decisions.

Beer's language of management was considered to be significantly relevant to an educational broadcasting organization where the "editorial function" is defined as "the control" of transmitted information. The Educational Media Service of Kenya was established to provide high quality information beyond that normally provided by classroom teachers.

Distance education projects like EMS which use a teamwork approach rely heavily on sound organization, co-ordination, regulations, procedures, execution of activities, production and transmission of learning materials in time, forward planning, user views, interactions, internal monitoring of output, utilisation of learning theories in designing educational

messages and devising effective dissemination delivery systems. All the above listed management functions (process) are embodied and subsumed by Beer's managerial language. Hence, there is comparable parallelism or correlation between the concepts explicated by Beer's language and the crucial management functions of a distance education system.

The purpose of the study was to evaluate the effectiveness and efficiency of the design of the controlling subsystem of EMS (i.e., the management subsystem) in the terms of Beer's viable system model. This was done by superimposing EMS management functions onto Beer's descriptive model. Once superimposed, the analysis was expected to reveal the state of the existing management system of EMS in light of Beer's viable system model. At this stage, the analysis was expected to show the missing and dysfunctional or obsolete managerial processes. The analysis assumed that the non-existence of essential components would contribute to the overall effectiveness and efficiency of EMS because the management system's capability would be impaired to some extent if survival and objective management functions were not being carried out.

The superimposed management functions were mapped so that the analyst and the internal members who constitute the "mapped functions" could visually conceptualize the management process. Once having been introduced to the fundamentals of Beer's model, the members too would be able to conceptually analyze the system for its strengths and weaknesses. It was assumed that sound implementation judgements would be made if the people affected

could visually perceive the organisational management schemata in its totality as expressed by the reality of the visual mapping.

The lack of research specific to this area meant that the study had to rely heavily on related literature. Thus the study has incorporated concepts explained in the management literature, distance education methodological studies, learning theories, instructional design, managerial cybernetics, practical managerial experiences from the Commonweath public broadcasters and the theories of educational technology.

The study applied Beer's managerial language to evaluate the management design of the controlling subsystem of the Educational Media Service of Kenya. The tool is found to be powerful, and it could be considered to fill many of the existing gaps in programme evaluation methods. The study, while not being a careful description of EMS functions over time, is however a careful, systemic evaluation of its management functions as they currently exist. The current structure has grown over time, and it is possible for managers of distance education institutions to relate their experiences with those of EMS. The emphasis was laid on the effectiveness of the current management process in terms of possessing the management capabilities which have been explicated by Beer. The outcomes of the study are expected to indicate what needs to be done in order to improve the management system of the Educational Media Service of Kenya, as well as provide a case-study type demonstration of the application of Beer's analysis.

Limitations. During the analysis the analyst was constantly

aware of Jaap's warning that—"The trap we must avoid at all costs is trying to force one model into a culture which is not responsive to its basic philosophy or concepts. With a natural need to understand new or different concepts, we tend to interpret the ideas and practices from our current frame of reference. This limits our capacity to expand our knowledge as we discard those parts which we see as irrelevant or ineffective. On closer examination, however, using different criteria, there are exciting possibilities." (p. 60).

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Considerations in the study of Distance Education

Formal Education

The emergent Third World nations inherited educational systems characterised by gross imbalances, especially in access to educational opportunities, irrelevant curricula and a shortage of teachers and middle and high-level manpower. Kenya was an example of this phenomenon. "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" (Adagala, 1977). Thus after independence, the political systems of the majority of the emergent nations promised increased educational opportunities as well as removal of social-economic inequalities. These nations saw in education the key factor to equalising socio-economic imbalances and increasing the level of their economic development—if education was geared to the national needs (UNESCO, 1982). This notion was supported by the economic theory equating the level of education to economic growth and development. This theory postulated that there was direct correlation between the level of education and the level of

individual earnings. The perceived education and economic benefits at that time supported this view, especially in Kenyan society where there was a correlation between levels of individuals' education, amount of earnings, and social mobility in relative terms. This notion led to the growth of social demand for education by both individuals and the society. People demanded education for themselves and their children. Thus Third World policy-makers were obliged to respond to a tremendous social demand for education. This meant that some of the Third World nations were spending as much as thirty percent of their public expenditure in education. This figure is currently being reduced in some countries but in Kenya the educational sector continues to consume nearly one third of the nation's total expenditure. Thus, since independence policy-makers in developing nations have faced the managerial problem of allocating human and fiscal resources to fulfill the promises made to the electorate.

Distance education was chosen by policy-makers for economic and social reasons. It was used by some countries to solve some of the social problems in terms of extending equal educational opportunities to all the citizens. This strategy attempted to solve social inequalities created by inherited educational systems. Distance education was embraced in a number of countries as a high-level strategy for solving some of the glaring educational problems because it seemed to offer a cost-effective alternative to schooling in terms of utilising scarce resources to meet some of the social needs, expectations and demands for education. Economic evaluations by funding agencies like the

World Bank, UNESCO, USAID, UNDP show that distance education systems are generally cost-effective with variations (UNESCO, 1977, 1980; Perraton, 1982). Economic evaluations by Jami-son, Klees, Wells, and McAnany (1978); Orivel, 1977) and others show that radio has been used cost-effectively in the domain of social development due to the low cost of transistor radio sets.

The concept of distance education is being used in a general way to refer to instructional programmes conducted and operative at a distance. Educational broadcasting systems are usually subsumed under the concept of distance education if they are under the management of educational institutions/organizations (Keegan, 1982). This is because broadcasting is one way of delivering educational content at a distance, simultaneously to identified learners. The same programmes can be recorded by audio-cassette in the case of radio, or video-cassette in case of television. However, they cannot be formally "educational" under Keegan's definition if some form of feedback does not exist (Daniel, Stroud, and Thompson, 1982). Some educational broadcasting systems are tightly managed by Ministries of Education, in terms of content, finance, employment of staff, and provision of receiver sets to users. Examples of some successful educational broadcasting systems are the Tele-Niger project, Hong Kong Education Television Service, Singapore Educational Media Service, Zambia Educational Media Service, Sri-lanka Education Service, and the Mauritius College of the Air. The content of distance education transmitted through the educational broadcasting systems were seen as strategies for equalising

educational imbalances created by physical, social, psychological and economic barriers and environments. Such distance education programmes or projects varied from nation to nation -- and continue to do so --, depending on the nature of the problem being solved through learning-teaching at a distance. Differences existed and still exist between the distance education models chosen by different nations to solve their specific educational problems. These models were expected to fulfill specific social expectations and demands for formal and non-formal education. For example, distance education was initiated and continues to be used for the improvement of the quality of primary and secondary education within the conventional classrooms, for the extension of education beyond the classroom, and revamping educational systems in Africa, Asia, the Pacific Islands and Latin America (UNESCO, 1977, 1980, 1982; Jamison, and McAnany, 1978; Perraton 1982). In fact, nearly all broadcasting systems have in the past provided and still continue to allocate air time for educational broadcasting to improve the quality of school education. Since its introduction, distance education has proved to be a significant method for solving social, economic and political problems in relationship to enhancing individual economic benefits and producing better citizens, thereby fulfilling the expected economic and social objectives.

Whilst significant inroads have been made in terms of increasing educational opportunities through distance education the dilemma which continues to exist among the Third World

nations is how to expand mass education without lowering educational standards; and the related problem of arresting rural exodus by the primary and secondary school graduates. The youth who should theoretically stay in the rural areas to enhance socio-economic development by practising better, and more productive agricultural methods continue to migrate to urban areas seeking blue collar jobs. The rural areas are made unattractive to the young by the educational system which emphasizes elitism and urban life to the detriment of rural development. More recently, the economic view which equates provision of education to solution of social imbalances has been opposed by sociologists who believe that education does not alter social and regional imbalances. The sociologists argue that the content of current education systems -- including distance education -- is elitist, and therefore irrelevant to the hoped-for economic benefits and to the removal of social inequalities (NCEOP Report, 1977; UNESCO, 1982). These dialectical disputes have increased the educational dilemma, and increased the complexity of policy decisions and choices. The educational needs and demands mentioned still exist and the policy issues are complicated by the fact that better education must overcome the following constraints:

-lack of qualified teachers, especially in the science subjects and maths

-the majority of existing teachers are untrained, especially in the rural areas

-lack of adequate financial and physical resources.

-high teacher/pupil ratio

-high drop-out rate,

-rural to urban migration by primary school graduates

-irrelevant curricula,

-severe shortage of learning-teaching resources

These educational problems coincided with greater utilisation of media resources in education, especially after World War II. Different education systems were implemented to utilize media capabilities in order to increase educational effectiveness in three ways. First, distance education systems would use broadcasting in order to reach the majority of the target group of in-school learners. The broadcasts would be supported by complementary print materials. The broadcasts had to be simple so that they could teach and be understood with minimal teacher support. If there were no teachers, the broadcasts would occur with student-monitor supervision. Hence, the programmes de-emphasized teacher support by making them simple, personalised and addressed directly to the learners. Such distance education systems aimed at improving the quality of formal systems by providing high quality broadcasts and textbooks. Second, both the underqualified trained teachers and the untrained teachers were to be educated through in-service training and continuing education programmes specifically designed for the improvement of teaching methods and better subject knowledge. Educational broadcasting was viewed as an inexpensive alternative for raising the academic standards of the primary teaching force. Finally, the policy makers and the planners thought that the quality of

the rural areas could be improved if distance education systems offered integrated non-formal curricula; a curriculum that would attempt to incorporate concerns of socio-economic productivity, i.e., better methods of agriculture, concepts both farming and animal husbandry, and health skills. Thus, different nations choose different models of distance education to suit their policy planning needs. (UNESCO, 1977, 1980 and 1982)

Distance Education As An Alternative Route To Education

There are distance education projects which were initiated specifically to provide alternative routes for primary school graduates who failed to qualify for government/private sponsored secondary schools, for example, Mexico's Telesecundaria, Brazil's Maranhao FMTVE, Minerva Madureza Project, Bahia Madureza, Malawi's Correspondence College, etc.

Distance education often serves as non-formal education, meaning education for the illiterate and semi-literate. The content of distance education is designed to match the learners' daily activities. It is expected to inform, to change attitudes and to improve socio-economic development. Such distance education projects do not offer certification.

Radio, much more than television or print, has been used successfully for social development (Rasmusson and Span-Mead, 1983). In 1977 there were 33 educational radio projects in Latin America (UNESCO, 1977). Radio is also cost-effective, with comparative studies on cost -effectiveness favouring radio over television (Jamison and McAnany, 1977). The "radiophonic schools"

which started in Colombia and later spread to other parts of Latin America are successful distance education innovations for adults mainly because they have developed a curriculum based on the needs of rural adult learners.

Current studies in distance education in developing-nations are encouraging. The literature survey (CEDO, 1974; Daniel, et al, 1982) revealed that distance education institutions are moving away from autonomous systems to joint ventures between two or more agencies. This co-operation is between either public and private enterprises or national and international institutions. For example, Ghana Broadcasting Corporation has co-operated with the Institute of Adult Studies to create a multi-media distance education system. This facet of co-operation exists in many developing nations. Other joint ventures between distance education organizations exist in Malawi, Kenya, Sri Lanka, Middle East countries etc. The co-operation is between government institutions.

In Latin America, universities have co-operated to form an international distance education system— "the Capricorn Interuniversity Program" which has been initiated and implemented by educators from Argentina, Bolivia, Brazil, Chile, Paraguay. But in general, distance education universities in developing nations have not been well developed (UNESCO, 1982).

Third world governments have used radio successfully for political campaigns, radio forums (Tanzania, Senegal, Bangladesh), and other types of programmes to initiate, stimulate and motivate listeners towards change. There have not been many

studies in instructional radio. The most prominent is the
Nicaraguan Radio Mathematics project which was found to be
instructionally effective but expensive (Jamison et all, 1978;
Perraton, 1982; UNESCO, 1980).

National Perspective: the System of Education in Kenya.

The System

The formal system of education consists of three levels: basic education (pre-school and primary); secondary education; and tertiary education. Basic education has seven grades at the end of which students sit for a selective examination to secondary schooling. Secondary education consists of three stages: junior education which consists of the first two years of secondary education, the "ordinary level" which consists of the following two years, and the "advanced level" which consists of two years. There are selection examinations after each of the three stages: "juniour", "ordinary", and "advanced" examinations. The junior examination is taken by some students who may wish to discontinue school. The "ordinary" and "advanced" examinations are prerequisites for the next level of education. They are important certification examinations. The examinations are set and marked by teachers, under the auspices of the Kenya Examination National Council. They are therefore teacher-referenced in contrast to norm and criterion-referenced tests (UNESCO, 1982). There are plans to reduce secondary education to a period of four years (Eshiwani, 1983).

University education takes three to seven years depending on the faculty. The system of education in Kenya is very elitist and

selective mainly because of lack of adequate financial and human resources.

Kenya's education system has experienced several changes since independence. Some of the significant changes have been: removal of racial and religious segregation and barriers, achievement of universal primary education, localisation of curricula, integration of education under the Ministries of Education, and joint management of education by government and parents. The most recent change has been the division of the former Ministry of Education into two ministries: Basic and Higher. The Ministry of Basic Education is in charge of pre-school education, primary education, primary teacher training programmes, administrative and supervisory departments. The Ministry of Higher Education is responsible for secondary and tertiary education as well as related training programmes.

Finance. The two ministries consume about 30 percent of the total government budget. If the expenditures on training by other ministries are included, educational expenditure rises to about 41 per cent of the national budget. Most of the expenditure within the two ministries is consumed by teachers salaries: 90 per-cent in primary; 65-70 per-cent in secondary; 60 percent at university level. (Fine, 1974; Eshiwani, 1983). According to UNESCO (1982), Kenya teachers are highly paid in comparison with the national per capita income, teachers salary being five times higher in average. Kenya also relies on foreign teachers, especially in technical and university education. These teachers

are paid 20-30 times higher than the national per capita income. Such imbalances create problems and a perpetuation of elitist education based on high teacher costs (UNESCO, 1982). In total, primary education accounts for 65 percent of recurrent expenditure. This figure does not include money spent by parents who are responsible for constructing and maintaining primary school buildings as well as teachers houses. This expenditure is likely to rise since population growth is at the rate of 3.5 per cent. The population census in 1979 showed that the total population is about 15 million Kenyans; 7.3 of whom are under 16 years of age and the education system will have to provide education for the existing and future school-going population.

Growth of Education. Between 1974 and 1981, primary school enrollment increased by 38% while secondary schools expanded at the rate of 11%. Some of this difference represents a lack of access to secondary education to primary graduates, the majority of whom are qualified for further education. The majority of the primary school are graduates leaving the school system between thirteen and fourteen years old; too young to either work or terminate their education. This dilemma has led to the gradual re-structuring of basic education from seven to eight years (NCEOP, 1977. Eshiwani, 1983).

The teaching force has grown from 24,324 in 1963 to 127,580 by 1981. The number of untrained primary school teachers has continued to grow. Between 1980-1981, 30-34 percent of the primary school teachers and approximately half of the secondary school teachers were untrained. There has been a high correlation

between increased enrollment and increased number of untrained teachers, both at primary and secondary levels. The role of distance education systems in Kenya is to fill in the gaps and deficiencies which the formal system cannot combat.

Distance Education in Kenya

There are many institutions offering correspondence education, both private and government enterprises. This review is limited to the government funded systems which are under the Ministries of Education. The Kenya Ministries of Education have two institutions teaching at a distance, the Educational Media Service (EMS) under the auspices of the Kenya Institute of Education (K.I.E.), and the Correspondence Course Unit (C.C.U.) which is a subsystem of the Institute of Adult Studies, University of Nairobi. The Educational Media Service is under the control of the Ministry of Basic education while the Correspondence Course Unit is under the Ministry of Higher Education. Since its inception in 1967, C.C.U. has continued to offer distance education for in-service teacher training and upgrading. The education is limited to primary school teachers. Recently, C.C.U. has extended its upgrading training role to other professionals, e.g., training of 3,000 literacy teachers, education of co-operative workers, etc. C.C.U. concentrates on adult and non-formal distance education.

K.I.E. is a national high-level curriculum development unit. It has six projects dealing with all aspects of Kenya's curriculum for education. Out of the six, three of them are

distance education systems. These are the Radio Language arts project, the African Curriculum Organisation and Educational Media Service.

The radio Language Arts project is an experimental programme sponsored by USAID and executed by the Academy for Educational Development. The progamme seeks to explore the cost-effectiveness of increasing radio English language programmes from "once a week to daily" on "improved learning" at the lower primary level for rural target audiences. Lower primary refers to the first three years of basic education, ages six to eight.

The African Curriculum Organisation, based in K.I.E. teaches African curriculum developers at a distance. The courses consists of correspondence lessons which are at first studied at the learners' institutions, and residential face-to face teaching at the K.I.E.

The education Media Service started in 1963 as Schools Broadcasting. The main delivery system was radio supported by print. It was introduced to combat the same educational problems outlined in the section on developing nations. Schools broadcasting was established to improve the quality of primary and secondary education by preparing and producing educational radio programmes to complement the school curriculum. The radio section continues to offer high quality direct radio teaching to schools for both learners and teachers. In 1975, experimental educational television was added to EMS for instructional programmes. Not having a film and television infrastructure, television experimentation was confined to the existing primary

teachers' colleges which possessed television sets. Since its inception, its functions have spread to include the production of film, television, slide/tape and small scale media. The production sections are supported by four service functions: graphic design engineering, publication, and distribution of print materials. The total staff has grown to 70.

The recurrent and development expenditure for EMS operation is part of the 30 percent of the national budget spent on Education. The Ministry of Economic Planning allocates money to various ministries based on their 5-year development plans, annual budget requests and previous actual expenditures. The expenditure is divided into recurrent and development expenses. The allocation of money is based on the submitted justified plans and how well these plans fit into the national development policy. An understanding of the total EMS operational system would contribute to better forecasting by EMS subsystems as well as annual budget allocation by the policy-makers.

At present the management system of EMS consists of five sections: radio, film and television, design and print, library resources, and engineering. These sections are directed by sectional heads. The number of staff in each section varies from 5 to 24. These six sections are in turn managed by the programme director, who reports to the deputy Director of KIE. By 1983, the Management system had an extensive environment consisting of the following: 4,135,345 primary school learners, 464,671 secondary school learners, and 127,580 primary and secondary teachers. The number of untrained teachers was: 37,412 in primary schools, and

8,058 in secondary schools (Ministry of Economic Planning, 1982).

There are 16 primary teachers' colleges with a total enrollment of 12,596 in 1981. The government initiated two secondary teacher training colleges for training of secondary school teachers. There are tentative plans to change the system of basic education, probably to extend the primary cycle from 7 to 8 years and alter the teacher training curriculum. These changes will affect Education Media Service activities since its environment is in a state of dynamic flux. Its future depends on the internal capability of its management system to cope with the changing environment.

Statement of the Problem

The picture painted in the literature on the status of distance education in developing nations is a rosy one. Yet, only a few of the projects have been subjected to rigorous analysis by internal or external agencies. The Educational Media Service of Kenya falls into this category of acclaimed successes yet it has not been subjected to rigorous, systemic evaluation. Systemic evaluation in this study would include a critical examination of the management system to find out whether or not Educational Media Service is doing what it was established to do. This can only be done by a critical holistic analysis of its management system. Holistic analysis means the perception of an organization as a total system. If EMS is perceived as a system, the observer must see it as a whole. This is because a system consists of many component parts which are related, integrated or connected to each other and their environments. The system's components have specific characteristics but they all work together to achieve specific objectives and to produce specific outcomes. If some component parts are missing or dysfunctional, then the system cannot function effectively, i.e., it cannot fulfill the educational objectives for which it was established because it does not possess the requisite capability.

The role of management is to make sure that the organization possesses the necessary capabilities in terms of the requisite

component parts to enable the organization to function effectively. Management should continually evaluate its structure to ensure that the organisation has the requisite component parts. Management is also responsible for ensuring that the system's components are harmoniously interfaced and working together to contribute to the attainment of the objectives. This means that designing adequate operational activities, internal integration of system parts to enhance the operational functioning, and organizational congruence with the environment. This is a complex task and no manager can see to all the operations or decisions involved. Managers therefore create divisions, delegate power and design organizational charts to help them cope with variety. This aspect of management is "control" of the organizational variety. Control in this study means that the system is organized to plan, initiate/execute, lead, evaluate its actions, generate alternative strategies and solutions, and restructure its functions to cope with the needs, expectations and demands of its environment in relationship to its objectives (Jaap, 1982). This means that the organization continuously adapts its functions to serve its dynamic environment. Coping with the environment involves designing system scanning mechanisms which collect information for decision-making(Michael, 1973). Facilitating the decision-making process enhances the system's congruence with its environment and its self-adjustment to cope with its future changes. This means that management systems have to be designed so that they can function as wholes, and this is the aspect that was examined in

this study.

The Educational Media Service of Kenya was analysed to determine whether it has a management control subsystem that is organized and interfaced to enhance integration of its parts, coherence of its function and congruence with the environment. In specific terms the management structures of the three levels, Kenya Institute of Education, EMS and the Radio Section were subjected to systemic analysis to determine whether or not the management structures have the necessary component parts, constituting the requisite system's capability, to meet the needs and demands for a distance education management system. This is a major task, requiring several types of knowledge and skills. Therefore this study was confined to the analysis of the actual structural design of the controlling subsystem of the Educational Media Service. In order to evaluate the design of EMS controlling subsystem, the analysis must include, one level abve and one level below in order to make longitudinal comparisons demanded by Beer's language. There are several reasons why the control subsystems of a distance education system are problematic and need re-designing through analysis.

First, Mitchell (1977) has stated that a role of educational technologists is to "focus on "the optimal allocation of human, material and financial resources to produce desired educational outcomes." This is an important role for any management control subsystem. The future of educational technology and EMS lies in its ability to provide higher quality services and more effective utilization from the same resources, since educational budgets

are not likely to increase in the near future (UNESCO, 1982).

Second, educational technology can save on costs. Moreover to achieve expected outcomes, distance education management systems have to be properly designed. The start-up costs are higher than those of conventional institutions (Jamison, et al. 1978). For example, over 20 million Kenya shillings were spent to build the current Educational Media Service complex. The above figure does not include staff salaries and the recurrent as well as development expenditures which are required when the system is operational.

A holistic analysis of the existing management system of EMS was expected to show the subsystems that currently constitute EMS, any other organizations and groups which are formally linked to its distance education operational activities, both at managerial and environmental levels, and organizations as well as individuals who contribute directly to the effectiveness of EMS.

The analysis was also expected to reveal how the components are organized and connected to function as a whole system. Once the structure of the current system was analysed, concepts of managerial cybernetics were applied to re-design the control subsystem. The study was based on the belief that the control subsystems of distance education systems are complex. They cannot fit into the conventional teaching models (Wagner; UNESCO, 1980).

The resulting model of a system is important, since it can be used for planning future activities, as well as manpower and budgetary requirements. The model represents both strengths and weaknesses, all necessary informatn for intelligent planning. It

is a justified representation of reality since it shows to the
policy-makers "who is needed, where, for what, at what cost" from
a total visual perspective.

Economic Evaluation

Kenya, like other third world nations, faces the problem of
lack of material and human resources. Economic evaluations
(cost-benefit and cost-effectiveness analysis) are useful since
they are concerned with scarcity. But they do not tell us the
total impact of the system on the learners and the society. They
fail to look at the total system: its impact on its environment
and vice versa. History has demonstrated the importance of
self-examination leading to self-improvement (e.g. national
evaluation through special committees, university research or
company self-appraisals) (Brau, 1979; Brooks, 1979). Failure to
do so can lead to costly failures, like the Ivory Coast's
experience. The Ivory Coast's Instructional Television project is
one of the least cost-effective examples of distance education.
It was a nation-wide project that attracted a lot of funds from
bilateral and multi-lateral organizations such as UNESCO, WORLD
BANK, USAID, FORD FOUNDATION, UNDP, International Labour
Organization, French, Canadian and Ivory Coast governments. It
was an innovative, well-designed, researched ande evaluated
joint-venture where billions of dollars were spent. Economic
evaluation by Orivel, (in UNESCO, 1980) indicated its
cost-effectiveness. Yet, the Ivory Coast's project has come to a
halt. Why, when there was no lack of evaluation? Torgbor (1982)

points out the conflict of evaluation reports on the project from sponsors, reviewers and critics as to who was doing what and for whom, reflecting the dilemma facing distance teaching project evaluations in developing nations (Jamison, 1981). The dilemma is related to the contextual meaning of a system's achievement of its effectiveness from the realities of the sponsoring experts (executing and funding agencies) the receiver (developing nations) and the critics (system's observers). "Viewing the Ivory Coast project in its entirety ....It is high time we shifted the focus on logistic and linear aspects of projects evaluation to a more holistic assessment that would take account of the human beings involved. Cost effectiveness, technical quality in material production, paper and pencil tests to assess pupil behavior--all are important, but they do not tell us the whole story of the impact of the project on the recipient. The Ivory Coast set out to produce a young adult who could integrate school life and his environment. She produced a young adult who was articulate in French and had a limitless intellectual curiosity, but who had become an alien in his own native community." (Torgbor, 1982, p. 13). Similar views were expressed, and recommended at high-level UNESCO delibelations (UNESCO, 1980). A systematic analysis of third world projects does point out that in public media distance education successes are often blown-up out of proportion. Another example is the highly accaimed Tanzania health campaign project which was cost-effective or successful since listeners acted and built 750,000 latrines. Yet the latrines were never used due to cultural practices/norms

which the planners and evaluators were not aware of.

Third world nations cannot afford the experience undergone by Ivory Coast, especially when the innovations are built with loaned money. Therefore this study emphasized a holistic analysis of the control subsystem, and implementation decision-making by the staff of EMS in terms of the systems theory models. While recognising the importance of input-output economic evaluation models, this study emphasized the importance of complementing the linear economic analysis models i.e., goal models which are linear and which are mainly concerned with balancing the costs of input and outputs. The economic evaluation goal-models assume that the "producer" of the output is economically efficient (Mishau, 1982). Thus such models assume that the management systems of distance teaching "producer" institutions like EMS are efficient. The concept of efficiency is contextual and achievement-related in terms of work (Instance, 1982). In relationship to EMS, the economic input-output models would be concerned with comparing the costs of inputs and outputs (UNESCO, 1980). Such models would not be concerned with the management systems of distance teaching organisations, which they treat as blackboxes. Under this assumption, economists then calculate variance of the costs of outputs when compared to input costs. The study questions this assumption (UNESCO, 1980). The management structure of EMS was evaluated to determine whether or not EMS as the "producer" of distance teaching-learning materials was efficient and effective. The study assumed that the management system of EMS was effective and effecient if the

requisite component parts of a distance education system were in existence, integrated, connected and functioning as a coherent system, congruent with its environment.

Secondly, the distance education management system as "producer-system" consists of functional activities which fit best into an industrial-model (Peters, 1967; Wagner, 1980). The study examined whether or not the management system of EMS was designed to manage an industrial enterprise. Was EMS designed to operate as an enterprise? This was a big question, hence the limitation of the analysis to the examination of the design of the control subsystem.

In developing nations, the concepts of educational technology, its innovations, and industrial management, especially in distance education, are relatively new. Worse still, developing nations lack manpower with managerial skills, especially in distance education systems. The study emphasized the holistic approach to examine the problems outlined above. Distance education systems have to be implemented with particular care and nurturing if they are to survive economic austerity and conventional biased attitudes.

It was timely to subject the management system of EMS to a systematic analysis because by the end of 1983, the custom-built complex (office, studios, library) will have been completed and operational. The study mapped existing activities of EMS onto Beer's conceptual model to reveal, through analysis, component parts of the management system that are obsolete, missing, dysfunctional, those that needed to be retained and enhanced and

areas where new programming is needed. More important, the analysis demonstrates visually the linkage of component systems, subsystems, interrelationships, channels of communication, and environments that constituted the management system of EMS.

This study was limited to the analysis of the existing structural design of the "Controlling System", therefore making the study a conceptual evaluation. The problem can be re-stated as:

Is the "Controlling Subsystem" of the management system of EMS designed as a viable system that is able to cope with the educational needs of its dynamic environment ?

Are the component systems of the control subsystem designed to facilitate coherence, co-operation and co-ordination of the whole system as in industrial models?

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Description of Beer's Model

Educational technologists have successfully applied models to solve educational problems, (Jaap, 1982; Lent, 1979; Jamison, 1977). The current literature on management systems reveals three types of management models. These are the Japanese model (managerial culture), the goal-model (economic linear model), and the system-model (holistic model).

The first two types of models were rejected in this study because they do not deal with the problem of designing management systems with adaptive and flexible capabilities.

The Japanese model. The Japanese model emphasizes the creation of managerial culture in organizations. This culture is reflected by the various organizations' traditions and ceremonies which have values and meanings for the individual employees working in the organizations. The management cultures are geared towards evolving organizational communities in which individuals realize that each one of them is individually and collectively responsible for the organization's performance or effectiveness, (Jaap, 1982). The model therefore, places great importance on the development of human resources, i.e., the strengthening of individual and organizational interpersonal bonds. This is what Michael calls organizations participative processes (Dill,1982; Michael,1973).

The goal-model. The goal model originated from economic and

engineering studies. It emphasizes the organization's achievement of stated goals/objectives, thereby sacrificing the organization's adaptability to its environmental needs in persuance of its goals (Beer, 1972). This is because the model is based on decision theory in which the organization engages itself in a series of activities aimed at reaching some defined end-points/or producing some defined outcomes. This approach of decision-making uses probability statistics to predict the outcomes. The model emphasizes causal relationships between intermediate and ultimate goals. The application of goal-model in the evaluation of distance education projects like EMS has been challenged by educationists who claim that education is not an industry with identifiable inputs and outputs which are causally related (Cummins et al. 1981; UNESCO, 1982). The goal-model is interested in the final products/profitability. It is difficult to use the goal-model in evaluating the design of EMS management process and hence judging its effectiveness in terms of its capability. It is problematic because goal-model's criteria varies situationally depending on the organizational settings. It is also difficult to separate individual objectives from the organizational objectives, and vice-versa. Why do people choose certain functions and join specific organizations? Michael has postulated that peoples' compulsive desire to control makes them choose professions like teaching, management, engineering, invention, or bureaucracy (Ratoosh and Michael,1973). It is difficult to substantiate the allegations since we do not know the extent to which individual goals influence organizational

effectiveness and vice versa because this can be known, at best, only for a specific organisation at a particular time. The goal-models are not concerned with these distinctions since what matters is achievement of the end rather than the means for doing so. Goal-models cannot therefore be applied to a structural analysis of a multifarious social system like the Educational Media Service. This is because the effectiveness (system's capability) of EMS management process is the subject of this study.

In addition, the management functions and activities of EMS do not best fit a model which places emphasis on a series of activities since its activities are multi-dimensional, like all social systems with an infinite number of black boxes. Therefore, a goal-model is inappropriate for the evaluation of the management system of EMS (Cummins et al. 1981).

The holistic system-model. The system model is appropriate for the study of EMS because it treats organizations as social systems. Educational systems like EMS are working models of social units. Social systems are characterised by nesting of systems within each other, hence creating dynamic situations and constituting messes which can only be analysed holistically. Social systems cannot be treated linearly as though they were composed of series of functional activities aimed at some defined end-points as goal-models presupposes because social systems are dynamic and holistic. With system models, all activities are dynamically interrelated and there are no defined end-points from which causal relationships can be assessed. However,

correlational relationships can be sought using multiple criteria
at any point within the continuum. It is possible to evaluate
different criteria at specificied times to determine the state of
the system. Many system models are generally difficult to
operationize because they do not make provision for establishing
and identifying causal relationships that may potentially exist
between and within the systems' criteria themselves, i.e., the
dependent variables. However, a system-model was appropriate for
evaluating the design of the management structure of EMS because
the study was interested in identifying the existence of the
processes for the "control cycle of planning, directing and
evaluating organizational operations" (Michael, 1979, p.41). This
system-model is future-oriented and corresponds to the crucial
management function of controlling rather than decision-making,
for control is the prime responsibility of managers at all levels
of management.

A prime example of a system model is that of Stafford Beer
(1979). Beer has offered a managerial method of describing what
he has named as: "viable system model (VSM)" which is a
multi-dimensional construct of relationships: people, functions,
resources. It is a powerful tool for the analysis, diagnosis and
design of management structural processes. The approach is
equipped with a language for its description and a structure for
re-designing and establishing new values and meanings of the
conventional organizational charts which characterise the
thinking and structure of most management systems. "At least, I
have proposed a model, and a language for its discussion" (Beer,

1982, p.31). The VSM empasises the value of analyzing and designing systems holistically as well as designing control mechanisms for organizational variety. Beer's viable system model assumes the logic of one world and one set of values for the underlying evaluation criteria (systems' adaptability) and is universally applicable in any organizational setting. This approach is suitable for analysis of EMS which, as an educational organization, is a social system consisting of messes with multi-attributes. The analysis will therefore avoid danger of missing levels.

Beer's Management language (Viable System Model).

Every viable system has three important characteristics. These are:

-possession of five sub-systems which express the necessary and sufficient conditions of survival (Beer,1982).

-the invariant property which means that each one of the five subsystems-is necessarily a set of viable systems itself, thereby making the viable system have the property of closure. This means that the VSM observes itself in its activities. This is the important quality of self-reference, for the viable system model is what it does rather than what it says it is.

-the viable system is "recursive." Each "recursion" level uses a language which the levels above and below.

do not understand.

The model shows positions, functions, relationships, areas of collaboration and co-ordination, coherence, and differences of a management system. An individual organization's performance is determined by the extent to which its complexity mirrors that of the environment. It is therefore important to examine organizational structures holistically to determine those environmental elements to which organizations respond. The complexities can be compared to find the elements that cohere together and those that are mismatches. Once the mismatches are identified, organizations can be re-structured, for organizations are systems of structured functions, relations, actions, and some unstructured activities which may be harmful or beneficial in judging the organizational effectiveness.

The viable system is viable if it can maintain "quasi-independent" existence. It is a self-organizing, purposeful system. It has internal criteria of stability which enable it to maintain homeostasis and to adapt itself to a dynamic environment. A viable system exists in an environment that is a precondition of its viability (Beer, 1979).

The Educational Media Service exists in an educational environment which is a precondition of its viability. It would not have existed, without certain educational needs. The school system for which the Educational Media Service was created has changed since 1965. The fact that school's radio broadcasting has grown and survived means that the system has some adaptive capability.

The study emphasizes the analysis of management design. Beer, Lawrence and Lorsch, Michael and others consider that the viable management systems will be those that will master the science and art of organizational design to achieve both high differentiation (clarification of functions) and integration (coordination of the total organization).

In relationship to the Educational Media Service, the management has a defined environment: an environment which is clearly defined by Kenya's educational acts and plans. The environment is captive and consists of a direct environment (the school system) influences directly by the non-formal educational system and the surrounding political system. The work of EMS management is to serve the needs of the stated environment.

In this study the evaluative question about the management design of the Educational Media Service of Kenya is primarily concerned with what it is doing (rather than what it says it is doing). Is there a direct correlation between its observed activities and its stated objectives? Is there dissonance? Are there mismatches between what it is doing and its internal criteria of stability? Does it have built-in error-correcting mechanisms? Does it have a comparator which compares its outputs with its internal criteria of stability? The criteria of stability refer to the Educational Media Service "internal editorial standards" which are used when judging the quality of distance education final productions (broadcast and print materials). If mismatches can be identified, then it is possible to generate solutions utilising the powerful descriptive

qualities of Beer's model and keeping in mind the views of other organizational reseachers especially in the field of the systems' model designs.

Brief description of the five subsystems

(Insert Figure 1 about here: showing the five subsystems of Beer's viable system model)

System 1

System 1 is horizontal and carries out operational activities of the total system (i.e., what business are we in?). It emphasizes the present activities of the organization's business within its physiological limits. In brief, it is action-oriented. It consists of the management unit and is linked directly to its defined environment. The three parts of system 1 are embedded within each other: the management unit being the core of the "embedment"; The parts are connected by channels which have the capacity to transmit the variety generated. This means that there is considerable variety diffusion within the embedded structures which heightens the interaction and interdependency of the three parts. System 1 is also autonomous and is much more aware of the organization's day to day specifics than its metasystem, i.e., the boss since it has a better knowledge base. This means that systems 1 must be given:

-freedom to carry out present organizational business

without its metasystem "breathing down its neck" all the time,

—authority to execute its operational and environmental transactions (distance education research, development, and production of materials),

—trust to carry out its duties, and

—autonomy to make necessary choices, err and carry the responsibility for the consequences of the choices made.

If the above concessions are given, there will be facilitation of organizational loyalty, since system 1 can err without fearing reprisals or going to the extreme of covering up important ideas, views, and information at variance with its metasystem. This freedom acts as a delimiter since the given choice is a responsibility (Beer, 1979, 1982; Michael, 1973).

System 2.

System 2 is a cybernetic discovery made by Beer. It is a subsystem of system 3. It exists and is designed to dampen conflicts between systems 1 and system 3. It handles issues, such as policy statements, designs subsystems for routine reporting, and enhances co-operation and co-ordination between systems 1, system 3, and system-3-star (see Figure 7). It is also used by system 3 to dilute the superior power generated by system's 3 orthonogonal relationship with systems 1. System 2 does so by

carrying out co-ordination activities, thereby, reducing to some degree systems' 1 perception of system 3's executive functions. This happens because systems' 1 perceive system 3 from a horizontal-vertical dimension. System 2 is therefore a service for systems 1 and 3. Its functions are unique and important, for without system's 2 anti-conflict capability, critical resources for systems' 1 activities may be wasted in survival rather than functional activities. A system's survival activities are called autopoeisis, i.e., activities for the self-production of the organization. To carry out its functions, system 2 requires different cognitive, affective, behavioural, and perceptual skills in order to make identifications and distinctions of problematic activities, and to report accurately to system 3 for resolutions of conflict and command decisions.

System Three

System 3 is the "corporate directorate", occupying the vertical command axis with orthogonal relationship with systems 1. It is the boss of systems 1, and as such, it exercises vertical intervention necessary for maintenance of cohesion between systems 1. System 3 is able to perform this role because it occupies a strategic superordinate position which gives it a systemic viewpoint, i.e., a broad picture of systems' 1 activities. This position makes it possible for system 3 managers to co-ordinate lower level activities since they understand systems 1. interactions better than the individual managers of systems 1 (Beer, 1979, 1981, 1982, Michael, 1973). System 3 is therefore a very important system since it is responsible for the internal functioning of the viable system. Beer calls it the fulcrum of the viable system. According to Beer, systems 3 span of control should be between 6 to 7 Systems 1. The executive function of System 3 is to make tactical policy decisions for systems 1. System 3 is able to do so because its business or main concern is with the present activities of the organization, or "inside and now". However in order to minimise its use of the command channel, system three has two subsystems responsible for its metasystemic activities. These are, system 2 (previously discussed) and system-three-star. The role of system-three-star is to provide services to enhance operations of systems 1. This system also audits systems 1 financial expenditure to prevent

fraud. System 3 uses this channel to check informally the performance of systems 1 during for example, cocktail parties or informal gatherings. Having system 2 and system 3-star enables system 3 to avoid becoming autocratic and gives autonomy to systems 1. The metasystemic activities add neccessary requisite variety to the vertical axis so that vertical and horizontal possible system states are balanced out (see, Beer for detailed analysis of organizational variety).

System 3 is therefore an important decision-making-point at one level of recursion. This executive function is also significant because System 3 is aware of the future, for it maintains a powerful homeostat relationship with system 4. System 3 is able to do so because it also belongs to the above level of recursion. This means that system 3 can authorize future activities since it is made aware of possible future options and implementation decisions by its respective relationship with system's 4 futuristic activities and system's 5 policy decision function. Thus system 3 is able to make implementation, continuation, and utilisation decisions as a result of occupying this crucial metasystem position. Because of occupying this crucial position, system 3 is able to deploy its command channel to provide leadership and day to day administration. Michael maintains that this relationship is the result of the law of hierarchy (Michael, 1973). Beer has emphasized the importance of system 3 loosening its control over systems 1 by encouraging trust, openness, support, expression of feelings at variance with system's 3 thinking so that the command channel can reduce the

degree, and the amount, of covering up of important information by systems 1 that system 3 may need. This is where those crucial algedonic meters or interpersonal relationships can be applied by system 3 when dealing with systems 1 in order to control their activities. System 3 can do so by applying the pain and pleasure syndrome or reward and punishment for exercising control.

System 4.

System 4 is the planning component exploring the problematic futuristic environment, what Beer calls "outside and then" (Beer,1979). The role is laden with conflict, ambiguity, stress, frustration, hostility, and lack of understanding since its outcomes threaten autonomy of the other subsystems. System 4 staff are resented by systems 1,2,3, because they are perceived as representing power, omniscience, and as operating clandestinely from systems 1,2,3 viewpoints.

System 4 activities are essential in any organisation for the viable system must plan for its future by preserving organizational competence that must survive. System four's explorations define new realities, opportunities, developments, and innovations which prepare the organization for future technological discoveries. An organization lacking system 4 is costly, for it pursues the present and meets the future unprepared for new technologies.

The staff who work at system 4 level are special people, people who can think dialectically and cybernetically. (Beer, 1979; Michael, 1973). Other characteristics should include: staff

equipped with skills of research and development; people with initiuitive skills; personalities who can embrace error, take risks and who can function under conditions of great turbullence; people who are treative as well as being realists, able to formulate problem-oriented questions which embrace error; people who interpret data correctly, and they are not afraid to report the results correctly even when such information threatens the competence, autonomy, authority, and control of top and middle level management. The staff who operate at this level have special talents. They and other members must therefore be treated with care, love, attention, and be given freedom to explore the future. Such people are hard to find, hence the importance of nurturing the staff who carry out futuristic research and development functions to prevent feelings of being frustrated. Beer has recommended maintenance of a powerful homeostasis between system 3 and 4. There should also be an area reserved for interactions between system 3 and 4 to reduce resentful feelings, misperception of system 4 futuristic activities which are often perceived wrongly by systems 1, 2, and 3.

System 5.

System 5 represents the Board or various committes. It provides closure for the viable system. It is the highest decision-point at one level. System 5 staff make strategic policy decisions. Their role is crucial because they shape the future of an organization. In most cases system 5 staff are removed from the day to day activities of an organization. This distance makes

their function objective so that they can resolve disagreements between system 4 projected future activities and system 3's performance capability. Thus system 5 decides on important policy implementation decisions.

Additional components of Beer's model

Channels of variety. Beer's viable system model has several channels of variety since its existence depends on a continuous flow of information. Channels of variety consist of any possible mechanisms that an organization may deploy to transmit information within and between itself and its linked environment/s. System models emphasis that organizations should have feedforward and feedback channels which are crucial for amplification and attenuation of system's variety. A system's variety means the infinite possible states which a system may exhibit in carrying out its survival and functional activities.

This flow of information makes the model a learning system, evolving towards a specified system goal/s or objectives. This is an important consideration especially in analysing distance education systems like the Educational Media Service because poor programme quality may affect many learners. Therefore immediate remedial mechanisms are crucial if learners are to be saved from learning wrong messages. And it is not easy if several channels for amplifying and attenuating desired (distance education content) and wrong signals (not properly explained content) are not catered for in the management design.

The concept of Beer's viable system model is based on

information flow. The five systems have channels communicating information to each other and to and from the loosely defined environment of the viable system. These channels are subject to the Law of Requisite Variety since their role is to transmit information continuously so that the "organization" can maintain its internal equilibrium or "homeostasis". (Homeostasis has been defined as "regulation of variables important to the survival or well being of an organism" (Samuelson, 1978). This operational definition of "homeostasis" will be used in this study.) This information amplifies or attenuates system's variety and makes it possible for the system to regulate itself and maintain control between and within the five systems.

The channels which transmit variety from source to receiver are called by Beer "variety amplifiers". Beer also uses the terms lower variety bloc (source), and higher variety bloc (receiver). These channels must be designed properly so that they can communicate messages within the viable system model in such a way that judgement and decision-making can be made based on correct information. These channels are crucial, especially in distance educational systems which represent a lower variety bloc but with high variety output (broadcasting source), and the captive environments (listeners and viewers) who represent the higher variety blocs with high variety input. The "variety amplifiers" channels (delivery systems) convey knowledge, information, and skills to the distance learner. Hence, the need exists for reducing content misunderstandings as much as possible by clarifying distance education messages. In order to fulfill the

law_ of Requisite Variety, there must always be matching control variety to offset disturbance variety in order to achieve control of an organisation or system. Channels which transmit messages from the high variety bloc (receiver) to the low variety bloc (source) are called variety attenuators by Beer, (1979). These channels carry control variety which is used to cancel out the perceived disturbance variety. Another name commonly used to describe them is feedback channels. The two channels form a dynamic loop, enabling the system to maintain balance within its physiological limits. Variety control channels are therefore crucial, for they must be able to distinguish correct information signals from noise and vice versa. This means that they must have the capacity to transmit generated messages clearly and correctly, and to filter or discard useless information. They therefore carry heavy costs because the information transmitted is used for making critical decisions. Therefore the staff responsible for information transmission must be able to evaluate the information transmiting only the important signals. Their function is to stop management from being inaundated with data, for managers at all levels tend to fear information carried by variety control channels. This is because sometimes such information exposes managerial failures and successes, thereby revealing their strength and weaknesses. Managers, if overloaded with too much information, find themselves caught up in the vicious circle of dealing with trivialities especially interpersonal conflicts, and having no time for making important present or future decisions. The costs wasted are difficult to

calculate (Beer, 1968; Duckmanton, 1977; Michael, 1973).

The transducers. The transducers "translate" information whenever it crosses a system's boundaries. According to Beer, "there has to be a mechanism at the boundary capable of coding and decoding these messages as they pass. This mechanism is called a transducer, because it leads across" (Beer, 1979, p. 101). Samuelson has defined transducers as "devices for the analogous transformation of one form of energy into another. This tranformation occurs directly or indirectly by controlling a generator of the second form of energy by means of the form of energy to be transformed." (1978) The word transducer has been used by Beer symbolically to mean, "conversion or translation of one kind of signal energy into another kind" and this operational meaning will used in this study. This means that the information carried by the feedforward and feedback channels is changed by transducers who receive, interpret, translate, then, pass on transmitted messages. There are various forms of "transduction" processes ranging from the electronic, logistical (receiver sets), pyschological and cognitive. In brief, "transducers" should convert information from one kind into another but not interpret the transmitted messages as it happens in management. Beer emphasizes their crucial role in message interpretation since they can distort or clarify information signals during the transduction process. To ensure that there is no message distortion the variety capacity of the transducers must be at least equivalent to the control variety of the input or output channels (Beer, 1979).

Algedonic loops. Algedonic loops are special channels for transmitting emergency messages across levels of recursion and hierachy. Algedonic loops are used to prevent the viable system from becoming comatose. It is possible for organizations to reach this state because most managers use the hierarchical structures to make themselves inaccessible from the lower levels. This means that management may be unaware of lower level turbulence, hence making themselves unaccountable for lower level errors. They also use the aura of expertness to protect themselves from being judged as incompetent (Michael, 1973). This could be one of the reasons why managers tend to hide and avoid interactions with lower level manager. The syndrome of the boss always being right means a lot to some managers. Managers can therefore go to sleep, inside their castles, while the organizations plunges into chaos. Algedonic loops are designed to prevent organizations from destroying themselves.

At the bar. The bar represents the informal channels of communications. This is one of the channels properly utilized by most organizations, for without visiting the bar, or (its equivalent) managers may miss important information and knowledge. At the bar, managers can openly express and acknowledge feelings of uncertainty, fear and other anxieties without fearing loss of their dignity/aura, and without being judged. At the bar, feelings can be given, received, and recognized without judgement. The role of the bar is to provide

a place where managers can reduce stress by acknowledging organizational conflicts, ambiguities, confusion, and disruptive cliques. At the bar, there is no need to be defensive, distrustful and negative. This means that the bar enables managers to increase their trust; valuing, and self-understanding, since ideas are given freely and received without judgement. The bar also provides an environment conducive to giving, rewarding and correcting of knowledge or information (positive and negative feedback), since the atmosphere is free of social conventions which make people experience feelings of rejection and domination, even by their peers. It is important to note that even at the bar, managers do not cross levels. The logic of the viable system is based on the fact that managers speak different languages at all levels of recursion. The bar is therefore the place where people at the same level share their strength and weaknesses by acknowledging conflicts, anxieties and fears.

CHAPTER THREE

ANALYSIS OF THE EDUCATIONAL MEDIA SERVICE

In order to understand and thereby improve the current structure of the Educational Media Service, three levels of the organisation have to be analysed: the institutional level, the divisional level, (i.e., EMS) and one subsystem within EMS. The process represents a "continuum" from macro to micro analysis. The use of Beer's language calls for this three stage analysis. However, the need to identify the content and the interrelationships of these layers is also made clear by the management problems briefly presented below. It is this apparent interrelation of problems that "validate" Beer's strategy.

Management Problems and Levels of Analysis

The emergence of the Educational Media Service within the Kenya Institute of Education created a problem of managerial disharmony. It is a unique problem because a media production division was merged with a system of entirely different purpose, namely national curriculum research and development institute. The media division produces distance education instructional programmes for schools and non-formal audiences while the two

curriculum divisions conduct basic and applied research for the improvement of formal and non-formal curricula. The end-products for EMS are multi-media curriculum packages while the end-products for the curriculum divisions are syllabi and sometimes textbooks. The majority of the school textbooks are published by commercial companies. This distinction between the end-products explains the different operational activities, processes and outputs of the three Institutes' divisions.

The learning-teaching instructional materials for each division are intended for the same audiences, teachers and learners. The levels of operation are different; yet similar in many ways. KIE operates at a high-level, making national curriculum policy guidelines and plans. EMS also operates at a high-level in making media guidelines and at classroom level in planning, developing, and producing distance education materials. Hence, the end-products (textbooks-multi media materials) complement each other because they are integral components of the schools' learning and instructional resources.

Curricula "end-products": Syllabi and textbooks. Syllabi are the main end-products of the two curricula divisions. Syllabi are broad teaching guidelines. They inform the teachers about the amount of content which each class level is expected to cover in order to achieve specific educational objectives and given scholastic achievement. Therefore, the success obtained from the syllabi and textbooks is dependent on teachers' understanding and subsequent utilisation of the skills and knowledge embedded

within them. That is why the Ministry of Education has a department called the schools' Inspectorate, whose job is to ensure that teachers make the best use of the syllabi and textbooks by correctly interpreting the teaching and learning guidelines. This is possible since the system of education in Kenya is centralized and the Kenya Institute of Education is responsible for developing the broad curricula guidelines through applied research.

Sometimes, the two curriculum divisions produce detailed teachers' guides and pupils textbooks, especially if the divisions are introducing a completely new and unfamiliar curriculum. On such occasions, the two curriculum divisions cooperate with the inspectorate to conduct teachers' in-service courses. The educational media division must observe two objectives when developing the multi-media curriculum packages, especially those intended for educational radio.

> "Schools broadcasting in Kenya has two main objectives
> at both primary and secondary levels. The first is to
> alleviate situations in which there are inadequate
> numbers of well-trained teachers. The second is to
> bring relevant and tested educational support materials
> into classrooms where, at best, provision from other
> sources is often inadequate and frequently
> non-existent." (CEDO, 1974 p.193).

The multi-media curriculum packages consist of viable instructional material intended for direct consumption by the target audiences. These materials consist of radio programmes, films, video, tape/slide, photographs and charts. The recorded materials are accompanied by supporting teachers' notes and sometimes pupils' pamplets. These notes contain brief

instructions for the classroom teacher and the pupils. The content of the instructions consist of the activities envisaged for teachers and pupils before, during and after the broadcast. The broadcast notes are expected to prepare the classroom teachers for the optimal utilisation of distance education. The Education Media Service considers it important that the teachers' notes include brief but clear summaries of planned "broadcast" content and the activities envisaged for teachers and pupil. It is considered impolite to invade the teachers' classes without informing them about the nature of the broadcasts. With advance information, teachers can link broadcast content and projected classroom activities with their on-going scheme of work (instructional plans). A survey by a British Council and Commonwealth team found that teachers utilised the print notes quite often.

> "The teachers' notes already showed signs of considerable use at the beginning of the first term. Generally only two copies are issued to each school and staff compete to gain possession."(CEDO,1974:196)

The situation has since changed and the notes have increased as well as becoming more detailed in accordance with the teachers' resource needs. The broadcasts have become more self-sufficient in the hope that they will redress the imbalance of educational opportunities between urban and rural areas, and among educationally disadvantaged groups of learners.

The difference between Media and Curriculum divisions is therefore embedded in the nature of the programmes' themselves. EMS programmes teach at a distance directly to the learners,

using the teachers, college tutors and institutions as resources.The end-products of curriculum divisions are developed and written for further analysis and interpretation by teachers.

The above discussion leads to another difference, which is also related to the resource requirements. EMS materials comprise self-sufficient distance learning resources which learners can utilise with minimal assistance from teachers. Therefore, the language used in transcription is simple, personal and explicit. The curricula materials addressed to teachers are written in a formal language. There are therefore differences in terms of production operations, methods of delivery, and implementation. These differences will become more apparent during the "institutional analysis".

The final difference relates to the cost of the learning materials.The learning material produced by EMS is distributed freely to the learners while textbooks and syllabi materials are distributed at the cost of production by a special department called; the "Kenya School Equipment Scheme".(The Kenya School Equipment Scheme is a buyer and distributor of primary schools learning resources. Primary schools buy their learning resources through this department). This is a crucial distinction because the methods of delivery are related to financial and human resource requirements. First EMS pays for publishing and delivery of its materials. Second, EMS is responsible for the dissemination of its materials. They are distributed through surface channels or air waves. In comparison, the curriculum divisions do not pay for the publishing and delivery of their

end-products. The cost of publishing is borne by the Jomo Kenyatta Foundation which is a government department responsible for publishing syllabi and textbooks developed by the two curriculum divisions.

These financial differences create managerial problems of balance and perception, particularly with respect to the allocation and utilisation of human and material resources. Each division requires a predetermined amount of resources, and they therefore compete. In practice, media productions require more resources for start up and recurrent expenditures. The cost of air time alone consumes nearly two-thirds of the Institute's budget.

Mission conflicts. Yet another major difference between the divisions is related to the internal operational activities (processes). Real difficulty arises out of the requirement that the division of the Educational Media Service participate in curriculum development activities as well as carrying out media production activites. How much time should the media division spend on curriculum development and how much on media development and production? This is a sensitive issue because the two separate activities both provide considerable opportunities, thus creating a confict. For example, the media division is provided with a national framework and opportunities for participating in national and international curriculum-oriented conferences, projects, seminars and workshops. Curriculum-oriented participatory activities are encouraged since they are creative and desirable; but, they also conflict with media development and

production activites in terms of time and cost. The situation is a managerial dilemma. While it is desirable for the media division to participate in the on-going curriculum development and research processes, it is also important that the division keep asking itself this survival question: what business are we in? It cannot be both a media service subsystem and a curriculum research and development one. The Educational Media Service cannot perform dual tasks without neglecting one. This has been a divisional problem caused by the fact that media specialists have both subject and media production expertise. The curriculum specialists, on the other hand, do not have media production expertise. Hence, the desirable diffusion process is one-sided to the detriment of the media division.

Given the problems as outlined above, it is apparent that analysis must be completed at the institutional level of in order to relate the structure of the Educational Media Service to the structure of the overall Kenya Institute of Education. The discrepancies identified will assist the internal members of the Institute in correcting the problems. Because EMS is only one part of the Institute along with the curriculum research and development divisions, and yet "serves" those divisions as well as operating independently, the emphasis will be placed on those interrelationships. The analysis will allow us to make longitudinal conclusions and judgements about the structure of EMS and its subsequent improvement.

Finally, the divisional analysis will be enhanced by a micro analysis of one of its embedded control subunits. The analysis of
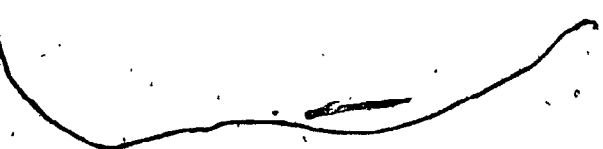
one of EMS sections will allow us to understand better the Educational Media Service micro operational activities and delivery components. The radio section was chosen because it has been in existence since 1963 and it is the main distance education subsystem of EMS. The longitudinal analysis across the three levels of management will enhance insight into the current controlling subsystem of the Educational Media Service. This will enable the systems analyst to draw correlational conclusions and make recommendations which spring from the interrelationships of the existing structures of the three levels of management.

To recapitulate, the analysis of the three levels of the organisation was chosen as the best method for indicating sensitive structural gaps and for suggesting evolutionary changes which have serious managerial implications for the present system of distance education. The approach provides a systematic methodology for the rational analysis and evaluation of management systems. This approach uses a logical language, in which the internal members of EMS, the policy-makers, can make connections between existing structures, indicated structural gaps and suggested design changes. If the affected managerial components can make the necessary connections, then internal discussions related to the suggested changes will be fruitful. Thus the approach which will be used was chosen as the best way of analysing and communicating serious, sensitive and crucial information which have implications for the future perfomance, efficiency and effectiveness of a flexible evolutionary; distance education system of Kenya. It is assumed that change is easier

for the members of the Institute and the policy makers if related to an analysis of the existing structures.

Comparisons are made between what exists across levels and an ideal management structure as proposed by Beer's conceptual "viable" system. This comparison generates possible solutions which if implemented will enhance the efficiency and effectiveness of EMS. The conceptual model proposed by Beer was chosen as a tool for analysis because it incorporates the important components of a management structure and its processes. The concept of management entails the following activities: "plannng, controlling, organizing, appraising and leading the procurement and utilization of both human and physical resources at the disposal of an organization in order to achieve the organization's defined ends" (Report of NCEOP, 1978, p.143). Daniel and Snowden used a four step management cycle to analyse the management of small open universities offering distance education. The model identified the four activities of planning, organizing, leading and evaluating (Daniel and Snowden, 1980). Beer's conceptual model offers a language, or methodology for analysing organizations. The model asks: Who is planning, leading, organizing, evaluating (appraising) and controlling? Are the activities organized in a fashion to enhance organizational efficiency and effectiveness? Are there mismatches, dysfunctional or missing components? Beer's language also emphasizes the fact that a "viable" system model is based on the flow of information between managerial activities and between the organization and its environment. This aspect will be

Included in the analysis.

Institutional Level of Management (KIE)

The Kenya Institute of Education was established to improve curriculum through basic and applied research. Education Media Service was absorbed into the Kenya Institute of Education in 1978. Since then, the Education Media Service has tried to fit into the activities of the Institute as emphasized by the earlier discussion of the management problem and levels of organisation.

Current Trend and Practice: Teaching in class and at a distance.

Currently, the nation is emphasising the teaching of practical skills. This national shift in emphasis is being implemented through primary teachers' colleges and special schools: technical and business, village polytechnics, Institutes of Technology. The national aim is to create a rural infrastructure which values practical skills and where such skills and knowledge can be marketed or applied, thereby reducing to some extent rural to urban migration. During the times of major curriculum evolutions, as at this moment, the Institute creates projects, to research, develop and produce syllabi, textbooks and multi-curricula (distance education) materials. At such times, the Institute's staff cooperates with the Inspectorate to implement new curricula through teachers' in-service courses.

At present, the three divisions are working together, to translate national objectives into operational, curricula and media objectives for basic education. For this, the Institute has

developed a curriculum model whose operational objective is based on translating the identified national objectives into specific curricula and media objectives. This approach emphasizes fostering of learning experiences within the reach of the learners and teachers. Once the media curriculum objectives are agreed upon, then each discipline formulates subject sub-objectives. There must be a correlation between the identified and stated discipline (subject matter) objectives with learning opportunities within the reach of most learners. The media division isolates subject objectives which can best be learned through multi-media resource materials. This is why media specialists are encouraged to participate in the curriculum development process so that they can facilitate panel identification and statement of media-oriented objectives, i.e., distance education objectives. The media objectives are often identified after the statements of general subject and content objectives, as the following observation reveals:

> Since one of the aims of the service is to give educational support at primary and secondary level on a broad front, it is clearly impossible in the limited time available, to cover the whole of any syllabus in one subject and so a judicious selection of topics has to be made. (CEDO, 1974 p.194)

This practice has not changed.

The task of identifying content areas best covered by media is delegated to media sub-committees. These sub-committees possess the skills and knowledge necessary for analysis and design of instructional multi-media curriculum packages for distance education. With regards to the curriculum materials, the

curriculum specialists and private publishers write standard classroom textbooks to teach the subject objectives. Sometimes, the media division isolates some textbook portions where learning can be enhanced through audio, radio or visual programmes, The media division does not reproduce textbook content but rather complements it by producing up to date materials, especially in social sciences, civics (public affairs), English literature, and in the field of general knowledge.

Mapping of the Institutional Level onto Beer's Conceptual Model

(insert here Figure 2 showing mapping of K.I.E. onto Beer's conceptual model. Frequent reference to this Figure is recommended while reviewing the analysis of the Institutional level of management).

Systems 1

According to Beer, system 1 is a viable subsystem nested within its metasystem. As a viable system, it can exist on its own if/removed from the parent organisation. Its role within the organisation is to carry out the main "operational activities" i.e. the main organisation's business. It is therefore action-oriented, horizontal, autonomous and it is much more concerned with (and aware of) the current activities of the organisation than the other components of the organisation. Therefore, system 1 represents the main operational activities being performed by the organisation.

What are the main operational activities being performed by the Institute's subsystems at the institutional level of

management? By closely scrutinizing Figure 2, it is evident what constitute the main operational activities of the Kenya Institute of Education. It is important to note that Figure 2 is a diagrammatic representation of the Institutes' managerial control subsystems, perceived from the point of view of Beer's conceptual model. As the descriptive conceptual model explicates, there are three main divisions of K.I.E. which qualify as Systems I. These are:

.division of the Educational Media Service i.e. distance education

.division of Higher education i.e. mainly, secondary schools' curriculum research and development

.division of Basic Education i.e. curriculum research and development

(see systems 1 in Figure 2).

As Figure 2 indicates, systems 1 comprise the programmes co-ordinators (square management box), the sections which carry out production activities (circles' operational activities) and their captive distance learning environments.

Besides these three divisions, there are international divisions which operate independently but which are under the Director of the Institute. These divisions are: the ministry of Basic Education Projects, International Cooperation Projects and the Intra-African cooperation projects. The international projects will be excluded from this analysis since they are financially controlled by the international bodies to which they are attached, and include an essentially different and largely unrelated managerial structure (i.e., their "divisional" status is basically nominal).

<u>Curriculum Divisions</u>. The operational activities of the two curriculum divisions consist of the following continuous curriculum activities:

- creation of new and relevant curriculum materials, i.e., syllabi and textbooks.

- conducting broad basic and applied research through special projects as inputs to the on-going specific curriculum areas' research.

- review and subsequent revision of the existing syllabi and textbooks in accordance with evaluation reports and data.
- initiating and promoting innovative educational practices which contribute towards the improvement or increase in quality of education in Kenya and Africa.

<u>System 1 of the Basic Division</u>. The programme co-ordinator for the Basic Division occupies the Systems' I Management unit box, thereby making this person the leader of this division. The managerial activities of the divisional head are delegated by the Director of the Institute. This role will not be discussed in detail since the purpose of this study limits the analysis to specific divisional areas which relate to the controlling subsystem of EMS. This division cooperates with the media division when designing distance education materials intended for primary education in terms of formulating the distance education enrichment and improvement components.

The programme' co-ordinator for Basic education has an extensive operational field. The operational activities consist of developing curriculum and curricular support materials for the

following audiences:

.pre-school learners

.primary school learners

.primary teacher education
(students and lecturers)

.special education (the handicapped)

.adult and continuing education

This division is very busy revising the total primary and teacher education curriculum. It has also been active in streamlining special education and developing curriculum for various categories of handicapped. It is one of the largest divisions in the Institute with a staff of 31 curriculum specialists. Its greatest challenge has been to devise a curriculum for out of school young adults. This challenge involved development of a curriculum for the urban disoriented adolescents referred to in Kenya as "parking boys and girls". These are young children and adolescents who live in city streets and who have no tangible means of earning their living. The division organized the "Undugu Project" which attempted to rehabilitate these young adolescents by teaching them socio-coping skills and knowledge which they can market in society. Many of these adolescents have welcomed this second chance to live in a normal social environment. The curriculum is unique in the sense that it was jointly designed by social workers, curriculum specialists, media specialists.

The environment of the Basic division is extensive. It consists of all the pre-schools, primary schools, primary

teachers' colleges and special learners like the various categories of the handicapped. This division is also responsible for developing curricula for special groups of adults wishing to improve their basic education.

System 1 of the Higher Education Division. The Division of Higher Education is similar to the Division of Basic Education in terms of curriculum research and development. The only difference is in the nature of the environments. This division serves the curriculum needs and demands of the Ministry of Higher Education. The Ministry of Higher Education is in charge of secondary, post-secondary, secondary teachers' colleges and tertiary systems of education. The programme coordinator is Systems I. S/He leads curriculum research and development in the following curriculum areas: secondary school learners, secondary Teacher trainees, business student, technical learners, and social education.

The operational activities and environments of the higher education division consists of Kenyan Secondary Schools: government, private and harambee (community) schools. Recently, the Institute has emphasized a different approach to curriculum development. This approach emphasizes fostering of learning experiences within the reach of the learners and teachers. The current curriculum research and development has emphasized these areas:

.agriculture education
.business education
.technical education
.social education (ethical, values, beliefs)

The aim is to make terminal education practical and relevant to the majority of school learners. This philosophy is in contrast to past experiences and practices where education was elitist preparing learners for the next level of education. This division has 22 curriculum specialists.

System 1 of the Educational Media Service division. This is the division in charge of producing and delivering distance education, i.e., the focus of this study.

The programme coordinator for media occupies the management box of System I, making this person the leader of the division. At the institutional level, the divisional coordinator presents and protects media interests within the Institute. This means that the person keeps the other divisional coordinators aware of the special objective function of EMS, i.e., development, and production of multi-media instructional materials for direct consumption by target populations. It is crucial that this role be understood by the internal members of the Institute, because the work of EMS is to enhance the quality of education, as stipulated by the national curriculum objectives. Therefore, the tasks performed by EMS complement and enhance the work of the two curriculum divisions. Although this relationship is well comprehended by the three divisions, it does not, however, influence the fact that the three divisions compete for both fiscal and human resource. This competition makes EMS vulnerable since its share of resources depends to a great extent on

agreements made in managerial participatory discussions and on
decisions about allocation of resources between the divisions.
Thus the allocation of resources to EMS will be influenced by the
perceptions of the two curriculum divisions. It is therefore
important that the distinct objective function of EMS as a
distance education system be appreciated and nurtured by the two
curriculum divisions. Otherwise, its efficiency and special needs
will suffer. The major thrust of this study hinges on the fact
that the future of effective distance institutions will depend on
the type of nurturing extended to them by the policy makers and
other educational institutions. It is therefore expedient that
the other two divisions of KIE perceive the media division's
instructional activities as being distinct, different and yet
complementary. The future efficiency and effectiveness of EMS may
hinge on being perceived by the internal members of the Institute
and the high-level policy makers as a distance education
subsystem which is an important part of the total educational
system with unique and distinct contribution to make to education
and society, and therefore given freedom, autonomy and other
requirements necessary to perform its operational activities.
Beer's conceptual model emphasizes the fact that systems' 1 must
be given freedom and resources necessary to carry out their
functional activities. The task of the programmes coordinator of
media is to explain to the director and the other programme
coordinators the unique operational activities of the division.
The allocation of resources therefore depends very much on how
well the programme coordinator represents and explains the

divisional tasks to the internal members who operate at this level of management and to the other formally linked policy makers.

Media Division: Operational activities. The operational activities consist of production of distance education multi-media curriculum packages which provide direct teaching to schools and to the out-of school audiences. These learning materials are produced by the division's two operational activitities i.e. radio broadcasting, and film and television sections. These activities have already been discussed under "multi-media curriculum packages".

The radio section produces radio programmes mostly for schools. Currently, the section is cooperating with other agencies to develop and produce radio programmes and self-instructional guides for the in-service training of unqualified teachers. The section is also producing direct radio programmes intended for listeners who can understand English. These programmes are topical and they explore content areas which lend themselves to educational analysis and diagnosis. For example, included is content related to health issues, special groups which need national attention (like the handicapped, alcoholics etc.), research findings in agriculture whose results may need immediate attention and other related socio-economic issues. The school programmes are accompanied by printed notes which are continuously being adapted to teachers' utilisation patterns.

The operational activities of the Film and Television section are different from those of the radio section. This is mainly due to lack of a visual infrastructure which delimits considerably the visual environment. The section is relatively new, and has an energetic, devoted staff handicapped by the lack of ████ntial utilisation facilities. Kenya like many third world nations lacks a rural and urban infrastructure due to the high costs involved in establishing a television transmission network, rural electrification, and provision of inexpensive receiver sets. At the moment the policy-makers are placing emphasis on developing a strong, audible and accessible radio infrastructure. Therefore, the Film and Television section will continue to be a producer of visual resource materials for use by primary teachers' colleges, their lecturers and students. The operational activities of this section will therefore continue to be limited by the lack of an extensive film and television infrastructure. However, the section has made great contributions to the operational activities of the Institute as a whole through its publicity productions. The section has produced films and video programmes intended to make the nation aware of the innovative institutional and curricula activities being carried out in K.I.E and in schools. Such advertising films include "This is K.I.E.", "Curriculum Change", "The Radio Lesson", "The Handicapped" and others.

The two sections of EMS cannot functions without the professional services of the engineering section. This section

provides the two operational activities with studio, on-location and post-production technical services. The section also maintains the electronic and electrical physical hardware and software. The graphic and design section provides professional production services to the Institute's three divisions. The resource section and the library section, both components of EMS, provide distribution, dissemination, lending and other services to the three divisions of the Institute.

In conclusion, the analysis of the media division shows that some of its activities are related to the operational work of the three divisions. For example, advertising of the Institute's activities, library work, graphics and design and tasks performed by the resource section all contribute to the Institute's divisional functions.

Media Division's environment. The division shares the same environment with the two curriculum divisions, i.e., the formal and the non-formal. However, several utilisation patterns affect and delimit the media environment. These factors will be analysed under the media's channels of variety. From the analysis of the three divisions of the Institute, one can appreciate the crucial role of systems 1. Without them, there would not be an organisation requiring management. The same parallel can be drawn from the analysis of K.I.E. Without the three divisions, there would not be media and curriculum tasks competing for scarce resources. This is a powerful conclusion for it emphasizes the significance of the functions of the key resource, the staff

embedded within the operational circle. Thus, each system 1 must be given freedom to provide leadership that places importance in developing and enhancing the staff.

The characteristics of the media division require special understanding and subsequent support by the internal members as well as the policy-makers because of needs which influence its cost-effectiveness and efficiency. It is very important for the Institute as a whole to perceive the three functions of the media division. First it enhances the effectiveness of syllabi and other curricular materials by producing enrichment information. Second, it provides free education by extending educational opportunities to specificic formal and non-formal groups of learners whose educational needs cannot be served within the teacher-classroom environments (rural farmers). Third, the media division produces materials for internal work of the Institute.

Systems 2, 3, 4, and 5 of the Institute

The other components of the conceptual viable system model exist to serve the managerial needs of systems 1. Beer calls them the "metasystem". They consist of systems 2, 3, 4, and 5. The crucial managerial functions are performed by system 3. According to Beer, system 3 is the fulcrum of one level of management. This means that system 3 constitutes the main decision-making point and constitutes the core of leadership to systems 1, thus making system 3 the enforcer or applier of its decisions. System 3 is the "boss" or the commanding channel at the Institutional level. In brief, system 3 is the "main decision-maker" at one level of management. The decisions made are related to new tasks as well as current activities of systems 1. The crucial objective function of system 3 is making the hard decisions which enhance the work of systems 1. Secondly, system 3 makes decisions related to the future activities of the organization. This makes the role of system 3 full of complexity. To enhance system's 3 decision making functions are system 2, system-3-star, system 4 and system 5. In the Institute, the Director of the K.I.E. represents the managerial functions depicted by Beer's conceptual system 3. The director has assistants who play the role of Beer's system 2 and system-3-star (audit channel).

System 2: Functions and activities. According to Beer, the work of the conceptual system 2 is to reduce conflict generated

by the operational activities of systems 1 and the command decisions issued by system 3. The managerial function of system 2 is to reduce the generated conflict (i.e., damping "oscillations") by designing rules, regulations and procedures related to the operational activities of systems 1. It must also devise workable systems of reporting, and create fluid and flexible channels of coordination and collaboration. The importance of system 2 is therefore the creation of regulatory mechanisms which harmonise the institutional activities.

The Institute's Director and the management committee issues procedural information which regulates Institutional activities as a whole. Before implementation of regulatory mechanisms, the Institute's management seek consensus from the internal members working as curriculum or media specialists (operational activities) about the procedures related to their specific activities. The agreements define boundaries within which the three divisions operate.

The members of the Institute are also controlled by regulations issued by policy makers from higher levels of management. Such regulations are issued through national laws, acts, circulars and general letters of information. Such regulations are implemented by the Director of the Institute. The director has delegated some of the controlling activities to the chief programme coordinator and the chief administrative officer.

The chief administrative officer enforces those procedural regulations concerned with the overall operation of the Institute. These include procedures related to the utilisation of

the Institute's physical facilities, the system of purchasing
hardware and software, and the system of circulating requisite
information and procedures related to the smooth operation of the
Institute. When the administrative officer is enforcing
regulatory mechanisms, then the activity being performed becomes
a system 3 function, i.e., command.

The Chief Programme Coordinator. The work of the Institute's
"chief programme coordinator" needs special mention because it is
different from the "anti-oscillatory" (harmonising) activities of
the administrative officer, i.e., system 2. The managerial post
occupied by the chief programme coordinator is an academic
function, in comparison with the general regulatory tasks of the
chief administrative officer. The work of the individual is to
coordinate the content of the operational activities of,
especially, the two curricula research and development divisions.
A lot of coordination and collaboration occurs across the
operational activities of the two curriculum divisions to prevent
unnecessary content overlap and to ensure requisite amounts of
curriculum redundancies across disciplines, within chronological
grades and between education levels, i.e., basic, secondary, and
tertiary. The task is an enormous one, considering that the
Institute has 66 panels with a membership of 1500 people
(Eshiwani, 1983). The information output of the panels is
therefore enormous and full of complexity since it implies
specific innovative or curriculum change decisions.

These panels guide the operational activities of the three

divisions. The use of panels, per se, is "anti-oscillatory" because it reduces fundamental academic and professional differences among panel members. They must come out with agreed "minutes" representing the participatory decision making forum. Through panels discussions, the Institute is able to develop and produce syllabi. Therefore syllabi embody panels' agreements (guidelines) about essential aspects of the national curriculum. A close scrutiny of Figure 2 reveals that the operational work of each division is regulated by a course panel. The division of basic education is regulated by a Primary Course panel, the higher division by the Secondary Course panel, and the media division by the Educational Technology panel. The curricula reports and material produced by both subject and course panels have managerial implications. The chief programme coordinator assesses the professional and administrative implications contained in the panel "minutes" and then makes crucial recommendations to the Director of the Institute. This makes the function "anti-oscillatory" since it reduces the managerial complexity embodied in the minutes of the panels into manageable "variety" (Beer, 1979).

The chief programme coordinator is therefore accountable to the Director of the Institute for the total coordination of the curricula. However, the Director makes the hard decisions, especially the ones which are conflict-laden. Beer has emphasised that hard decisions should not be delegated since they constitute the main function of management at all levels of the system. (Beer, 1979).

.The chief programme coordinator.is informed about environmental utilisation and learning difficulties through the work of the Institute's research and evaluation section. The activities of the research and evaluation section are regulated by the research panel which controls educational curricula research activities. This means that the panel reviews research proposals, approves them and commissions research by the Institute's staff or by external researchers. The members of the panel are mainly researchists and evaluators drawn from a wide cross-section of the nation's research and evaluation capability. The control of research activities ensures that crucial research is given priority and that some areas are not heavily researched or excluded.

System 3: The Director and the Deputy-director

Beer's conceptual model emphasises the importance of system's 3 managerial role in any organization. System 3 is the component of the organization which makes operational decisions which affect the existing and intended future activities of the organization.

In K.I.E., the position is occupied by the Director of the Institute. The Director of K.I.E. exercises the professional and administrative authority vested in the functional activity by the Ministry of Basic Education. Hence, the Director is accountable to the Ministry of Basic Education for the smooth management of the Institute. The Director's management activities consist of leading, controlling, organizing, planning, and appraising. The

Director provides the Institute with requisite leadership, both academic and administrative. The leadership function is not confined to the three divisions which have so far been analysed. A close look at Figure 2 will show that the Director is also responsible for the professional activities of the special national and international education projects based at the Institute. The Director is guided by the "Council's Academic Board" in matters relating to future curricula and media activities. The Director is the "secretary" of both the "Academic Board" (system 4) and the Governing Council (system 5).

Due to the heavy responsibility vested in the function of the Institute's Director, the establishment has catered for the delegation of authority. Thus the director has a deputy who is in charge of some of the decision-making functions. The work of the Institute's general administration is exercised by a large cadre of supporting staff under the leadership of the Chief Administrative officer.

System-3-star: Chief Administrative Officer

The conceptual system-3-star channel of Beer's viable system model represents all the activities (operations), means (processes) deployed by the director (system 3) to enhance, check and audit the work of the main operational activities of the Institute. These activities will be mentioned in brief since most of them are distinct and familiar activities, characteristic of many public organisations.

The conceptual map of the Institute's activities shows that

the system-3-star audit channel stems from the Director's authority. This is an important distinction since auditing activities are placed on this channel in order to counterbalance the variety generated by the divisions, i.e., systems 1. With the possession of this channel, the Director is kept aware of some of the activities of systems 1, which might not have been revealed by the regular information flowing from systems 1 (divisions) to system 3 (the Director). Secondly, the audit channel provides Institutional services which are shared by the three divisions (systems 1). The Institutional central services are controlled by the administrative division. The sharing of central resources has always been been problematic since the demands for services always exceeds the existing supplies. The staff of the Institute have suggested that queueing problems could be reduced if some specific resources were to be assigned to the divisions. In carrying out the Institutional administrative duties, this division is highly regulated by public policy guidelines which control utilisation of public resources. For example, the administrative division works closely with the three divisions to find feasible and acceptable ways of sharing and utilising the scarce resources. At such times the administrative division acts as system 2. Once the regulations are agreed upon, then, this division enforces them in the course of carrying out the service duties. At such times, the role of the administrative officer is both a system 3 and "system-3-star" function, because the division is controlling allocation of resources across the three operational divisions on behalf of the Director. Beer has

emphasised that systems 1 should be consulted in matters relating to their operational autonomy. The division fulfills this requisite necessity since it operates under Institutional regulations and procedures, agreed upon by the divisional heads (systems 1), the Chief programme coordinator, and the Institute's Director (system 3).

The administrative division is therefore a service division carrying out functions and activities which enhance the work of curriculum research, development and distance education. It provides the following services:

    1. Financial accounting mechanisms (allocation and audit)

    2. General administration, i.e.,

        maintenance of buildings/grounds,

        office accomodation,

        telephone, transport,

        purchases and stores,

        catering services,

        security services.

    3. Manpower Development and Training (Human Resources Development).

The work of this division is very sensitive and could lead to serious "oscillations", i.e., management problems and disagreements. To reduce "oscillations" and malpractices, the work of this division is controlled by the Governing committee on "Finance and General Purposes". Both this committee and the chief administrative officer are advised by the divisional leaders in

matters relating to staff appointments and purchasing of physical resources. Some of the internal matters relating to office accomodation, staff training and career development are solved by the management committee consisting of the three divisional leaders (systems 1), the Director, the deputy-director, chief programme coordinator (system 2) and chief administrative officer (system-3-star). It is evident that at this level of management, the divisional leaders, though systems 1, are parts of the metasystem. This is a managerial difference between Beer's conceptual model and the Institute's management processes.

In carrying out these activities the Director and deputy-director (system 3), are stipulated by the "civil service" (public) code on utilisation and allocation of resources. Therefore, the Institute's general managerial practices are stipulated by the public service legal acts. These acts belong to system's 2 function. However, their interpretations and applications may belong to system 3 (enforcement), system-3-star (services to operationalize regulations) and systems 1 (specific operational activities stipulated by the employment acts).

System 4

According to Beer the work of system 4 in any organization is a futuristic activity. The activities are exploratory and they consist of probing into the problematic future to discover means (technological processes) and ways (methodologies, approach) which the organization can deploy, to keep its main activities (operations) efficient and its products (outputs) effective and

competitive. In order to do so, the staff who carry out the system 4 activities must understand explicitly the main operational activities of systems 1 and the environments' needs and demands. They must also have a vision of the Institute's future trajectory, so that they can suggest feasible conceptual options, both operational (processes) and content (end-products), which the organization can adapt to in preparing itself for the unknown curriculum and distance education technological developments.

(i) The Academic Board. The Institute's Academic Board attempts to carry out the stated system 4 function. The Academic Board is similar to the conventional universities' senate. The Academic Board is able to do so, because its members are nominated as a result of their academic contributions in the field of educational administration, management, planning, research, and in the field of media production, design and broadcast management. The Academic Board members perform system 4 functions in their organizations and this makes them qualified to guide the future curricula development work of the Institute.

The Academic Board does so by reviewing the syllabi and other curriculum material developed by subject and course panels. It is a system 4 function because its members are appointed on the basis of their reputation in the field of education, media research, media production, administration, and teaching. They approve and make future-oriented broad policy guidelines in terms of the Institute's curricula and distance education directions.

(ii) Research projects. Internally, the Institute creates

special future-oriented research projects to explore ways and means of solving specific educational problems through curriculum activities. Such projects are related to the improvement of education of identified needy groups. The projects may also involve production of distance education learning materials to fill the projected educational gaps and imbalances. Such projects include research into the future of pre-school education, non-formal education for the adults, and the handicapped population. These research projects are futuristic because they explore new curricula and distance education roles.

(iii) Public information: Marketing activities. The Institute is currently developing a basic curriculum which has serious implications for the society. Thus the Institute has produced films explaining to the society why it is changing its basic curriculum. The major objective is to involve the society in the Institute's future activities, thus preparing the environments and policy makers for future curricula demands and support for both fiscal and human resource requirements.

Beer's conceptual model emphasises the importance of encouraging discussions between the staff of system 4, 3, and people in the environments who are likely to be affected by the Institute's future changes. In business organizations, such discussions are secret and therefore protected because of their monetary value. However, in public organizations, it is advisable to subject the projected future activities related to systems' restructuring and future markets' changes to public debate, since

the society (especially parents) has a stake in the educational skills, knowledge, and processes transmitted through the curriculum, i.e., instructional content and teaching guidelines. This is because the content of syllabi influences to a great extent the education outputs. The function of seeking new markets and creating new curricula for future society are system 4 activities. Before such activities are implemented, they should be subjected to public debate to obtain discursive legitimation and therefore public support. This is one of the reasons why the Institute's final learning and teaching materials have to be approved by the Governing Council.

System 5

Beer stipulates that system 5 is an invariant to systems' 1 and likens it to the snake eating its tail. In business organizations system 5 functions are performed by the conventional "Boards of Directors".

The Institute has a Governing Council which constitutes its system 5. The Council makes final decisions related to policy issues and the development of the Institute on behalf of the accountable officer, the Permanent Secretary for Basic Education. The membership of the Council is varied for it attempts to include all the parties whose future is affected by the Institute's media and curricula functions. Hence, the membership draws representation from parents, teachers at all levels of education, trade unions, the teachers' union, members of parliament, the two Directors of Education, two Chief Inspectors

of Education; the Chief Examination officer, religious groups,
etc. The council members are appointed with the aim of creating a
decision-making sample representative of the diverse national
educational curriculum expertise required to meet some of the
educational demands.

In conclusion, the Institute's structure has evolved over
time, containing many of the crucial components required in
Beer's descriptive conceptual model. The structure is continually
evolving to meet the national educational, curriculum and
distance education needs for Kenyans. It is therefore an
evolutionary, adaptive viable system which is fashioned to
perform its survival and functional activities efficiently and
with competence.

Divisional level of management (EMS).

The Educational Media Service was identified as a "viable system" at the divisional level. It is viable since it can exist on its own as an institution for distance education. This level was identified by taking the divisional level first, then identifying the level above and the level below. The level of management above the Educational Media Service was identified as the Kenya Institute of Education, and the level below is made up of many sections as shown by Figure 3. The level occupied by the Educational Media Service will be refered to as the "divisional level". The level of management below it will be called, the "sectional level". The level below it is the "media specialist level". The media specialist level will not be analysed as a management system because its activities will be examined under the operational activities of the radio section.

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insert Figure 3 about here showing the mapping of the current EMS management system onto Beer's viable system model).

Figure 3, Mapping of EMS Activities onto Beer's Model

As Figure 3 demonstrates, the following components

constitute the Educational Media Service management system, the:

- radio section
- film and TV section
- design and print section
- library section
- resource section
- technical services section

Through investigation and application of guiding questions, like, where is variety, which variety is absorbing each other, which components can exist on their own, and what are they doing or claiming to do, the various component subsystems comprising the Educational Media Service were identified. Figure 3, illustrates the six sections of EMS which operate as systems 1. Examine closely Figure 3. The squares in Figure 3, represents the management unit of system 1; the circles represents the operational activities of system 1; and the amoeboid structures the formally linked environments. The criss-crossing lines represent channels whose function is to transmit information signal within and between the "head" or management unit of systems 1, the media specialists, i.e., the operational activities of systems 1 and the target audiences who comprise the loosely defined environments. As channels cross boundaries, re-coding process occurs. The re-coding process refers to the mechanisms which the management system of EMS utilises to encode and decode information signals. The receivers and transmitters

of information signal have both encoders and decoders. For example, the receiver sets encode and decode broadcast signals. The target audiences encode and decode information signals whenever they listen to messages. Listening involves different levels of processing information by learners as they interpret, internalise, understand and reproduce information signals. Each of the above listed subsystems or sections, and their constituent components maintain a powerful equilibrium within and between its operational activities and their target environments.

Systems 1.

Each of the six divisional sections operate as system 1. According to Beer, system 1 must be able to exist on its own as an independent entity. With reference to EMS, system 1 would be any section which can exist on its own: as an independent distance education organisation. This means that it must have inputs, operations (processes) whose outputs are targeted to or for a specific environment/s.

The six sections of EMS are managed by the sectional heads whose responsibility is to control horizontal operations, as shown by Figure 3. Therefore, the sectional heads and the deputy heads comprise the management unit of system 1. Thus they occupy the management box. (see Figure 3).

The radio section. The horizontal operations of this section consists of producing radio programmes for both the school and out-of-school learners. This function started in 1963 and has continued to the present. The environment is a large one

consisting of the following categories of learners by 1981:

4,184,602 primary pupils

464,671 secondary pupils

110,911 primary teachers

73,499 secondary teachers

(source: Ministry of Economic Planning and Development, 1982, chap. 15)

The section has not been able to cater to the entire school curriculum needs for educational radio. This is because its efforts have been geared towards the improvement of the quality of education at the basic level, i.e., the first seven years; and for primary teachers, the majority of whom are unqualified or underqualified both academically and professionally. Since 1982, the radio section has been busy producing programmes for in-service training of untrained teachers. This is a joint venture between EMS, the Correspondence Course Unit, the Kenya Institute of Education, and the Primary Teachers Colleges. The project has been implemented and aims at training 3,000 teachers every three years. The radio section is also busy producing educational programmes which will be parts of multi-media curriculum packages for the improvement of primary education. This is due to the fact that most of the Institute's curricula efforts have been concentrated on revamping basic education.

The sectional management unit is tightly embedded within its horizontal operations. This means that the head of the radio

section is continuously interacting with the media specialists who comprise the operational activities of EMS. The head interacts with the media specialists through staff meetings and production meetings. The staff meetings are held constantly to solve sectional managerial problems. The production meetings are held to discuss production innovations, problems and difficulties which emanate from either the head of the section or the media specialists. The production meetings are held with specific individuals or teams, in reference to the nature of the production problem, innovation or difficulty. However, the same relationship does not exist between the media specialist's (radio section's operational activities) and their defined target environments (cf. Beer's loosely defined environment of the conceptual model). This is because the media specialists are separated from the learners by distances and space, an important point meriting serious consideration, which Figure 3 does not demonstrate. The operational activities of the radio section are connected to their environments by variety amplifying channels. These channels carry operational outputs (radio programmes, print supporting notes) which are respectively transmitted through terrestial air waves and transported by surface means of communications. These variety amplifying channels transcend distance, space, physical and psychological barriers, which exist between the media specialists and the target audiences both formally and informally linked.

The Voice of Kenya has allocated permanent air-time for educational radio. The radio section broadcasts five hours per

day, from Monday to Friday, eight weeks per term for three radio terms. The information about radio broadcast schedules is communicated to all educational institutions by the radio timetables, daily newspapers, and the school radio announcements. According to Beer, the variety proliferated by EMS should be matched with requisite attenuating variety from the target audiences, i.e., the variety transmitted by EMS to its environments should be in correspondence with the variety originating from the target audiences to EMS. The channels carrying environmental variety to the section are not clearly defined as Figure 3 shows because the section does not have formally defined channels carrying attenuating variety to complement the deployed amplified variety. Therefore system 1's management unit and its operations are isolated from their specified target audiences inhabiting the loosely defined environment of Figure 1 (see Figure 3). This means that only minimum diffusion process exists between the management unit, its operations, and their environments. However, the channels connecting the operations to the management unit are very strong due to embedment and close proximity of the two to each other. The diffusion process between the sectional head and the production operations of the media specialists compose a dynamic continuous loop amplifying and attenuating horizontal variety deployed by the two, i.e., the sectional head and the media specialists.

Transducers transform one form of transmission (energy) into another. Beer calls the process "translation" of information

signals from one form into another. A variety of informantion translators or decorders exist between the sectional head and research and productions activities. For example, the staff mental processes change information signals from one form into another, i.e., through the interpretation and understanding of informational signals which occurs when staff interact with each other, during staff meetings, in deployment of various interpersonal skills, use of words, gestures and expression of moods etc. But of crucial importance are the models of each others' reality contained in the heads of the people who operate within the square and the circle (Beer, 1979; Mezoff, 1980, 1982). Both models delimit each other's variety, thereby affecting the outputs of the subunit due to different interpretations of the transmitted and exchanged information. The re-coding process is more crucial in the environments. Hence, the Ministry of Basic Education supplies good quality radio sets to some schools, through the department of the Kenya School Equipment Scheme, to guarantee high level decoding equipment. The decoded information is further encoded (listening), and decoded (interpretations by listeners) by the learning models in the heads of the listeners. Understanding the selective mechanisms which operate within the learners has been the subject of educational psychologists for a long time, an area still under investigation; and outside the limits of this study. Suffice it to say that selective mechanisms exist within the environments which range from known logistical information to the unknown, psychological factors. We can make an assumption, that some

information is lost since not all learners are good decoders and encoders of messages transmitted through the audio and visual modalities, i.e., radio and print support materials respectively. It is also difficult for EMS to match its operational variety with that of its target environmehts. To heighten the re-coding process the radio section utilizes a unique instructional model which will be discussed at the sectional level.

Film and Television section. This was the second divisional section to be implemented. It was started in 1975. Like the radio section, the head and deputy head of the section form the management unit. The operational activities consist of productions of visual resource materials, i.e., production of 16 mm. films, tape/slide, video. The outputs of its operational activities are intended for the formal and non-formal education as part of the Institute's curriculum development function. The formal environment in 1981 consisted of 12,596 students enrolled in 16 primary teachers' colleges and their tutors. If broadcasted, the programmes are open to viewers who possess television sets. The non-formal environment consists of the entire national population of adults, adolescents, and children who possess decoders, i.e., television sets. The section is in the process of producing educational magazine programmes for children. The three components of system 1, i.e., the management unit, operational activities and environment (target audiences) are connected by variety amplifying and attenuating channels as Figure 3 demonstrates. The section head and deputy use staff

meetings, telephones, internal memos, and interpersonal relationships to amplify their horizontal variety. They are both tightly embedded within the sectional operational activities. The operational output is transmitted via the Voice of Kenya's television channels (the Voice of Kenya (V.O.K.) is the national public broadcasting organisation with the mandate to control utilisation of air time). Since the section's environment is not very large because of lack of television and film infrastructure, the section has utilised the best alternative in terms of variety amplification which are the 16 learning resource centres being built in teacher training colleges. For the non-formal rural audiences, the mobile cinema circuits might offer means and ways of reproducing film messages thus amplifying film messages intended for rural consumption.

The operations are separated from their environments by space, distance, and psychological barriers, thus weakening the "embedment" of the operations within their environments and vice versa. However, when compared to the radio section, film and television section is "embedded" much more to its environment, because of the lesser numbers involved. Secondly, teacher training colleges have more facilities which are beyond the reach of many primary schools like telephones, electricity and trained human resources. Thirdly, the operational variety deployed horizontally by the section matches to some extent the variety deployed by the environments. There are 12 media specialists operating within the circle, but in continual contact with the 16 primary teachers colleges. The staff contained within the two

units have the same academic qualifications but different professional qualifications. Thus film and television staff have media production experience while the college staff have teacher training experience. They both work together in making programmes which are relevant to the media needs of tutors and students, thus matching to some extent sectional operational activities to environmental needs. This means that the horizontal operational activity of the film and television section is closely linked with its environment (primary teachers colleges), thus increasing the embedment, interactions and diffusion processes between the two units. The section uses a variety of activities to increase its interactions with the target audiences. For example, conducting of in-service training of teachers through seminars, scriptwriters workshops, and meetings or visits. Sometimes, the section may use other forms of communication like telephone system, and correspondence. These means of communications are used both formally and informally as channels for transmitting environmental disturbances and needs (variety) in terms of users' feelings, views, problems, appreciations, concerns etc., to the operations (media specialists) and the management unit (the head of the section). The section has cultivated this intimate relationship because its survival depends on the acceptance of the role of visual media materials in the process of training of teachers. Fortunately, colleges are staffed by lectures who are willing to try out innovative media strategies and accompaning educational practices. The main emphasis has been placed on teaching students how to use their physical learning environments

in devising teaching-learning resources.

Design and Print section. This section operates as system 1 within the divisional context, i.e., in its relationship with the radio and film and television sections. The head and deputy head comprise the management unit. The operations consist of designing graphics for print, video, tape/slide and film, and producing teaching aids that may be needed to complement curriculum development materials. The section cannot exist on its own because, its operational output is not viable by itself, meaning that it exists to provide services to curriculum and media divisions. The section works in close collaboration with all the Institute's sections, and this is a precondition for its survival. In terms of Beer's conceptual model, and in comparison with the radio, film and television sections, the graphic and design section does not have a formalised learning environment, for it exists as a production service section, serving the needs of the two sections. It does not therefore qualify as system 1 because in practice its service environment is internal. It however qualifies as a "metasystemic" activity. Beer's managerial language points out that metasystemic activities are designed by system 3 to make it possible for the command channel to provide essential services to the operational activities of system 1. There is no doubt that the production services of graphic designers serve some essential and specific multi-media production needs of the radio and film and television sections. The section should therefore occupy the system-3-star channel of

Beer' conceptual model. The functions of this section have always been metasystemic, but the present structural arrangement makes it impossible for the section to play this role since its perceptual angle is horizontal and not vertical. Secondly, other systems 1 cannot perceive its functions properly since they are structured as parallel systems. If moved to its rightful position in terms of Beer's conceptual model, there will be increased horizontal perception of its role.

Library service section. The library services section is another system 1 because, unlike the design section, it could almost exist on its own. This section has been in existence since 1974. It became a section of EMS in 1976 when both were merged to create a wider-based curricula resource division. Inside the management square box is the sectional head and deputy. (see Figure 3). They are both responsible for a bookstock of 20,000 volumes and 200 journals (Mugiri and Thompson, 1982).

The section's operational activities are varied reflecting the nature of its embedment within the media division, the Institute, and Kenya's system of education. The section collects books, periodicals, films, unpublished reports, audio and other visual materials. The section offers the normal lending and reference services to selected clientele.

Its environment is both internal and external. Internally, the section carries out metasystemic activities related to the Institute's curricula development function; for example, literature searches for information and ideas, mounting of exhibitions etc. The external environment consists of practising educationists such as selected student teachers, high school students and university staff. The operational activities of this section can be split to fit systems 1 and 2, and 3-star functions. The normal library functions of ordering, sorting, classifying, lending are systems 1 horizontal activities. The rules, regulations and procedures about borrowing and lending

books are "anti-oscillatory" activities falling under system 2 function. The "anti-oscillatory" activities consist of rules, procedures and regulations which are designed to reduce book queueing problems and to enhance the utilisation of the library services. Such functions are important because as Beer indicates they are there to dampen or reduce incidences or severe conflicts which would arise if users were to queue for services over long periods of time. These activities are important for they regulate both informal and formal users of the library facilities. Other activities, like the search for literature, ordering of special books and publications fall under the role of the metasystemic audit channel if they are intended for the support of the Institute's main activities: in terms of both curricula development and media production inputs. (see Figure 3).

Resource section. This section operates as system 1 as shown by Figure 2. Since the merger of the former Institute's central resource unit with the Educational Media Service, the resource function has suffered a "crisis of identity" and subsequently its survival. The resource function often changed its managerial positions from being under the responsibilities of both graphic and design activities to library functions reflecting the different conceptual perceptions of its role by the Institute and the media division. Its functional and survival activities have also been closely related to the visions of its management unit and system 3 of the media division. This dichotomy has been reflected by the various internal changes causing sectional

instabilities, i.e., uncertainty, which has characterised the growth of this section.

Both the head and deputy occupy the management square box constituting the management unit. (see Figure 3). If operative, the operational activities of the resource section which are defined by the section's objectives would be diverse and far ranging. Succintly, the envisaged resource section's operational activities would overlap the library functions; for example, the library functions of collecting, storing, retrieving, utilizing, and accessing educational resources. However, the resource section has other envisaged, operational activities consisting of creating logistical dissemination networks; training of resource personnel in resources production, utilisation and dissemination, establishing a national tracing and retrieval system for educational resources, publicising the Institute's activities, and organizing media displays, promoting and implementing the concept of resource-based-learning approach in Kenya schools.

The environment perceived by the section is wide and full of complex variety. The sectional environment consists of the national system of education, i.e., primary schools, secondary schools, teacher training colleges, both primary and secondary, and teacher advisory centres. The section's perception of its formally linked environment extends to the global international and national universities, curricula development institutes, polytechnics etc.

The resource section does not qualify as system 1 in terms of Beer's managerial language because the section has not defined

its role to contain activities which are distinctly resource. For example, promotion of the concept of resource-based learning is a curriculum function because its adaption and subsequent operationization would mean changing the current educational practice as well as injecting of capital and knowledge into operationizing the concept. In other words, it is not a sectional role but an institutional and ministrial role. The perceived operations are far too global and to some extent unrelated to the media division's activities of producing media instructional and resource materials. The section does not have the necessary staff equipped with requisite skills and knowledge to match the global environment. Finally, operating to meet global needs would bring conflict between the resource section and other educational subsystems which are designed to provide national and international interfaces like Kenya's UNESCO commission. The publicity role is a system 4 function because it is concerned with the outside environment and ways of changing its attitudes towards media utilisation. It needs rigorous research to find out the strategies which act as educational fashion setters or changing agents.

In conclusion, the resource section needs to define much more specifically its operational activities in relation to its internal capabilities. Most of the staff were recruited and trained in 1980. The role of the resource section is crucial but it needs to be balanced with the Institute's internal fiscal and human capabilities. The section needs realistic nurturing by system 3 and systems 1. Otherwise it will find it difficult to

carry out its perceived activities and to achieve credibility internally and externally.

Technical services section. Until recently, the engineering function occupied the system-3-star channel. But with the recruitment of divisional engineer, there was a sectional structural adjustment to create an engineering sectional system 1. Thus, the function was moved from its metasystemic vertical position to the current horizontal positon, thereby decreasing its metasystemic role and increasing its horizontal operational variety. Before the creation of this section, V.O.K. provided technical services and studios. But the building of EMS studios and purchasing of the accompaning technical equipment necessitated the creation of a divisional engineering function to provide maintenance and operational capabilities.

The sectional head and deputy head, professionally refered to as engineer-in-charge and assistant engineer-in-charge, occupy the square box since they constitute the management unit. (see Figure 3).

Their operational activities consist of providing technical service to the production sections; radio and film/television sections. The section also provides copying services to the school formal system as well as other educational institutions wishing to use any of the recorded programmes. This function, though independent of the production sections, does not make technical service a system 1 because they copy the outputs of radio and film/television sections. The divisional objective is

to persuade schools to buy audio-cassettes and tape-recorders, thus utilising their teaching-learning capabilities.

In the future, the technical services section hopes to extend their maintenance services to primary teachers' colleges and primary schools. The formal environment of this section's radio and film and television operational activities. Therefore, the sectional activities are metasystemic, occupying the vertical perspective in relationship to the production sections. The section should be allowed to do so. Otherwise it may emphasise merely "survival" activities to the detriment of its function, production services. The stated function "to develop and supervise a maintenance scheme for....primary school radio and tape recorders" is a survival activity, because there exist cheaper repair mechanisms within the rural environment. The schools may probably ask EMS to provide them with batteries which is a logistic material requirements rather than a technical need. To resolve the issue, a feasibility study in terms of a cost-benefit analysis would be useful before a decision is reached. It may well be that providing this service to schools may prove to be more costly than lack of it, because radio technology is simple, widespread and cheaper than what the section might offer.

System 2

The damping or "anti-oscillatory" function is carried out by many activities at different levels of control. There are two types of damping subunits: professional and managerial. In order to understand the professional function , we need to understand first the special role of panels in professional development. There are two types of panels, subject and course, for primary, secondary and teacher education. The panel membership is mixed to provide continuity between 'panels. The concept of curricula development through the panel system was initiated in an effort to make education relevant to national aspirations and to satisfy the cry for relevant curriculum by both lay persons and politicians. The Panel system was adopted as a high level strategy for careful curriculum planning and management.

Systems 1 of EMS are encouraged to attend panel deliberations so that they can advise the panels on curriculum areas best served by media. The panels appoint media subcommittees to facilate individual media productions. Systems 1 prefer to work with subcommitees to quicken their development and production roles and to confine panel variety to a manageable amount. The subcommittee role is one of damping content disagreements since they (panels) contain systems 1 creativity and balance it with pedagogical requirements. It also harmonises content variations so that systems 1 can present to their environments agreed facts and validated concepts. This variety

damping role safeguards the environments as well as systems 1 from accusations of factual distortions or mistakes. If the content is agreed upon by the panel members the division assumes that there will fewer environmental complaints (users) about pedagogical relevance of facts and concepts. Another function of the media subcommittee is to facilitate systems 1 production, since panels meet twice or thrice a year; while systems 1 require continual guidance. Lastly, subject panels represent the environments, therefore making it possible for the school system to contribute to the media decision-making process. The role of the library science panel is different. The panel was initiated not only to monitor the library activities but to promote library science education in Kenya. Hence, the panel monitors "materials for the study of library science, the development of library training courses and other library matters related to education, including the Learning Resource Centre concept." (EMS, 1981)

The role of the course panels is to reduce content disagreements between subject panels by providing a forum with a wider base for reviewing subject panels' recommendations. The educational technology panel reviews systems 1 production proposals, deciding on priorities and making recommendations, thereby providing recognized legitimacy and media acceptance. Panel membership is mixed with educationists and media producers as well as managers to provide a balanced perspective for the division in terms of providing a wide base for media selection and utilisation decisions. I want to emphasize the fact that the Institute's panel system reduces disagreements related to

specific curriculum/subject content and instructional strategies, but not managerial problems. Therefore, the division does not have a system 2 to damp "oscillations" between system 3 and and within systems 1 management units, their operations, and their formal and informal environments.

System 3

Looking at Figure 3 it is evident what happens when system 2 is non-existent. All the metasystem vertical variety is concentrated on system 3 which deploys it downwards, hence over-utilising the command channel.

At the divisional level, this position is occupied by the programme co-ordinator (media) who is the boss of the division. As the divisional boss, the programmes co-ordinator exercises authority over systems 1, questioning unorthodox practices detected within systems' 1 operational activities and providing guidance to systems' 1 management unit, thus using a variety amplifying channel. S/He is kept aware of systems 1 horizontal activities through monthly reports which systems 1 have to submit at the end of every month. The reports contain operational achievements, consequences met and unmet, problems encountered and suggestions for possible solutions. The normal relationship between systems 1 and 3 is one of co-workers rather than the conventional boss. The term "boss" will be used to mean facilitator/guider rather than the traditional heavy-handed, dogmatic authoritarian, for in media, system 3 exists to facilitate the work of systems 1 rather than to exercise

authority (implement or execute policies and regulations) per se, which is a variety delimiter. The role of programme co-ordinator is to represent media interests at the intitutional and sectional level by questioning systems 1 sectional operations and explaining them to other divisional managers, thereby promoting utilization of media in education. The progamme co-ordinator is able to exercise control and leadership because s/he occupies a strategic synoptic position which gives him/her a broad picture of sectional activities. S/He is kept aware of what is going on within, through interactions with systems 1 during staff meetings, by monitoring broadcast outputs, application of algedonic meters (creation of positive interpersonal relationships), by reading field reports, newspapers' critical educational columns, etc. As the boss, system 3 demands explanations or issues instructions, thus applying variety attenuating channels.

The Programme co-ordinator is heavily embedded within systems 1 horizontal operations due to their close proximity, and systems 1 monthly forecasts which inform system 3 about sections' future thinking and directions. Sometimes system 3 attends sectional meetings to keep in touch with sectional discussions about their productional problems, innovations, failures and successes.

The programme co-ordinator performs some "damping" activities like the issuing of uniform office procedural directives; for example, rules and regulations with regards to ordering of equipment, reporting system of equipment losses and

other financial matters, etc.

The programme co-ordinator applies the system-3-star audit channel when checking sectional expenditures (proposals and payments) and authorising them. The divisional receipts are further scrutinised by the Institute's accounting clerks whose function is to service sectional operations by tightening financial expenditures to prevent fraud. The fiscal role of the divisional co-ordinator is to safeguard sectional financial allocations by making sure that sections do not spend beyond their budgetary requests. S/He also ensures that finance is properly used for production and service activities.

The programme co-ordinator uses the audit channel successfully when sharing a cup of tea, thereby dropping to sectional levels and sharing there frustrations and successes, but more importantly checking physically but in a pleasant way actual sectional task performances. S/He also applies this channel when taking important visitors to meet sectional heads and media specialists. When applying this channel, the systems 1 and divisional head have a rare chance of exchanging ideas and thoughts on media production possibilities as well as specific media limitations. The major function is to make sure that fiscal resources are properly utilized.

System 4

The division does not have a formally established system 4. However, the planning function, both short-term and long-term, are carried out by sectional management units in consultation

with media producers, i.e., the staff whose roles are enclosed within the operational circles. One of the functions of the media specialists is to plan their production workloads using different criteria, for example, urgency, priority, time limit and relevancy to environmental stated needs. The sectional head discusses further, individual operational projections to ensure that they are within the sectional mandate. This is important because sometimes producers may wish to carry out productions beyond sectional fiscal capabilities. In such instances, the sectional heads delimit operational variety, and perhaps annihilate unknowingly future production possibilities. According to Beer and Michael, they cannot help doing so since they are concerned with the present and do not have the capabilities of understanding the future (Beer, 1979; Michael, 1973).

The sectional plans are submitted to the progamme co-ordinator who likewise scrutinises, questions and approves them after lengthy discussions with individual sectional heads. This means that at the divisional level, systems 3 and 1 explore the problematic future. It is self-evident that they do not have the ability to do so since they are managers of the present. They could probably predict into the future if that was their role but in practice the projected plans are reflections of sectional/divisional past and present practice. I would like, however, to emphasise the importance of involving horizontal operations in planning their perceived future, especially their present horizontal capabilities which they understand better than the progamme co-ordinator. This ensures that they are committed

to the divisional future projections since it is their future too. However, their projections need system 4 inputs in terms of programme research and development since production sections do not have skills and knowledge required for probing into the future. It is also important to involve the programme's co-ordinator in sectional planning to ensure that present activities are in line with ministrial educational broadcasting regulations, plans and policies. Secondly, the programme co-ordinator's role as system 3 is to harmonise media activities with curricula development activities. S/He is able to do so because of the vertical perceptual viewpoint of sectional activities and the horizontal divisional point of view in relationship to other divisions, i.e., system 1 role at the Institutional level of management. The programme co-ordinators form the Institute's management committee. The committee is chaired by the Director of the Institute who is system 3 at the institutional level of control.

The shortterm future activities are reconciled during the staff meeting's deliberations. Long-term plans requiring deeper thinking, understanding, reflections, and total agreements are discussed in special seminars/workshops usually held away from the place of work. They are internally organized to harmonise, and co-ordinate future divisional activities and approve structural changes, thereby facilitating survival-oriented activities and reducing internal and external turbulences and uncertainties. It is also easier to implement agreed future plans. Other system 4 functions are publicity-oriented

productions, like the films "the Radio Lesson", "This is K.I.E.",
and "Curriculum Change". The three films attempt to explain to
the formal environment major curriculum and media activities
especially innovations. The management and media specialists
attend national and international, media-related conferences,
seminars and workshops. Hence, even though the section does not
have its own research and development section, it is kept aware
of the state of research and developments in distance education,
library science, educational and public broadcasting,
resource-based learning, curricula development and electronic
engineering. The division places a lot of emphasis on maintaining
its national and international contacts in terms of media
production, electronic equipments, and media utilisation changes.
The division recognizes the fact that it does not have staff
qualified to probe into the future. Attending conferences,
seminars, workshops is not the answer but it is a useful
compromise.

It has been predicted that the next decade will be dominated
by informational technology. Hence, whoever controls information
will have power over those who do not have it. Therefore, the
initiation of a system 4 unit seems a timely undertaking,
especially in Kenya where radio is the dominant medium of mass
communication. It is the only delivery system which has an
extensive rural infrastructure, and which, though
unsophisticated, still has unexplored potentialities and
possibilities. A system 4, exploring future possible new distance
education, audiences, extension of curricula and better means of

applying media strategies in production and utilization of media seems a timely proposition. EMS, in turn, has studio and print capabilities to produce high quality distance education messages given the exemplified need.

System 5

In practice, the division does not have a system 5 subsystem. However, the functions of system 5 are carried out by the management committee. It is the management committee which approves systems 1 budgetary requests, expenditures, and future activities. The committee also sanctions and approves internal structural changes as suggested by systems 1 and 3. The committee facilitates systems' 1 operational activities by approving accounting mechanisms relevant to media productions. The management committee therefore provides closure for the division. It is worth noting that it is composed of divisional systems 1 and the Institute's metasystem, i.e., the director. According to Beer, each level should have its own system 5. We can say that in practice the division suffers because it lacks a system 5 to provide closure for systems' 1. Systems 3 cannot play this role since their function is to provide leadership to 'systems' 1-inside and now. Hence they do not have the requisite variety to provide closure since they are embedded in sectional activities and unaware of the future. As Figure 3 shows, the mass media panel should provide closure to systems 1. However in practice mass media deliberations are related to professional survival discussions rather than internal media productions. The panel is

composed of sentient groups (Michael, 1973), i.e., media makers and users. Its objective is to provide a forum or a platform for discussion. To quote an EMS structural document, the mass media panel

> "is rather different to other panels in that it is not concerned specifically with the activities of K.I.E. It, in fact brings together media makers and users and provides a forum for discussion of media activities. It is particularly concerned with non-formal educative projects." (EMS, 1982, p.5)

Therefore, mass media panel's role is not a system 5 function, although it occupies this structural position. In practice, the management committee at the next level of control provides closure to systems 1.

Algedonic loops, filters, meters

The algedonic loops are the emergency channels which can quickly communicate urgent messages. The algedonic filters and meters are the various ways of utilising interpersonal relationships.There are several ways of transmitting distress signals. The quickest and most efficient way is the telephone. This channel can be used for transmitting formal or informal messages about managerial dissatisfactions. The formal internal algedonic loops (channels) are:

- staff meetings
- official memos to the decision-maker with copies to

the affected individuals

- official letters of complaint

The formal internal algedonic signals are:

- absentism

- discontents in task performances

- general disatisfactions with the division

- poor interpersonal relationships, especially breakdowns in communications

- complaints

The environments uses formal channels to transmit dissatisfactions in divisional media programmes. The majority, both teachers and pupils, write directly to the Institute. The division encourages interactions with the environment and algedonic signals are welcomed and attended to immediately.

A variety of informal channels are deployed by both the division and its formal and informal environments. The most effective channels are the interpersonal ones. The divisional and sectional heads react quickly to rectify managerial errors. In a recent commonwealth broadcasting conference held in Toronto, the managerers of the public broadcasting systems agreed to the suggestion that it was politic for monolithic systems to publically accept and embrace error rather than being presenting a defensive stance. The division of media is moving towards error embracing and admitting publically that a mistake was made, for it is human to err.

The Bar

There is no bar in Figure 3 for it is operationally impossible to reflect this role diagramatically. The role is well served by the Institute's cafeteria. This is the place where staff at the sectional level of management meet briefly to share the ten and three o'clock cup of tea. The informal channels for sharing managerial problems are socialization proccesses; for example, parties, lunch dates, informal gatherings and definitely 'the actual bars, which all create atmospheres conducive to relaxation.

The formal professional groups could be regarded in a literal sense as "bars", where managers at the same levels of control meet to share and acknowledge their strengths (successes) and weaknesses (failures) without being judged or patronised. Within the divisional context this role is provided for nationally by the mass media panel and internationally by the Commonwealth Broadcasting Association. In both associations the division openly declares its worries and seeks advice from the members. I find the two associations important in the sense that managerial problems, though to some extent cultural laden, are everpresent pervasive elements of the human system. In other words, systems 1 and 3 are comforted when they realize that organizational problems are not confined specifically to themselves.

Channels of variety

The concept of the viable system is based on free flow of information within and between subsystems. The lines in Figure 3 represent some of the infinite channels through which information flows within the division and its environments. We should note that these are the channels which the division has designed, hence its control of the information which it has allowed to influence itself. The division has an intricate filing system which reflects the types of information that are important to itself. This information must be protected since it is of use only to the internal environment and therefore confidential and worth protecting. Exposing this information to outsiders would be an invasion into the privacy of the division, especially its preservation of authority. Some of the organizations which have allowed access to managerial authoritative information have suffered accusations of inefficiency, lack of imagination, and other negative factors which are unwarranted.

In concluding the analysis of the divisional level, it is important to note the different types of divisional control operating together and feeding into each other: the panel system of control and managerial control. The panel system safeguards educational content broadcasted by the division. The managerial control facilitates the divisional decision-making process. Our analysis has centred on the latter since the panel system of control is a pedagogical, damping mechanism. I think it is also clear that the divisional function is to some extent a

metasystemic activity in relationship to curricula development
and relevance. It is a media service system for curriculum
enrichment and provision of internal KIE media needs.
"Educational Media is indivisible from curriculum development and
for that reason, the Educational Media Service was absorbed into
the Kenya Institute of Education." (Mugiri and Thompson, 1982,
p.27).

Sectional Level of Management: The Radio Section

(insert here Figure 4 showing the mapping of the current
radio section onto Beer's viable system model as of
January, 1983)

As we stated earlier, educational radio broadcasting started
in 1963 under the auspices of the V.O.K. The responsibility for
educational radio was transfered to the ministry of education in
1965, making educational radio an important component of
educational <learning resources. Since then producers of
educational radio have co-operated with the school inspectorate
and curricula developers in making education relevant to the
national needs.

When the division was merged with the Institute, it was felt
that radio producers' roles in curricula development was not best
described by the name "producer". The name "media specialist" was
adapted to explicitly describe the complementary function of
media production and development with curricula development. The
name change could possibly describe a survival mechanism because
in practice there has not been significant role change.

We will digress for a moment to discuss the staff described
as "media specialist", who constitute systems 1 of the sections.
Media specialists are usually recruited because they have shown a
talent for creative productions. A media specialist working for

EMS has a university education or its equivalent in media production or education. Most of them have taught for at least five years or they have produced exemplary programmes. Both acquire media or pedagogical skills through interactions during the task performances. The divisional description of their academic and professional role, is:

"well-qualified teachers who have extra training in media production and educational technology." (EMS, 1982, p. 6).

"The Head of the service considers that it is important for producers to understand the content of the material they are working with, even though most scripts are written by people outside the division. At the same time the unit is fortunate in possessing individuals with professional broadcasting and theatical backgrounds and these gifts, together with the experience and skills of teachers have undoubtedly helped to ensure interesting and viable programmes." (CEDO, 1974, p. 194)

The assumption is that those who are highly skilled in media acquire, through the diffusion processes, educational philosophy and practices through interactions with their educational counterparts; curriculum specialists and panels. We can assume that this process occurs because they are tightly embedded in an educational institute and its environment. We can safely make such an assumption based on the notion of embedment as exemplified by Beer (Beer, 1979). "Within the staff of the

Schools Broadcasting Division one detects a symbiotic balance of educational and professional broadcasting experiences" (CEDO, 1974, p. 195). We shall henceforth use the term "media specialist" to explicate the contextual media role in the divisional function of providing a media service. The name is used within the institutional context to reduce role conflicts by avoiding ambiguities and confrontations between media and curriculum specialists.

System 1

As Figure 4 shows there are four media specialists and seven assistant media specialists. Each one of them operates within the square, i.e., the management unit. In terms of conventional hierarchies, the media specialists belong to a level above the assistant media specialists. However, in terms of horizontal operations, they all belong to the same level of control.

Each of the media specialists is assigned a production load which consists of two to three series of programmes. The assigned series is related to individual subject specialization and preference. The same holds for school grade levels.

The process of assigning tasks is fairly democratic and media specialists are encouraged to choose production areas in which they have confidence in. The section respects individual locus of commitment and control which are related to individual personalities. Media specialists have a high locus of personal commitment and creativity for they occupy extremely vulnerable positions in the Institute. This is because in the final

analysis, they are responsible for production editorial decisions which are made solely by them. The fact that they are accoutable for their mistakes makes media specialists defensive of their production creativity. For although errors are occasionally expected, social systems refuse to accept errors from media specialists. The commitment of errors is interpreted as a sign of incompetence, inadequacy, and therefore a punishable offence. This makes it difficult for media specialists to accept variety attenuating information due to the human desire of amplifying their creativity, / for media specialists face the disturbing danger of compromising independent critical and creative thinking with panel thinking.

They must therefore possess a high level of locus of control. They embody in a very personal way the section's internal criteria of effectiveness. To preserve their integrity, media specialists function is explicitly elicited. In essence, they represent legitimized media expertise within the panel. Their role is to assist the panel in eliciting media elements which would be translated into feasible radio programmes, and subsequently serve as media inputs into curricula resource materials. The role of a media specialist is therefore a demanding one and many of them opt to move eventually to other educational areas which do not demand a lot from individual's internal locus of commitment and control. This is because each of the media specialists manages their own horizontal variety. In practice, it means making realistic horizontal production plans, implementing them, and evaluating them through pre-testing and post-testing.

They set their own regulatory mechanisms which prove to be difficult for some of them who were previously controlled by timetables, official hours, etc. Media specialists are tightly embedded within their operations and they are in actuality indivisible from their productions.

As Figure 4 shows systems 1 concentrate on producing series for primary schools and for teacher in-service education. This pattern reflects current education practice in Kenya in which educational emphasis is being geared towards improvement of basic education through curriculum revision and training of unqualified teachers. Figure 4 reflects this aspect. At the moment, systems 1 plan to produce in total: 13 series for primary education, 13 for in-service training of teachers, 3 for secondary, 1 series for regular primary teachers and 1 series for secondary teachers.

Most of the primary series consist of 24 programmes corresponding to the radio term. The secondary serials ranges from 8 to 24 progammes per year. The duration of each programme range from 15 minutes for lower primary, 20 for upper primary and secondary, and 30 minutes for pre-university students. The number of programmes in each series is variable, reflecting the decision questions posed by the panels in terms of media needs for radio and audio-cassette. The secondary productions are dominated by language-oriented series in Kiswahili and English, fasihi and literature respectively. In broadcasting, the series reflect the creativity, personality, and managerial skills of the individual producers. This makes systems 1 vulnerable to internal and external turbulences because series development and productions

take a lot of time and money. Subsequently, systems 1 exercise and accept a lot of control of their operational variety.

Media specialists exchange scripts, organize listening sessions, give and accept agreements and disagreements, all aimed at improving the quality of productions. The heavy operational interactions between and within circles represent giving and accepting creative ideas in terms of conversational theory (Pask, 1983). This practice has meant sectional acceptance of responsibility for individual errors, in practice operationizing in practical ways the national philosophy of mutual responsibility and accountability for individual's quality of production.

It is evident that systems 1 experience tight control measures, thus delimiting horizontal variety. The question of freedom and constraint is a practical issue for systems 1. But why do media specialists accept this tight control? I think that the nature of broadcasting makes programme control acceptable to media specialists, especially when the magnitude of the amplification process, is taken in consideration. The programmes are transmitted via terrestial air waves from Nairobi to learners spread out and far removed from the programme source. If there are mistakes/errors, they are simultaneously reproduced and assimilated according to the learners' models. Media research has not clearly discovered how children process information encoded in an audio modality (Sturm, 1982), and thus media specialists are working in an area full of blackboxes. Therefore, they welcome programme inputs which coincide with their own creativity

and perceptions of learning/teaching variables projected by the schools and out of school environments. Once an error has been transmitted, it is not easy to rectify the mistake or provide remedial services. EMS does not have regional centres which could provide remedial teaching. The editorial control is the responsibility of the Institute. This responsibility is exercised by the sectional head (whose role was discussed under system 1, at the divisional level of management) as well as the panels. The media specialists as educationists recognize the limitations of educational radio in terms of its inflexibility and learner control. The environments can neither control the times of broadcasts nor change the style of teaching during the learning process.

Each of the media specialist possesses an internal criteria of stability beyond which s/he cannot be controlled. The internal criteria of stability is an individual's editorial criteria for production of educational programmes which is based on their internalized educational values and creativity (see Pask's p-individual and Gaines' D-individual, 1983). The media specialists work with a team of informally linked but essential individuals consisting of artists, scriptwriters, and education consultants. They all contribute to the production process. I want to emphasize that the level of control by panels, and other media specialists is determined by individual media specialist's needs; for in essence, media specialists determine the amount of control that they respond to.

Although systems 1 are encouraged to interact with their

environments, they cannot match the variety deployed by the school system and the informal system. Therefore the majority of environmental selective mechanisms remain unknown to media producers. When they manage to go out into the environment, both are handicapped by the law of hierarchy. Media specialists are perceived as powerful by the environment since they represent central authority based in Nairobi. This means experiencing the problem of diplomacy since both teachers and pupils cover up important information.

Besides visiting the environment, the section uses variety amplifying channels like correspondence, resource section's dissemination networks, supporting teachers' and pupils' notes, and the inspectorate system. The most important variety amplifying channel is a policy issue. When the school programmes are on air, no other national programmes offer competition.

In essence, systems 1 have a captive large audience which they can influence to facilitate listening habits and skills.

The environments communicate with media specialists through correspondence, visits and evaluation reports. But in comparison, the variety attenuating channels are dominated by variety amplifying channels, thus creating an imbalance between the environment and the section.

System 2

The function of system 2 is carried out by various divisional conventional practises, regulations and procedures. The subject panels' function of guidance is a system 2 activity

because it reduces content disagreements. The role helps in confining some of the systems' 1 creativity, and harmonises into a coherent whole the different content interpretations. This practice has been supported by Pask's research into the conversation domain (Pask, 1983). Amongst the subject panel members are primary school teachers whose curricula input make the programmes more relevant to the environmental educational audio needs. We could say that panel members direct systems 1 because they act as a reference group representing legitimized expertise in media and education. The role is "anti-oscillatory" because of its legitimacy in terms of representing validated systems of beliefs.

The systems' 1 function of research into audience variables, pre-testing, and post-testing all contribute in reducing distracting content and strategies, thereby confining programme variety but dampening deviating variables. The evaluation reports are therefore system 2 mechanisms because they transmmit environmental values, needs, beliefs, conventions to systems 1. The reports also reflect some environmental reality as perceived by the models of evaluating media specialists. But as Beer and Pask have pointed out, individual systems confine environmental variety so that it conforms to individual's perception of reality. This is one of natures' delimiting variables, reflecting social system phenomena. The function of environmental evaluation is best done by skilled media evaluators, since media specialists cannot produce as well as carry out extensive programme evaluation. Media evaluation and research is a specialised

function requiring special skills and knowledge to determine the different types of selective mechanisms operating in the formally linked environments. The role of such personnel is to find ways and means of dampening the generated negative variety to enhance the effectiveness of systems 1 operations, i.e., educational radio productions.

The radio section has two continuity announcers whose role of linking programmes in a meaningful reduces utilisation problems, thus being a dampening activity of system 2. Continuity announcers provide links between programme series and the target audience in the environments. Their function is crucial for they can amplify or attenuate operational output by the way and style in which they link programmes. The continuity function is both "anti-oscillatory" and a channel for generating greater variety. To be more explicit, the daily announcements of programme schedules damp environmental "oscillations" by reducing audience confusions about times of broadcasts. On the other hand, the announcements amplify the level of serial utilization in the sense that more people are made aware of what will be on air at specific times. The assumption is that the greater the levels of announcements the greater the utilization level due to the amount of redundancy.

The listening sessions discussed earlier under systems 1 are a system 2 activity of reducing production problems. This is because they heighten systems 1 feelings of belonging to a creative organization. Thus by listening to each other's programmes, media specialists are made aware of the diversity of

progamme production variables as well as witnessing the different facets of sectional creativity and points of views. There is the sense of integration, mutual responsibility, individuals' worth, and implication and accountability for each others operational output. Thus we can deduce that the practice of listening sessions operationizes in a practical sense the concept of cohesion in terms of sectional outputs. This is an important distinction for media specialists since it means that the total radio system is responsible for programme errors.

This practice is also 'anti-oscillatory" since it reduces to some degree frustrations, discontent, conflicts of interests, competitions' and emphasizes positive co-operative effort between systems 1. On the other hand, the sense of belonging does not alter individual feelings of competence, efficiency, uncertainty, and media specialists stance of apologia or defensiveness in terms of personal production strategies. This attitude distorts information contained in the evaluation reports. This occurs sometimes when critical evaluations often lead to unjustified annihilation of creative production variables, thus causing "oscillations" rather than dampening them. This state of interaction is fortunately arrested by social and media conventional values , interpersonal relationships, and personal beliefs, for their is a physiological limit to one's critical valuation of colleagues' work. If media specialists are forced to be defensive, they refuse to receive helpful feedback. This is an important "oscillation" damping mechanism. Finally, media specialists have to co-operate with other subsystems' rules,

regulations, procedures of reporting and agreements. All these
practices dampen "oscillations" between media specialists and the
sectional head, although they operate at different levels of
control and within different subsystems. The systems and
subsystems that fall under this category are:

(a) the Voice of Kenya, which controls radio operational
outputs. The most important functions which affect media
specialists are: controller of radio channels,
management sound library, and exercising of broadcasting
policy.

(b) The divisional rules about utilisation of studio,
equipment, other service sections like, design and
print, resource section, panel system, curriculum
divisions, administrative services, and other agencies.
In total all the rules, agreements, regulations
emanating from outside the section and the institute are
"anti-oscillatory" mechanisms.

Finally I would like to emphasize the great
importance of interpersonal skills which are in
themselves "anti-oscillatory". They are important
because media specialists are in continual interactions
with different people on whom their programmes' input
and output depends. They are informally linked to these
people by agreements, conventions and mutual need for
each other. The interaction process is therefore
delicate although it is an example of a symbiotic

relationship since media specialists depend on performing artists for transduction, i.e., artistic interpretation of the script, directions and transformation of both into a programme. Interpersonal skills are crucial in this process.

System 3

We discussed system 3 at the divisional level of control as system 1. Now if we rotate the square counter-clockwise, we transform system 1 from its former horizontal perspective to a vertical one. We not only change the positions, we also change some of the roles. As system 1 at the divisional level of management, the sectional head was aware of what was going on in its operations. But as system 3, the sectional head's degree of awareness changes from knowing a lot to knowing less; for at this level media specialists are much more aware of the horizontal operations than system 3. However, there is a difference on what each is aware of. At the sectional level, media specialists are aware of their individual productions while at the divisional level, the sectional head is aware of what all the media specialists are currently doing. The horizontal functional activity is mainly as facilitator of media production. As system 3, the sectional head is also the "boss" of media specialists and as boss exercises institutional responsibility invested in the head of radio section. The institutional responsibility is to facilitate utilisation of educational radio in Kenya by supervising the production of high quality programmes which have taken into consideration the unique potentialities of radio as a medium for transmitting pedagogically sound instructional programmes.

The radio section uses a unique classroom instructional

model. This instructional model is transmitted over air or recorded on cassettes/tapes and complemented by teachers' and pupils' supporting notes. It has always been a problem to co-ordinate the two delivery systems making them coherent due to logistical problems and costs involved if one of them is modified to accomodate the other. Any modification process entails a large deployment of resources, both human and fiscal. This was one of the reasons why a resource section was created. I would however like to highlight the importance of the learning assumptions incorporated in the model.

After 20 years of educational broadcasting, the radio section has come to believe that its model has achieved a high level of instructional effectiveness in relationship to its design and application of tested learning/teaching strategies. This has been a gut feeling belief which is being tested under experimental conditions by a Radio Language Arts project. In this project, language topics are patterned around myths, legends, and ordinary life-experiences; a model which the section has applied, for the last twenty years.

The model is a self-validating system of media production beliefs. We believe that an effective instructional radio programme should contain the following strategies:

(a) the first 3-5 minutes should present the main facts/points of views,

(b) the succeeding 5-10 minutes should expand the main points using different indices of redundancy measures.

For example, dramatisation of episodes is used to exemplify difficult concepts, or drama is followed by narration to synthesise complex concepts and to simplify them, thus heightening the Piagetian process of assimilation and consolidation i.e. deep level processing of information/knowledge. We believe that redundancy measures encourage deep level learning as opposed to memorization of facts, the important objective being understanding of certain trends as opposed to mere knowing of facts (Pask, 1983).

(c) the speed for delivering programmes in accordance with listeners chronological ages. We believe that pausing helps learners in proccesing information according to individual models/modes of learning. Pauses are filled with mood music which is supposed to make listeners relax and process the decoded information. We believe that such pausing should act as bridging of parts to make the programme interesting and enjoyable. Thus increasing the index of enjoyment and artistic satisfaction (Sturm and Jorg, 1980, 1982).

(d) we incorporate several production strategies in an attempt to cater to different individual listening and processing styles. For example, narration, songs, verse-speaking, drama, reporting, interviewing, discussing, questioning, and classroom simulations,

i.e., question and answer strategy and commands, were used. All these strategies are related to learners' personal experiences. We believe that understanding from the audio modality is enhanced if concepts coincide with learners personal backgrounds (Ausubel's cognitive structures, Ausubel (1968) and Pask's participant).

(f) lastly, we utilise the socio- cultural tradition of story telling and listening as a viable system of transmitting education values, skills and knowledge; in the context of african tradition education. The current trend is to make programmes which can be easily understood by the listeners without the intervention of teachers who sometimes reduce variety (attenuation by the teachers). The strategy which is being used is a subtle one because the section is aware of the feelings of 101,911 primary school teachers; to whom we are partners and whom we cannot afford to antagonise.

(g) This teaching strategy has won international recognition. The radio section has successfully participated in international competitions like the "Japan Prize", a forum for facilitating excellence in educational broadcasting.

The sectional head performs the same role as divisional head, i.e., system 3 function at this level of control. We have touched on sectional heads' role as system 1 at the divisional

level. We shall highlight important distinctions which we have not discussed so far.

Firstly, looking at Figures 4 and 5, we notice differences between divisional and sectional heads' span of control. The divisional head is in charge of 6 systems 1 while the sectional head is in charge of 12 media specialists. This anomaly in the range of spans of control was noted by Daniel and Snowden with regard to Athabasca university, (Daniel and Snowden, 1980). This seems to be a dilemma of management; the higher the level of management the less the span of control. But this should not be the case, for according to Beer the span of control for system 3 should not be more than 6/7, and there should not be differences between lower and upper levels. This means that the sectional head's span of control should be reduced to a manageable number, not more than seven.

The second difference is related to sectional heads' role as the metasystem. The metasystem does not have a formally-designed system 2 while system 3 at the divisional level has a professional system 2, the educational technology panel. The sectional head does not have a designed system-3-star, because the technical service system operates horizontally in terms of its relationship to sectional head and divisional co-ordinator. Lacking a designed system 2 and system-3-star , the sectional head over-utilises the command channel, thus being perceived as authoritarian by media specialists in accordance with the law of authority (Michael, 1973).

In practice, system 5 is saved from this state by the panel

system which we have discussed under the divisional level of control. The activities which have been discussed under system 2 also serve to dilute system 3 command channel. The nature of broadcasting in particular cannot operate in an environment which is authoritarian since media specialist are responsible for editorial control of programmes. The editorial freedom increases their locus of commitment which is usually entrenched/embedded in the divisional management philosophy/traditions. The sectional head's function is to create an environment where creativity is valued and nurtured. Authoritarian environments would stifle creativity. It is crucial that management treat staff as a valued resource, for in essence the production work of media specialists project sectional creativity embedded in their operational outputs. They must therefore be given freedom to freely express their creativity within the learning-teaching constraints.

From our discussion so far it is evident that it is logically useful and a feasible proposition to design system 2 and system-3-star in logistical terms to balance the variety generated upwards (vertically) by media specialists. The laws of authority and hierarchy cannot offset the horizontal variety. It is not possible for system 3 to generate vertical variety, in making hard decisions relevant to programmes' productions, in this instance 30 series of programmes as well as other vertical-horizontal matters. However, the sectional head can nurture horizontal variety to enhance co-ordination and sectional synergy/cohesiveness by discouraging in-group loyalties, and covering up of information, i.e., practising diplomacy. System 3,

if dominated by horizontal variety, tends to deal with triavilities instead of making hard decisions.(Beer,1979). This means that media specialists might be tempted to withdraw important information which system 3 may need to make sectional decisions. Such incidences are common in many organizations. People who operate at this level find individual means of dealing with the problem which may exhibit different symptoms. Watson (1982) found that employees' opposition to management decisions were demonstrated as opposition to organizational changes while in actuality it was a class struggle based on group ideologies, British working class fighting management change of social values. Fortunately the proximity of sectional head to media specialists saves system 3 from experiencing information withdrawal and thus being forced to deal with triavilities.

Despite the identified imbalances, the sectional head still has a broader picture of systems 1 horizontal variety than individual media specialists because of occupying the strategic synoptic position.

The radio section does not have a formalised system-3-star although, the engineering section provides technical services to media specialists. There is a need to create at this level an engineering system-3-star function that informs the sectional head about sectional operational activities.

The Institute's administrative division audits sectional expenditures to prevent fraud. If irregularities are detected, they are reported to either the divisional co-ordinator or sectional head depending on the severety of the offence. However,

such experiences are rare since systems 1 do not handle money directly.

The Institute's manpower and development section and Individual's themselves handle the training function. There should be an activity concerned with sectional human resources development. At present the function is handled by the two systems 3: sectional and divisional. The sectional heads and individual systems 1 are responsible for sectional staff development. Both co-operate with Kenya Institute of Mass Communication and All African Conference of Churches in organizing basic training for media specialists. The section has found that training reduces systems'1 operational costs because of improving task performances by media specialists. The sectional head seeks training opportunities for media specialists to safeguard staff turnover and to reduce recruitment and supervision costs which would have to be injected if the staff were not experienced. Many of the media specialists attend training courses within or outside the country. Such training is planned in conjuction with the Institute's administrative division which handles administrative procedures and co-ordinates the Institute's manpower development and training.

Fortunately, the section has not suffered from Becker's theory of mobility, i.e., the sectional staff have tended to remain with the Institute, even after training, for according to Becker's theory, training generates mobility or a high potential degree of transfer of staff because of acquisition of broader conceptual frameworks (Woodward, 1975).

System 4

The Radio section does not have a system 4 probing into the future. The role is carried out to a limited degree by systems 1 research into audience variables. But this kind of programme research is a system 1 function since it is a vital input into individual's operational activities. However, as Hambrick (1981) has pointed out, management environmental scanning activities are conducted on an ad hoc basis at all levels of management because such scanning activities are not usually consistent with current roles and functions: for management tend to respond more to variety from their previous functional backgrounds. For example, a media specialist whose background is in teaching of a language will respond more to language variables transmitted by the environment and ignore the other curriculum areas, even though at that moment in time s/he was supposed to scan utilisation or consumption of media across the curricula spectrum. The evaluation reports submitted after field trips will henceforth be biased towards evaluators, previous background, in this case language teaching. This type of evaluation is wasteful because of the high degree of information attenuation. A decision maker using that information would make wrong interpretations and possibly costly decisions due to its restricted locus of environmental scanning, (Hambrick, 1981 and Michael, 1973).

The subject and course panels' membership consist of education practitioners and people who are involved in research in the field of education. Unfortunately, there are not many

media researchers and evaluators probing into the future.
However, the outlined functions do not agree with Beer's concept
of an exploring system 4, which should be probing into the
problematic future. None of the outlined subsystems fulfill the
role of a futuristic media research and development activity
across functions and hierarchies (Hambrick, 1981).

System 5

The section does not have a formalised system 5 at this
level of control. The function of approval is carried out by the
sectional head, divisional co-ordinator, the management
committee, and the Director of the Institute on behalf of the
permanent secretary. Thus, the nature of the closure determines
the level which carries out this role. This practice conflicts
with Beer's proposition that different levels of management speak
different "metalanguages".

Variety channels, and Algedonic loops

The channels which transmit information within the section
are similar to the divisional ones. The channels linking the
media specialists with the environment have been discussed under
media specialists linkage with their formal target audiences. The
channels form a mesh of dynamic loops which are difficult to
isolate since they are embedded within each other.

At the individual level, media specialists use interpersonal
skills when they visit the programme users. During such visits
they hold meetings and have fruitful discussions with the

listeners.

In the past, teachers were asked to assess programme series and send programme evaluation reports/cards to the section. The practice did not produce a lot of reports. However, the increasing demand for tapes and cassettes assures the section that their gut feelings about the instructional models are to some extent being appreciated. The objective of the section is to encourage better utilisation of the learning-teaching strategies incorporated within the radio instructional model by making users much more critical of the design variables. There is, and I think there will always be differences between media makers, academic evaluators and users. The section incorporates user views when developing programmes. The demand for copying services led to the divisional creation of dissemination activities within the resource section. We have discussed other variety amplifying/attenuating channels under resources section at divisional level.

The algedonic filters, loops, and meters are diverse and culture-oriented. They also reflect individual interpersonal skills, decision styles, individual personalities and they are embedded within the cultural system of beliefs and values. The media specialists and sectional head reflect complex interpersonal relationships which keep them awake and aware of their production responsibilities. And as it was pointed out earlier, algedonic meters and loops are crucial to a broadcasting system.

We have so far analysed in detail the radio section by mapping its actual functional and survival activities onto Beer's viable system model.

The two sections, radio and television, are mainly production sections. They therefore exhibit the same managerial and operational activities. Thus, to avoid redundancy the television section will not be analysed because its management design is similar to that of the radio section.

Method

Programme Evaluation Process

The analysis was carried out in three stages. The first stage consisted of identifying the Educational Media Service, as a possible viable system. Then, one level of control above and below EMS were identified.

The second stage consisted of subjecting each level of management to a rigorous analysis. The various activities were analysed to determine whether or not they exhibited the five conditions which determine an organization's viability. During this stage, the activities of EMS, KIE and the radio section were mapped onto Beer's conceptual model.

Thirdly, the results of the analysis were compared longitudinally across the three levels of control to determine whether or not similar activities existed at all levels. This is condition of "viability", i.e., each level of management is similar having the five conditions represented by the five subsystems. The analysis represented a "continuum" from macro to micro analysis.

The Educational Media Service was identified as a potential "viable system" at one level of management. The viable system above EMS was identified as the Kenya Institute of Education. This level was identified by conceptually placing oneself at EMS

level and figuratively looking above. The level above should be the one in which distance education is embedded, hence the Kenya Institute of Education. The level below was identified in the same way. Which viable system is embedded within EMS? Each of the various sections which constitute EMS could be viable systems. Among the six EMS sections, the production sections were identified as potentially viable systems at the next lower level. Only the radio section was subjected to a systematic rigorous analysis. This was because it is the major distance education subsystem.

Once the systems at the three levels of control were identified, each was subjected to another form of analysis. This analysis concentrated on identifying clusters of similar activities (variety) and determining which variety was absorbing each other. The guiding question which was used was: what is this component doing? This question facilitated the identification of functional and survival activities. Once the activities were highlighted, a second question was posed: Where does this functional or survival activity fit? Is it a System 1, 2, 3, 4 or 5?

System 1

The component subsystems at each level of management which could exist independently were identified as system 1. For example, the radio section was identified as system 1 at the divisional level of control while EMS was identified as system 1 at the institutional level of management. This means that the

"metasystem" at one level of management is a system 1 at the next
level of control (Beer, 1979).

System 2

The activities which damp malfunctions were identified as
system 2 functions. Thus what the analyst identifies as
horizontal, professional and administrative functions that reduce
operational, service and supervisory conflicts were identified as
System 2 activities. For example, rules, regulations,
conventions, values, ethnics, procedures which in general govern
human behaviour society and organizations. The word
"malfunctions" called "oscillations" by Beer means, differences,
disagreements, misunderstandings in reference to organizational
conflicts or within a body of knowledge. With this conceptual
understanding, the Educational Media Service activities or
pocedures which reduce conflict between the leaders of the
production sections, the service subsystems and authority
representative, i.e., the boss, were identified. However, it was
not possible to identify at divisional and sectional levels a
managerial activity whose function was coordination of Systems I
and System-3-Star activities to enhance team work and to
coordinate production and service activities.

System 3

System 3 was easily identifiable because he or she is the
"boss" of one level of control. The programme director of media
was identified as the divisional system 3, while the Institutes

Director and Deputy Director were identified as system 3 at the institutional level of control.

System 4

The System 4 activities were easier to identify since they are planning, marketing, publicity-oriented and research and developmental activities. They all probe into the distant future by forecasting or making projections about the future. In Kenya, the future consists of five years. System 4 activities would be projections of long-range distance education, new production areas and broad guidelines.

System 5

System 5 was also easy to identify since within the Institute, it is represeted by the Institute's Governing Council.

Variety Attenuators and Amplifiers Channels

The variety attenuators and amplifiers are the channels through which information flows. The information could be for intenal or external consumption. This information may be accessed by either the internal members of the Institute or some external persons; formally linked or informally linked to the Education Media Service. EMS information is organized into different categories and it is classified as either general or confidential. Several regulations, rules and laws are enacted to preserve the privacy of this information. The internal information is kept by the managers of the three levels of

management. The Institute has the largest informational bank which is managed by the supervisor of the registry and which is used internally by all the members of the Institute. EMS division has its own registry. All the information related to divisional activities is stored here. The sections have their own information banks which are managed by the secretaries. The individual members of EMS keep their own information. These centres of information are official and they are officially transferred between persons, in case of personal transfer. This information either amplifies or attenuates variety depending on its nature. The information system was not discussed in detail since the focus of this analysis was on evaluatin of the design of the management control subsystem.

Transducers

The process of re-coding is a complex one and it was not analyzed in detail. However, it operates at three major levels: First, there are the physical transducers like the receiver sets, i.e., radio sets, television sets, video-cassettes, audio-cassettes, film projectors, etc. The receiver sets recode analog and digital electron signals into sound and pictures. The technical transduction processes, that operates from media production to reception of information by target audiences is very complex and we shall not discuss it. The process of transmission of terrestial air waves is a complex area of electronic engineering. The important aspect which was noted was the transmission capability by the Voice of Kenya's radio signals

which cover the whole of Kenya at different frequency amplitude and modulations. Kenya uses mainly AM for radio broadcasting. The next levels of re-coding processes were identified by posing guiding questions like -- Who interprets the production input signals and the output programme signals? During the production processes, the director, artists, actors or performers and the technical crew all contribute towards the creation of a programme. This is the second level of re-coding. Complex transduction processes occur during the studio, on-location and post-production stages. The third level of re-coding is interpretation of content and subsequent processing by the teachers and various listeners both targeted and untargeted audiences. The three main types of re-coding processes are very different and full of complexity. However, they all contribute to the efficiency and effectiveness of a distance education programme. The practice of instructional analysis message design, evaluation and production techniques attempt to enhance mental re-coding processes.

Algedonic Filters, Loops and Signals

These are complex processes exhibited by the internal members of EMS. The analysis pointed out in brief behavioural characteristics constituting the algedonic filters, loops, and signals.

Algedonic filters (networking) These were interpreted as the interpersonal relationships usually manifested by behaviours. The identification of these was difficult and biased towards the

analyst's approach to management. However, sincerety is a
crucial personality trait for the staff of EMS deal every day
with different types of people. They must be perceived as being
empathetic and sincere. This is because distance education
requires team approach during development and production of
outputs. Whenever team approach is applied, there is heavy
consultations, socialisation and sharing of freely given and
accepted infomation. The staff of EMS apply intuitive skills,
their classroom experieces, media production skills and knowledge
to enhance their programmes. These views have a personal bias.

Algedonic signals. The algedonic signals were interpreted to
mean emergency communication channels, which keep the Education
Media Service awake and on the right path. As a distance
education system, EMS keeps itself tuned to the emergency signals
both internal and external. This is because of the inflexible
and learner control nature of educational broadcasting. The
division has attempted to incorporate schools' timetables when
scheduling programmes. However, the problem of synchronization
still exists. The radio section especially has maintained a
standardized schedule which has not changed over time. Projected
scheduling changes are announced in advance so that schools can
incorporate schools' broadcasts into their timetables. The
section announces when changes are not yet expected.

EMS is concerned with its target and untargeted audiences.
One of the objectives of the division has always been development
of close interrelationships and harmony with its formal
environment. This is because the division aspires to understand

some of the main points of view generated by the formally linked environment. The division pursues a strategy which is mother-family oriented. As the producer (mother) of distance education materials, the division keeps in mind the listeners best interests at a critical level of perception. For the learners are perceived as a family which consumes distance education learning materials. Hence, distress signals are dealt with efficiently and at speed. They are never questioned or evaluated to establish their credibility. Such decision-making efficiency is sometimes risky but on the other hand failure to make risky decisions can lead to disasterous consequences for a broadcasting organization, such as the Education Media Service.

The Bar

The "conceptual bar" was identified as a place where staff can relax and learn from each other. The identification and description of the bar is biased towards educational broadcasting. This is because the staff of EMS live with stress created by scheduling deadlines. This forces them to be highly organized. The assumption is that a high level degree of organization generates activity energy which is in itself invariant to stress. The conceptual role of the Bar, is a relaxing environment conducive to learning and which is accessible to the staff who operate within the same level of control. The conceptual bar was identified as KIE staff cafeteria and staff production/seminar rooms of EMS.

Materials

The Institute's and Educational Media Service publications
as well as internal documents were used to reduce writer bias.

CHAPTER FOUR

RESUSTS OF THE ANALYSIS AND DISCUSSION

Introduction

The first stage of analysis consisted of identifying the levels of control. The analysis showed that the three levels of management were institutional, divisional and sectional. Each of the identified level of control was further analysed, revealing very interesting results. Firstly, the analysis indicated the inadequacy of representing managerial functions with conventional organizational charts because charts say what the organisation is supposed to be doing, not what it is doing. What matters in a viable organisation are the actual activities of the system rather than what the system says it is doing. For example, some of the media activities were found to be dysfunctional in relation to the main activities of an instructional distance education system. However, the analysis also showed that the dysfunctional activities might be restructured to operate in a different context in order to achieve their viability.

The analysis concentrated more on the actual activities of the designed components of the controlling subsystems of the Kenya Institute of Education, Educational Media Service and the educational radio broadcasting. The analysis focused on those

aspects which have an influence on the controlling subsystem of EMS, the main focus of this study.

Results

The analysis showed that the three levels of management were the:

. Kenya Institute of Education, i.e., institutional level

. Educational Media Service, i.e., divisional level

. The Production Sections, i.e., the sectional level

According to Beer's conceptual viable system model, each level of control represents an independent entity. Thus, if any of the identified levels of management is removed from the whole, then each could exist on its own. However, in reality, levels of management exist as systems nested within each other as shown by this analysis. Figure 5a and 5b are diagrammatic representation of the three levels of management nested within each other.

(insert Figure 5a and 5b about here)

The two figures demonstrate the process of embededness as well as indicating the embedment of a distance education system (EMS) in a curriculum and research system (KIE). This means that the three levels represent three systems nested within each other and therefore influencing each other directly and indirectly through interactions. The interactions are the

channels of coordination, cooperation and collaboration.

The second and third stages of analysis, which consisted of rigorous examination of the activities of the current operating components at each of the three levels of control, revealed significant structural and functional differences across the three levels.

First Finding: well-designed institutional level

The institutional level of control the Kenya Institute of Education was found to be well designed in accordance with Beer's conceptual model. If one looks at Figure 2, it is evident that the mapping of the Institute's operational activities fit adequately onto Beer's conceptual model. The various managerial activities of planning, controlling, organizing, appraising and leading were being performed at the Institutional level as reflected by the structure of the Institute. However, this did not hold at the divisional and sectional levels.

Second Finding: missing components at the divisional and sectional levels

The controlling subsystem of the Educational Media Service and the educational radio section had missing components. The missing operative components were identified when the structure of EMS was compared with that of the Institute and the radio section. The missing operative controlling parts create significant "editorial" gaps within the structure of EMS and its sections. It is important to note the missing divisional

components as well as the activities which act as systems 4, 5 and 3-star as indicated by Figure 3. The missing components are crucial because they comprise important internal and external activities and connections, whose major functions should be performed by a system 2 and system 4. System 2's activities enhance collaboration and coordination by reduction of conflicts through establishment of operational rules, procedures, and guideline of reporting, and operating. The System 4 activities consist of researching into the external environments to find new solutions and technologies that may affect the future of the current operative activities of EMS. The forecast options should be taken into consideration when EMS makes organisational production plans, promotions, market analysis and explainations to the public about the organisation's future plans.

Third Finding: missing radio connections. In comparison with EMS as a whole, the radio section was found to lack major connections, both internal and external as well as important operational components which are necessary conditions of viability for an educational radio broadcasting system. For example, system 2, 4, and 5 activities indicated by Figure 4. According to Beer's conceptual model, structural gaps are usually filled in by activities which may be more merely survival-oriented rather than functional in relationship with the main objective function of the organisation. For EMS, its objective function is provision of distance education. Therefore any other activities unrelated to this objective function were

considered dysfunctional.

Fourth Finding dysfunctional EMS components

There were no dysfunctional components at the Institutional
and Sectional levels. However, the analysis of the controlling
subsystem of EMS showed that it possesses service components
whose activities concerned the whole Institute, primary teachers'
colleges and other educational departments. They were not
therefore specifically divisional service activities. The
divisional components which were found to be dysfunctional were
the resource and library activities. None of their stated
functions were found to be distinctly distance education per se.
Both sections disseminated media supporting notes, recorded tapes
and cassettes, and curriculum materials. The analysis of EMS
sections showed that dissemination of the media materials was the
only function which was distinctly related to distance education.
The other stated functions were found to be indirectly related to
the media division's stated function of distance teaching. For
example, the following stated resource section's objectives:

(a) To provide the services of a print and non-print
multimedia resource collection, including borrowing and
copying facilities to K.I.E. staff and those of other
educational institutions, educational administrators and
educational researchers.

(b) To distribute the produced materials of the
Educational Media Services and Curriculum Divisions of

the Institute to the appropriate consumers and to communicate to the Institute needs for further productions."

The above objective functions relate to the whole Institute rather than being specifically media division's service activities. The library section also provides services to the whole of the Institute. The analysis of these sections also showed that some of their activities are autopoiesis. Beer has pointed out that sometimes organisations carry out activities which are meant for sustenance, i.e., for continuity or survival, purposes. It is healthy to do so provided that survival activities are not overemphasized. The resource and library activities which were found to be excessively autopoietic were:

. national - training of staff, both formal and non-formal, to instill resource skills and knowledge

. training courses in library work

.. encouraging and nurturing the practice and concepts related to resource-based learning in formal and non-formal environments.

. developing resource dissemination networks with other national and international institutions.

The stated resource and library functions are therefore misplaced because they serve the whole Institute and not just the media division. They should be reflected on both the Institute's and the media division's structure because they provide system-3-star services to the whole Institute and other

educational institutions. Therefore the fifth finding is related
to the placement of the two sections. They should be reflected on
the Institute's system-3-star channel to demonstrate their wider
role of collection, leading, storing, retrieving, utilizing,
providing access, and dissemination of knowledge and materials.

The fourth and fifth findings are related because these two
sections are dysfunctional when compared to the media division
objective function, i.e., development, production and provision
of distance education. Their services are mainly related to
logistical distribution of the produced media materials. However,
they would cease to be dysfunctional if they were placed where
they really belong; at the Institute's system-3-star channel,
since their services are institutional and divisional. The sixth
finding is a conclusion drawn from the fourth and fifth findings.

Sixth Finding: lack of functional differences. The analysis
of the activities of both the library and resource sections
showed that there were no distinct functional differences between
these two sections. It was found that both sections state common
activities like collection, lending, distributing of print and
non-print materials produced at the Institute and elsewhere. It
is rational and logical to conclude that there are no significant
and dinstinct differences that would justify the existence of
both sections as independent entities.

Seventh Finding: misplaced system-3-star activities

The analysis showed that the activities of the engineering, graphic and design sections need re-positioning so that they can function as system-3-star functions. The analysis showed that these sections are positioned to function as systems 1 while their activities are distinctly metasystemic, i.e., they belong to system-3-star channel because they provide specialised skilled resources and services to the production subsystems of EMS. They are therefore essential production service subsystems. This decision was reached when the functions of engineering, graphic and design sections were contrasted with those of the production sections: radio broadcasting, film and television. The production sections are viable systems since they can exist on their own, purchasing production services when required. However, the engineering, graphic and design sections cannot exist as viable distance education subsystems. The analysis revealed the symbiotic relationship which exists between the production services and distance education operational activities. Both systems 1 (operational activities) and system-3-star cannot operate without a lot of cooperation and coordination. It is therefore important that both sections re-perceive their activities from the perspective of a symbiotic relationship which is the source of the media division's synergy.

Interrelatedness of Results

(a) Embedment and system's capability. Since the radio section is embedded within EMS(which is in turn nested within KIE, then it is reasonable to conclude that the missing, dysfunctional and misplaced components affect the total efficiency and effectiveness of each of the three levels of management, i.e., Institutional, Divisional and Sectional. The observation is based on the fact that the efficiency and effectiveness of one level of control is an input into the next higher level of management. This means that there is a backwash effect across the levels. For example, if the radio section is inefficient, then both EMS and the Institute are automatically inefficient and ineffective. This is a cardinal rule of managerial accountability. In terms of this analysis, it is logical to conclude that the variety generated by the missing, misplaced and dysfunctional components reduce to some extent the total effectiveness of the distance education in Kenya, especially that of education radio broadcasting.

The implications of this observation are significant when considering managerial problem posed by this study, i.e., the evaluation of EMS management system's capability in reference to its efficiency and effectiveness as a distance education system in Kenya. The analysis has continuously re-emphasized the importance of perceiving the media division from the distance education perspective rather than from a national curriculum

research and development perspective. Although the two activities are complementary, their operational activities, products and instructional target audiences are different in terms of instructional needs and subsequent levels of instructional analysis.

To be more precise, curriculum development entails high-level research as necessary instructional input into syllabi development and subsequent textbooks authoring. All Kenya schools use curriculum materials, thus making the curriculum divisions highly cost-effective subsystems. In comparison, only some schools, colleges and specific target audiences utilise the instructional materials produced by the Educational Media Service. This is because media materials are mainly intended for the majority of the disadvantaged rural and urban listeners and viewers. There is therefore a direct link at classroom level between the operational activities of EMS and its target audiences both listeners and viewers, as the institutional and divisional analyses pointed out (refer to the earlier discussion about differences between EMS' and the Institute's variety amplifying channels). This is not the ease with the curriculum divisions, for they do not communicate directly (variety amplifying channels) with the teachers and pupils. There is an extensive ministrial subsystem, the schools inspectorate, whose objective function is to amplify curriculum operational activities by implementing curricula guidelines, policy and desirable classroom activities. The schools' inspectorate, therefore, comprises variety amplifying channels because it

constitutes an interface between the curriculum divisions and their environments. It is the schools inspectorate which implements curriculum through its teachers' and field inspectors' in-service courses, instructional circulars and its field supervisory activities. The above observation and analysis leads to the first identification of EMS needs.

(b) System's observer: external interface. The Educational Media Service needs an interface between its distance education operational activities and both its formal and non-formal environments. Firstly, there is a need for a formal interface. The work of the interface would be as a variety amplification channel, performing tasks similar to those performed by the inspectorate system. Such an interface would complement the work of the existing variety amplifying channels by facilitating environmental conditions conducive to improved and increased utilisation of distance education. The interface would also in-service teachers and educational field officers in the various ways in which both groups could increase understanding and creative use of transmitted knowledge and skills by learners in the learning processes.

It would not be financially feasible to suggest that EMS create an amplifying interface between itself and its environment since this may not be a practical suggestion with regards to the current fiscal capability of the Institute and the nation. Both EMS and the schools inspectorate operate under the auspices of the Chief Inspector of schools. Therefore, if the internal

members of EMS and the policy makers agree about the neccessity of such an interface, then it is possible that the educational field officers could provide an effective "interface".

By comparing the analysis of the Institute's and EMS's variety amplifying channels, it is evident that there is a need for an interface subsystem: a subsystem that would facilitate implementation and supervise utilisation of distance education materials. Such an interface, if implemented, would increase the utilisation of media, thereby increasing the effectiveness and efficiency of the total system. Provision of such an interface is crucial since teachers control and measure the effectiveness of distance education. Teachers control educational radio when performing instructional tasks like selection of programmes from a series, incorporation of radio programmes into their schemes of work (synchronization), daily programme selection (switching on) and subsequent utilisation of suggested follow-up activities. In the past, Educational Media Service used to have a research and evaluation component. However, the section was dissolved because it was found to be educationally unfeasible to separate educational broadcasting from the rest of the curriculum implementation department, i.e., the inspectorate subsystem. Furthermore, the section did not have an extensive field network capable of covering the whole nation.

When the evaluation section was dissolved, it was assumed that the Inspectorate would supervise and facilitate the utilisation of distance education especially in encouraging media selection. This assumption seemed feasible at the time since media materials are part of the schools' curricula resource materials. This analysis has revealed that EMS materials are much more than mere learning-teaching resource materials since they demand and impose direct utilisation patterns. This revelation could account for the fact that the Inspectorate has not played the perceived role, since the media division has not yet explained the amplification process to the Inspectorate. This has meant that distance education has continued to lack an environment (field) implementation interface (variety amplifying).

The media division needs more support from the Inspectorate interface in order to establish viable implementation field channel. This objective function could be done with more co-ordination, understanding and internal discussions between EMS and the Inspectorate in terms of creating an effective environmental interface. This is possible if the notion of embedment and recursion is appreciated by the internal members of EMS, KIE and the schools Inspectorate.

To recapitulate, EMS is nested within KIE, which is embedded within the Inspectorate and under the Director of Education. Thus if the identified system need is perceived as a feasible

suggestion, then policy guidelines and participatory discussions between EMS and the Inspectorate department could solve the problem by creating an effective distance education field interface. If an extensive environment network is established to achieve the outlined tasks, then EMS could possibly achieve a very high level of efficiency and cost-effectiveness, since it has a captive national audience, free of competition.

Programming should be based on a national cross-section of educational needs and demands. This would actualize EMS belief that the content of distance education should be an expression of peoples' needs and choices, but based on sound feasibility studies. The form of interface should be compatible with other components that comprise Kenya's educational system. Such an interface would provide EMS with sound information data based on an external perspective: for the interface would play the role of the system's observer. The schools inspectorate could provide such an interface using sound data upon which good management is based. This is crucial since the concept of the viable system model proposed by Beer is based on the flow of information from the management system (EMS) to its environment through what Beer calls variety amplifying channels. The suggested environmental interfaces would provide EMS with information which would facilitate the work of the variety amplifying channels, i.e., radio broadcasting, supporting notes, teachers utilisation styles, pupils transduction capabilities, utilisation of receiver sets, coverage of content, etc. The above discussion leads to the second observation and distance education need two.

<u>(c) System's observer: non-formal and informal interfaces.</u>

The above suggestion leads on to the second observation. EMS needs to establish non-formal and informal interfaces. This is because some of its productions are targeted to the non-formal audiences; for example, the village polytechnics, families, out-of school youths and pre-school children. Such audiences cannot be observed by the schools' Inspectorate. However, EMS could establish formal links and interfaces which would provide the link between itself and the non-formally linked environments. Such a non-formal interface could also serve the Institute's activities which are community-oriented. The interface could be in the form of a management network consisting of the leaders of related government departments, voluntary agencies, and community leaders.

<u>Discussion of the Findings</u>

By comparing the analysis of the structure of KIE with that of EMS at the two levels of recursion, the analysis revealed significant differences and similarities.

<u>(A) Cross-level comparison, the Institute and Media division.</u>

<u>System 1.</u> Systems' 1 existed at all levels of recursion. They were recognisable since systems 1 are viable systems themselves. Their importance and significance was evident since no

organisation can exist without some operational activity for which it was established. Radio broadcasting, film and television sections were identified as the activities which comprised system 1 criteria of viability because both sections have a captive environment, separated by distance and time.

(B) Cross-level comparison of media division and radio section revealed differences related to the span of control between sectional leaders and divisional leader. The two leaders of systems 1 have greater spans of control than the divisional leader. The leaders of systems 1 control twelve media specialists while the leader of the division controls two system 1 leaders and 4 system-3-star leaders. Beer has suggested that the spans of control of systems 1 should not be more than seven. Therefore, there is an imbalance between the sectional and the divisional leaders. It seems as though the sections could re-structure themselves to reflect much more closely environmental target audiences by re-grouping operational activities according to either content areas, schooling grade levels or ages. This would increase the divisional systems 1, thereby, increasing the horizontal span of control of the leader of the media division. This would probably increase the effectiveness of the production sections because it would reduce the balance between horizontal and vertical variety. It is the hope of this study that such a re-structuring would offer more opportunities to the media division for fulfilling some of the acute educational needs. The re-structuring would also reflect the managerial design of the operational activities of the Institute's curriculum divisions.

It is recommended that the media production sections, radio, film and television sections be re-structured to increase divisional systems 1.

System 2: missing variety dampening or behaviour control "anti-oscillatory" activities. The work of the conceptual system 2 proposed by Beer is to reduce conflict generated by the relationship of systems 1 and system 3. The relationship is between a "boss" who has to make decisions which may be unpopular to systems 1 who are autonomous task performers.

It was noticed that the Institute has a formally designed system 2, the chief programmes co-ordinator. The functions of the chief programme coordinator is to dampen differences between the three Institute's divisions in charge of distance education and curriculum research. The "anti-oscillatory" function is achieved through the coordination function. The chief programme coordinator occupies the metasystem directorate position since the functional activity provides the Institute's deputy-director and Director with sound information related to the internal managerial problems (oscillations). The major factors causing interdivisional differences are resolved through the management committee composed of the divisional heads, the chief programmes co-ordinator and administrative officer, and both the director and deputy-director. This system of resolving differences recognizes the interdependence of the various divisions and the need for autonomy as well as sound team work. However, the media division still needs its own media coordinating function at the

divisional level of recursion. Beer has emphasised that the levels of recursion neither speak the same metalanguage nor are they expected to. Therefore the management committee cannot fulfill the role of system 2 activities of a media division subunit (a system 2). The committee probably generates more differences because it is composed of higher level decision-makers. Therefore, the media division needs an equivalent to the chief programmes coordinator to carry out the same activities at the divisional level, i.e., coordination of production activities, both with operations (systems 1) and with productions resource services, i.e, system-3-star activities of the engineering, graphic and design sections as shown by Figure 6.

(C) Coordination within the media division.

The analysis has shown that the Educational Media Service needs a system 2 to carry out the variety dampening activities performed by the "Chief Programmes Coordinator" at the institutional level. The tasks should be delegated to subsystems operating at divisional and sectional levels (EMS, radio, film and television sections respectively). At the divisional level, the work of a system 2 would be dampening of managerial "oscillations" generated by the operational activities of systems 1, services provided by production resources and exercising of authority by system 3 of Beer's conceptual model.

(Insert about here Figure 7 showing the management function of a System 2).

Possession of such a <u>coordinating subsystem</u> would harmonize divisional and sectional activities to heighten the system's synergy. Such harmony could be achieved by designing rules, regulations and laws which facilitate coordination and collaboration between production operational activities (systems 1), production services and resources of a system-3-star subsystem (metasystemic activities) see Figure 7. However, even with a system 2 coordinator, the analysis of the media division showed that the division lacks other subunits which should be designed to carry out coordinating functions.

The coordinating function of a system 2 would facilitate better organization of the media division. This would increase system's synergy since organization is an invariant of stress and burn-out conditions. If the Educational Media Service had a subunit responsible for co-ordinating its activities, then it would be highly organized. This is because the coordinator would reduce to some extent unhealthy conflicts, competitions, and disagreements between the production activities and the service components. Such disagreements sometimes cause differences, thereby reducing the effectiveness of the Media division. Sometimes, such disagreements are useful since they keep EMS

awake. However, exponential competitions negate coordination inputs.

(insert Figure 6, and 8: showing the need for coordination and indicating where the coordination should be and with whom.)

(i) Managerial constraints. In EMS, conflicts arise between systems 1 and systems-3-star production activities. The media specialists (operational activities of systems 1) have to coordinate with the production resources and services, i.e., engineering services, graphic designers, publishers, the staff who purchase the Institute's physical resources (software and hardware) and the administrative regulatory procedures. The above functions have to be highly organized, and controlled so that the multi-media curriculum packages can reach schools complete and in time. In order to achieve this objective, there must be total coordination and collaboration between and within the media divisions components+ (see Figure 6 and 7: both attempt to demonstrate the requisite coordinating function). This is what Beer (1979) has refered to as synergy which comes as a result of the interactions of the parts of a whole. The production activities outlined above cause considerable managerial "oscillations" especially because all the subunits operate in highly organized environments. For example, the centralisation of

scarce resources means that the Institute's and Divisional resources must be booked in advance. Studios, equipment and technical crews must be booked in advance so that the managers of such facilities can allocate them without bias to the various competing production activities. The system of booking varies in accordance with each service, leading to further disagreements. The problem of queueing, for the Institute's field service facilities, is thus a significant generator of internal problems. To elaborate, lack of internal coordination would mean that some subunits are frustrated due to lack of essential production facilities. This affects the availability of distance learning-teaching materials in the targeted environments or to the enlisted course participants. These internal problems affect the internal efficiency of EMS as well as its external effectiveness.

(ii) Scheduling. The situation is aggravated by scheduling of broadcasts. Scheduling is done in advance so that schools and the general public are made aware of the projected series. The analysis of both the Educational Media Service and the radio section showed that the system of disseminating utilisation information contained in the broadcast timetables and the teachers' supporting notes is a variety amplifying mechanism. Beer has emphasised the role of variety amplifying channels which ensure that information is reproduced and subsequently productive within the target audiences (refer to the divisional and sectional analysis). Therefore, to increase the level of utilisation and effectiveness of the media division, it is

essential and crucial to ensure that broadcast timetables and print materials are distributed in advance. The materials may consist of teachers' notes, pupils notes, wall charts, study guides, pupils' pamplets and other visual aids learning materials. The expectation is that if teachers receive such information in advance, then they will be able to incorporate broadcasts into their teaching timetables and lesson plans. Currently, a lot of coordination goes on to ensure that materials and broadcasts are synchronized and reach schools at the same time. The analysis of both the media division and the radio section showed that both levels lacked internal mechanisms that would ensure that all the production parts are working on schedule to meet the production deadlines. Such a controlling subunit is crucial since the production subsystems cannot oversee their coordination. They would not be impartial since their feelings are involved. They carry out studio, on-location and post-production activities, but do not control services like graphics design and publications of the support materials. The results of the analysis indicate that EMS should seriously consider implementing such a crucial subunit, i.e., control of productions' operations by both systems 1 and systems -3- star at the divisional and sectional levels. The role would be regulatory since its objective function would be facilitation of the logistical processes (production deadlines) rather than quality control. This means that the role would be that of a mediator or arbitrator and not a supervisor.

The role would heighten the efficiency and effectiveness of

media division's production processes. The staff of this division have to operate in a climate governed by tightly scheduled deadlines. Timing the utilisation of the media division's end-products depend very much on the effective organization of the individual activities (operations), coupled with tightly controlled production activities by both systems 1 and system-3-star. These are essential requirements for a distance teaching system since learning material must be well synchronized and coherent. This means that the end-products, either broadcasts, recorded audio or video cassettes, films, tape/slide, study-kits or supporting print materials must be carefully organized to present to the learners a coherent whole, i.e., learning components which are complementary and consistent between and within.

(iii) <u>Production deadlines.</u> Materials must be finished within a specific time-dimension if they are to be cost-effective. All these work-related constraints cause stress which is usually offset by the individual's level of organisation. However, the staff of the media division need a subunit to complement their organisation patterns.

<u>System 2: production mediator.</u> The above discussion of the results of the analysis has emphasised the fact that the media division needs a subunit to coordinate the functions of systems 1 and systems -3-star. The functions would be that of a facilitator, mediator and friend. The subunit would communicate sound information which would reduce conflicts through decision-making based on unbiased information. Such a subunit

would reduce internal "oscillations" between media sections. An internal programme coordinator would ensure· that multi-media production activities are finished in time by reduction of managerial problems which may hinder production work. The production sections need a subsystem which understands their working conditions, constraints and the need for specific information which can be applied to improve production variables as a whole. Eshiwani identified educational communication research areas as one of the major research gaps in the country.

Figure 7 is an attempt to demonstrate diagrammatically the role of an internal coordinating function. To recapitulate, the current media division's programme coordinator cannot provide internal co-ordination since the analysis has shown that the role provides divisional "leadership", involving popular and unpopular decision-making and enforcement of such decisions. Therefore, both EMS and the identified internal systems 1 require production coordinators to dampen "oscillations" between systems 1 and their metasystem. Strong disagreements occur since systems 1 speak a language which may be misinterpreted by the metasystem; for they both speak different managerial languages. This means that their organizational interests and perspectives are different, although they are both concerned with the efficiency and effectiveness of media end-products. The need for a system 2 function to dampen "oscillations" by playing the role of a mediator is evident.

The mediators should have expertise in media instructional design and production. Their major activity would be that of coordination of the development and production of distance

education materials. The subsystem would ensure that multi-media materials are integrated and produced following the shortest critical path. This would increase the utilisation level since the environments would have resource materials in time. Once the learning materials are ready, the resource section could act as a clearing house.

(D) Cross-level analysis: variety channels.

The foregoing analysis of the results leads on to the discussion of the internal variety amplifying and attenuating channels. Beer's conceptual model indicates the importance of these channels. These channels are crucial since their activities both stated and actual determine to a great extent the viability of an organisation. The channels used to transmit variety from the organization consist of the various ways and means which an organisation deploys to increase its effectiveness and its efficiency. Some of the media division's variety amplifying channels have already been discussed and those which did not exist have been suggested. The variety amplified is always matched with an equal amount of attenuating variety in accordance with the law of Requisite Variety (information). The continuous flow of amplifying and attenuating variety keeps an organization in balance within its physiological limits. This physiological balance is called "homeostasis" or equilibrium, and it exists within and between the various components of a conceptual viable system model. The maintenance of this balance is dependent on the continuous flow of information between and within the conceptual viable system, i:e:, its management unit, operations and loosely connected target environments.

The analysis of the three levels of recursion showed that there was no problem relating to the internal flow of information. There was continuous flow of information within the

three levels of recursion.

Research and evaluation. Cross-level comparison of the
Institute and the media division showed that the Institute's
chief programme coordinator controls a subsystem which provides
specialised information. This information may relate to the
internal professional activities of syllabi development or to the
perceived possible environmental oscillations which could lead to
under utilisation of curricula information due to inadequate
transduction processes; for example, the reading and
comprehension levels of both teachers' and pupils' instructional
objectives, content analysis, and suggested pupils and teachers
activities. This section is called the "research and evaluation"
section. It carries out activities which are system 2
(evaluation), and system 4, basic and applied research
functions. The section carries out field research during the
piloting of curriculum materials. The research is broad-based and
looks at the impact of the total curriculum in general. The
section also evaluates curriculum materials before they are
field-tested to determine whether or not the materials are
intergrated and interrelated to fulfill the total curriculum
objectives. This practice avoids repetition and encourages
integrative and complementary activities across the curriculum.
The section reports perceived oscillations to the chief programme
coordinator who relates the information to the Director of the
Institute and the two curricula divisions.

With reference to Beer's conceptual model, the divisional

and sectional levels of recursion should contain component parts,
carrying out similar activities. This means that the components
operating at the institutional level of recursion should exist at
the divisional and sectional levels of recursion. This is because
each level speaks a different metalanguage. Therefore the media
division needs its own "research and evaluation" subunit under
its control. The subunit's functions would consist of reporting
environmental oscillations to the leader of the media division
(system 3). It is self-evident, therefore, that the media
division requires a subsystem similar to the one controlled by
the chief programme coordinator, a subsystem that speaks the
media metalanguage specifically in understanding learning needs
of distance learners. This leads to the identification of the
next missing media component to serve the amplified need.

(i) Divisional monitoring and utilisation comparator.
Distance education in Kenya needs a subsystem for monitoring
purposes, especially measuring the utilisation of its outputs to
enhance learning. The subsystem would be a comparator, monitoring
EMS broadcast outputs and comparing them with the stipulated
media objectives. The subsystem would then communicate the
discrepancies to the media specialists. The data provided would
be taken into account when similar productions are carried out.

An internal utilisation subunit would research utilisation
patterns which may hinder or enhance learning. Such information
reduces utilisation differences and rural-urban inmbalances since
the data provided would be deployed to revise and to improve

multi-media curriculum packages. The subunit would also provide information about learners' and teachers' utilisation problems which broadcasters and producers should be aware of. Why is such a subsystem important? A teacher from India recorded the following experience:

> As principal of an elementary, middle and high school, I worked under severe financial constraints and administrative pressures. The only radio set we had was in my office. The programs were relayed to the classrooms over the inter-communication system. Often I would forget to switch on the set, until after the first few minutes. Having parents or guests in the office would make it even more difficult for me to operate it. These would be the conditions under which most principals would operate. Many schools in the city have a centralized broadcasting system, but schools in the villages may not have a microphone broadcasting system (Aranha, 1982 p.6).

Aranha has expressed the feelings of a teacher supportive of an educational broadcasting system. The major concern expressed by the quotation is the realization of the need for a monitoring teacher-supportive subsystem. An evaluation subsystem that would do more than just carry out a few probes into the environment. If Kenyans are to maximize the educational advantages of an educational broadcasting system, a subsystem that would carry out

continuous monitoring and evaluation activities is needed.

(ii) Action research. System 2 function of harmonising distance education content, through action research is both anti-oscillatory as well as variety amplifier because pilot testing activities are supposed to reduce learning problems and to increase learners' comprehension levels. The analysis of the radio section showed that the media division carries out many action research activities. The work of the proposed "monitoring and evaluation" subsystem would complement the formative research activities. Thus the research work of systems 1 into programme production variables, and their effects on learning should continue as essential research inputs into production variables. Beer's conceptual model emphasizes the embedment of the three parts of systems 1, i.e., the management unit (sectional leader), operational activities (tasks performed by media specialists) and target environments. It is important to distinguish the differences between the tasks of an evaluation subsystem (a system 2) from those of the production subsystems (systems 1). Both are inputs into programming. The action research by the production subsystems focuses on evaluating immediate production variables, which are direct inputs into their operational activities; for example, voices, pacing, pausing, sound effects, and production styles like drama, narration, simulations, reporting, documentation.

The analysis of the production section (radio), showed that the staff of EMS are expected to carry out formative (action)

research through pre-testing and summative evaluation of series. This practice is useful and healthy since it encourages operational-environmental embedment which is very important in facilitating understanding of each other through the diffussion process. However, a distinct evaluation subsystem would carry out research into the same variables but with a difference. The data would be wider based, across series of programmes and the information gathered would be subjected to rigorous data analysis and explicit interpretation of results. The information gathered would complement the subjective information of systems 1. The evaluation data should become a continuous form of input into programming.

Often, media specialists tend to rely on their own observations because evaluation reports are always out of date, whereas they are continuously tuned into their environments, and need immediate data for correcting the discrepancies existing in the end-products. A system 2 carrying out monitoring and evaluation activities should ensure that information flow is related to the on-going production processes because of immediacy. It is only then that the information would contribute to production activities.

Such information attenuates operational variety by confining some of the producers' creativity. The information facilitates utilization of distance education by increasing understanding through conflict resolutions. The word "confict" is used to mean learning problems generated within (internal) and between learners if they fail to understand the content taught

through distance education. Understanding of concepts means that learners have assimilated and synthesised information, thereby achieving synchronization of knowledge transmitted through media teaching. An evaluation subsystem would increase utilisation activities by conducting frequent surveys, in-service training of teachers in application of critical viewing and listening skills and organization of participatory channels (variety attenuating channels) between learners, teachers and media specialists. It is crucial that distance education systems involve users or consumers of their materials in programme production decisions. The support of the teaching system is fundamental and crucial especially in increasing the utilisation level and in measuring the effectiveness and efficiency of the formal classroom performances.

In the past the Educational Media Service has involved teachers and lectures in media production activities; for example, script-writing, pre-testing, piloting of new styles, summative evaluations and studio or on-location presentation of programmes. The media specialists, though qualified in educational training and subject matter content, are still required to work with content specialists. This enhances teachers' emotional commitment to the success of the programmes and keeps the operational activities (systems 1) informed about the environmental needs and demands.

(iii) Learning distance reduced by increased channels' capacity. It is probable that learning distances can be reduced by increasing channels' capacity, thereby reducing learning

problems (oscillations). The results of the analysis of the three levels of recursion have shown that the media division needs well-designed variety amplifying and attenuating channels. Such channels would communicate information to the environment that would increase the utilisation by reducing environmental-operational differences brought by lack of diffusion processes as a result of separation, a characteristic of distance education systems. The attenuating channels would bring information through the evaluating reports which would be sound data input into production activities. Thus the evaluating subsystem would form a cyclical dynamic loop increasing: utilisation of the media outputs (amplifying channel); learners comprehension of transmitted information (transduction); and producers improvement of the end-products (attenuating channels). The total function is anti-oscillatory, since conflicts and disagreements are resolved, and decisions reached because of sound information which would be provided by a monitoring and utilisation subsystem. A "monitoring and utilisation" component would not replace the production formative research carried out by individual media specialists.

(iv) Relationship of the production and utilisation subunits. The staff of EMS would welcome a subunit which acts as a "comparator" to ensure that divisional and sections' standards of performance are being maintained, improved and increased. The function would provide information to the production subunits about their performances when compared with the divisional

expected standards. With such information, the production sections would be able to correct and improve their media and learning broadcast strategies. The role of the subunit would be that of standization, facilitation and coordination with the intention of enhancing widespread utilizaton and acceptance of distance education as a viable method of correcting education imbalances and improving the quality of education. However, the information provided would be from an internal perspective. This information would be different from that provided by the recommended external interface, i.e., EMS-inspectorate interface.

Fortunately, the two production sections have achieved some stability and would therefore withstand high levels of critical analysis and subsequent correction measures. The policy has always been that as broadcasters, the sections would accept critical analysis of their work. Those who do not have self-regulatory mechanisms are re-cycled into the teaching system to avoid individual frustrations. The divisional practice is that the staff must feel good about what they are doing. The staff would not therefore be intimidated by evaluating subsystems both internal and external because the information generated by their activities would provide sound information data. Such data would enhance the effectiveness of their work because the information contained in the evaluation reports would improve decision-making processes by the panels, programme co-ordinator, sectional heads and media production staff. This would mean that programmes and series corrections would be based on sound evaluation data.

(v) Other "anti-oscillatory" system 2 activities. The

analysis of the three levels of recursion showed that the Educational Media Service carries out several "anti-oscillatory" activities. The following sectional and divisional activities were diagnosed as being "anti-oscillatory":

. panels' control of the content of distance education.

. media specialists' action research into audience variables, i.e., pre-testing and piloting production activities

. the work of continuity announcers who broadcast daily programming schedules

. internal media specialists listening sessions, i.e. the internal evaluation of multi-media curricula packages

. inter-personal skills when and in the observation of social conventions

. general managerial rules, regulations and procedures issued or desired by the:

-Voice of Kenya about broadcasting guidelines and allocation of air time;

-Institute reporting system

-ministry of education circulars of information

-public employment procedural rules

-social values and beliefs

-legal agreements between artists, contributors and the media division

-staff meetings

Summary of the missing system 2 functions.

The following system 2 functions were found to be missing at the media division's level of recursion:

.co-ordinator of the production activities of production

operations (systems 1) and production resources
(systems-3-star) equivalent to the Institute's chief
programme coordinator

.external monitoring and utilisation subsystem
equivalent to the Institute's "research and evaluation"
section

.in-service training of teachers and other users in the
acquisition of critical viewing and listening skills

.production mediator or coordinator

.external system's facilitator

.flow of information between EMS and target audiences
for reducing learning problems and increasing
understanding by increasing channels variety capacity.

.internal divisional comparator.

System-3-star

(E) Longitudinal comparison of KIE, EMS and radio section

The analysis of the three levels of management showed that KIE possessed a formally designed system-3-star while the media division and its sections did not have one. The work of the Institute's identified system-3-star is to provide essential professional and administrative support services and resources to enhance the operational activities of Institute's systems 1. This function relates to the work of the conceptual system-3-star of Beer's viable system model. The work of system-3-star is to provide metasystemic activities to enhance the work of systems 1 and to balance system's 3 vertical variety with systems 1 horizontal variety. The analysis of the Institute showed that the system-3-star metasystemic activities were being carried out by the administration division but with a difference in relationship to the conceptual viable system model. The leader of the administrative division is the Chief Administrative Officer. The analysis showed that the chief administrative officer controlled all the Institute's general support services, which operate as pools of essential resources and services for which the three divisions compete. Despite the high level of institutional organization, divisions conflict over the sharing of these support services. This is why Beer's conceptual viable system emphasizes that each level of management needs to have its own metasystemic activities which it can control. If one level of

control does not have within its structure its own metasystemic activities then it cannot exist as an independent entity. This means that the nested system lacks essential components which affect its internal and external criterion of efficiency and effectiveness.

The analysis of both the media and radio levels of management indicated that both levels lacked the outlined institutional administrative facilities which belong specifically to the media division. Beer's conceptual model emphasizes that all levels of control should have the five subsystem components. This means that the Educational Media Service as a distance education division needs its own metasystemic activities, both professional and administrative, in order to achieve viability. This need should be extended to its sections for they too need to have within their control their metasystemic activities. This is very crucial since control is related to their efficiency and effectiveness.

The analysis has shown quite clearly that the Educational Media Service cannot be a viable distance education system if it does not control some of the support services which have a direct bearing on its operational activities. It is therefore requisite that EMS be allocated its own administrative personnel and the necessary media support services in order to simplify the managerial problem of competing for resources. EMS management system therefore needs to be provided with either a media administrative officer and adequate supporting services or if this is not feasible, then KIE should provide adequate support

services to the three competing Institute's divisions so that they can be serviced in time without experiencing queueing frustrations. The queueing theory or linear programming techniques and tools can inform the Institute about the optimal number of requisite services and resources. However the economic realities can not accomodate this alternative because even if the number of requisite services and resources were calculated, decisions would still have to be based on fiscal criterion.

The consideration of the most feasible alternative and the subsequent decision making are the prerogatives of the internal members of the Institute, EMS and the policy-makers. Notwithstanding the above observation, it is highly recommended that the media division be given its own metasystemic activities, i.e., media administrative component in control of media resources and supporting services.

(a) Media administrator. The media administration officer should be a media personnel who can empathise with the divisional operational activities and its special needs. Such personnel could be responsible for EMS functions currently carried out by the Institute's administrative officer like media

- staff training and development both internally and externally
- staff personnel services
- purchases and stores inventory
- transport services

Other administrative supporting services could remain under the control of the Institute's chief administrative officer. The media division's administrative officer should report to the programme coordinator of media division.

Metasystemic activities of EMS. The analysis of the media division showed that some of EMS metasystemic activities have been forced by the organization charts to act as systems 1 while they are not independent entities. These are the media professional supporting services which exist to provide essential production resources necessary for the operational activities of both the radio broadcasting and film and television sections. Sometimes, the media division acts as the Institute's system-3-star when it produces the Institute's publicity films or carry out other internal media activities. Such activities are however very rare.

EMS metasystemic activities are performed by the graphic and design, engineering and library sections (see Figure 3). However, the work of these sections is not confined solely to the media division. The library, graphic and design sections provide professional services to the whole of the Institute. This means that the production activities of EMS have to compete with other divisions for the above services. However, the graphic and design activities are closely related to the media division's production activities. They provide specialised media production resources; for example, designing settings scenerios, captions, charts, line diagrams, lettering, printing, publishing, etc.

These media activities should therefore occupy the system 3-star audit channel since they are metasystemic. In addition, the media division needs to establish an internal "media service" subunit which would provide media production services to the Institute.

Resource and Library sections. The analysis of EMS showed that the activities of the resource and library sections should be merged to create another Institute's division in charge of national learning resource centres. The divisional level of analysis indicated that the activities of the library section and the resource section should be merged to create a resource division with a wider base for requisite application of its skills and knowledge. This recommendation is based on the fact that "production" rather than the "collection and dissemination" of learning resources materials is the main "business" of distance education in Kenya. The objective function of promoting the concept of resource-based learning in the formal and non-formal environments should be given a divisional operational platform. If the two activities could be merged then they would create a division which would contribute directly to the efficiency and effectiveness of both the media and curriculum divisions. It is therefore recommended that the library and resource sections be merged to create a "resource or library division".

The Institute's resource-library division should continue to perform the tasks currently being carried out by the two sections. In addition the resource-library division could:

. act as a clearing house and disseminator of curriculum
and media related materials produced in the Institute
and elsewhere.

. in consultation with KIE divisions, education field
officers, district education officers and the schools
inspectorate establish other "clearing houses"
throughout the nation. The division could rationalise
the existing educational field services by marginally
augmenting, the work and resources of "teachers'
professional groups (subject associations), teachers'
advisory centres and other field groupings or
associations. Such clearing houses should be within the
reach of teachers and students. The "clearing houses"
should also provide advice on better utilisation of the
accumulated learning resources.

. train managers of the regional resource centres in
critical skills and knowledge; for example, library
science, media production, utilisation skills and
knowledge.

. conduct frequently through the regional subunits
courses in media utilisation and production. Such units
should extend the capabilities of broadcasts media by
evolving innovative learning-teaching media materials;

for example, teachers' recording of local history by interviewing credible local leaders. In essence, the national distance education system should act as a catalyst for the development of localised distance education resources centres.

. train teachers through in-service courses about instructional technology so that learners and teachers can exploit to the optimal level, the advantages accrued by utilisation of media, especially teaching of critical viewing and listening skills. These skills are hardly taught, yet they are crucial factors which probably have contributed to the underutilisation of media as a whole.

. organization of seminars and workshops between media makers and users to enhance correct utilisation processes. The section could work with the recommended "monitoring and utilisation section".

The library and resource sections could perform the above tasks if they were given a divisional platform. Then, the division could have a section which could look after specific needs of the Educational Media Service especially its function as a distance education system.

The discussion so far has emphasized that the resource centres could act as clearing houses (warehousing) for the

end-products of the media division. Another section could be created to look after the curriculum divisions. It is important that the divisional skills and knowledge be optimally allocated across the divisions or departments who need the services of a library or learning resource centre.

In concluding this discussion about the function of system-3-star, it was noted that EMS should be allocated subunits to perform divisional metasystemic activities. The divisional metasystemic activities were identified as the existing functions of the following sections: graphic and design, engineering, some of the Institute's administrative services; and the non-existing functions of the media administrator, administrative support services, and an internal media production subunit.

System 4

The analysis of the existing structures of the Educational Media Service in light of Beer's conceptual viable system model has shown that the media division lacks a formalised planning subsystem. The vacuum has been occupied by the approving functions of the Institute's management committee. Beer has pointed out that if some requisite subsystems are not designed for, then the system will carry out activities to fulfill the functions of the missing components. The analysis showed that this phenomena has occurred in EMS. Unfortunately, the management committee does not possess the necessary skills and knowledge required by a system 4 to carrying out activities which probe into the problematic future. The management committee is

composed of programme coordinators (systems 1.), the chief
programme coordinator (system 2), the Director and
deputy-director of the Institute (system 3) and the chief
administrative officer (system-3-star audit channel). The
committee cannot therefore plan for the media division.

(F) Cross-level comparison: EMS and radio section.

Prototype subunit. The film and television section already
plans to establish a media prototype subunit. The activities of
the proto-type subunit would be experimental in terms testing of
programmes design and production styles, and their relation to
learning styles. This is a project which the division could
implement. The subunit would carry out some of the activities
suggested by Beer's conceptual system 4. In order to do so, the
subunit would have to be freed from the control of panels,
content specialists and administrative bureaucracy. Such a
subunit should have freedom to create innovative media through
utilization of the different media designs, and production styles
while considering specific medium capabilities and learning and
teaching styles of target audiences. The subunit should evolve
media communication strategies which suit and fit best the
African learning environments. Such innovative techniques should
be piloted by both the prototype and the evaluation subunits.
This would be in accordance with Beer's conceptual model which
has emphasized that the staff working as system 4, at each level
of management should be given freedom to carry out their probing
activities. EMS could explore possible ways of teaching practical

and symbolic subjects like mathematics, technical education, business administration, marketing, pure science through radio and print. The teaching of science and practical subjects in Kenya is handicapped by lack of qualified teachers and the dire need for audio-visual complementary materials.

Within the informal and non-formal sector, the Educational Media Service could teach business-oriented skills and knowledge, especially for the semi-literate artisans, majority of whom are the products of the village polytechnics. Such desirable new directions can be explored by the prototype subunit together with the research and evaluation subunit. The establishment of a prototype subunit needs serious consideration. In conclusion EMS needs a planning subsystem and programme research or prototype development functions to prepare itself for future technologies.

System 5

The analysis of the Educational Media Service in terms of Beer's conceptual viable system model has shown that the media division does not have a component providing closure to the division. The analysis of EMS showed that the division has a Mass Media panel which could re-define its activities so that it can act as the closure of the media division on behalf of the Governing Council. According to Beer's conceptual viable system model, a system 5 function provides implementation approval especially of innovations. The analysis of the Institute showed that KIE has a Governing Council which approves new directions for the curriculum and media divisions. Beer's system is based on

the fact that each level of control should have all five components. Therefore according to Beer's model, the Educational Media Service needs a system 5 component. Such a component would approve implementation of future media plans and new directions. For example, some of the findings resulting from the work of the proto-type subunit, media research, market analysis and subsequent marketing strategies, publicity-oriented activities, utilisation feedback data and internally generated ideas. However, such decisions rest on the feelings and perceptions of the internal management system of the media sections, division, and the Institute, i.e, the three analysed levels of management, if seen to be desirable. This is because the Governing Council is the formal forum for approving and providing new directions to the Institute and indirectly to EMS, since the distance education system is embedded within KIE. The delegation of the approving function to the Mass Media panel is implied (not actualized) within the operational system of the management system of the Institute because each level of management acts on behalf of the level of control above it. In the context of the Institute, the sections and divisions act on the behalf of the Director of the Kenya Institute of Education. Thus the decisions made are accountable to the Director. In corollary to this, the mass media panel would make media decisions on new directions on the behalf of the Governing Council if the panel is re-organized to play the role of Beer's system 5 function.

Channels of variety

Variety Amplifying Channels: System 4

The analysis of the divisional level of management showed that the media division did not have some variety amplifying channels. These are the channels whose activities relate to the marketing activities of publicity, promotions, public relations and rigorous analysis of distance education existing and future market although the division carries out some activities which publicise the Institute's and media division's functions.

These are new developments within the Institute which are not adequately reflected by Figures 2, 3, and 4. Most of these activities have been carried out by the staff of the Educational Media Service as part of their collaboration with the curriculum activities. The two production sections have produced radio commercials and films which are intended for publicising the Institute's activities. The fact that such activities were implemented and financed indicates that conducive possibilities exist for establishing a scanning subsystem. The subsystem would concentrate on probing into future by exploring possible learner needs for media. Its activities would consist of assessing the educational needs and, demands that could be solved by distance education. Its activities would therefore be market-oriented: publicity, promotion, public relations. For example, publicising the divisional up-coming innovative projects and series, thereby encouraging and providing avenues through which the environments

can participate in decisions about new directions. Such discussions are useful since they would ensure that new series of programme are based on learner needs and cater for specific social educational demands. The public relation function would consist of explaining the divisional strategies in general terms. Such a division could also apolog(se for the divisional mistakes if need be. The activities would aim at making distance education one of the mainstreams of Kenya's education. The marketing analysis activities fjt best into Beer's conceptual system 4 of the viable system. This is because they are futuristic, though concerned with acquisition of the forecasted new markets for distance education through needs assessment.

The marketing personnel would also research into existing learning materials which could be purchased or exchanged to serve immediate and future distance education needs and demands. Marketing activities would also explore new content options in relating distance teaching to the learners needs' and 'demands' for distance education. Such activities are a system 4 function since they are concerned with the extension of existing distance education environments in Kenya.

They are also variety amplifying channels since they are supposed to increase the effectiveness of the programme by increasing the number of learners and their understanding of the concepts taught (transduction).

The Educational Media Service has the production capabilities consisting of physical facilities and manpower essential for meeting the environmental demands and needs for

distance education in Kenya. The existing social demand for education in Kenya is high and distance education has the capability to extend educational opportunities to many Kenyans, thereby, making the division a dynamic contributor to Kenya's system of education.

Variety Attenuating Channels: System 2

The system 2 activities of the proposed "monitoring and utilisation" subunit would be variety attenuating channels since they would communicate utilisation data and discrepancies between distance education production outputs and EMS internal criterion of stability. The work of the two channels would balance each other in order to maintain the internal criteria of stability within the divisional "physiological limits", i.e., stable state of equilibrium.

If system 2 and 4 could be established, then, they should provide EMS with channels for communicating information to and from its target environments. The system 4 activities would be variety amplifying channels since system 4 activities represent activities which increase consumption of distance education in relationship to quantitative data (marketing, publicity, promotions), and qualitative, i.e., understanding of programme content. This brief discussion leads on to another need of EMS management system, i.e., the need to establish and formalise, marketing activities, for example, market analysis, publicity, and promotions through its audience research function. The possession of the aforementioned variety amplifying and

attenuating channels would heighten EMS involvement with its environment.

The Bar

The analysis of the media division and the radio section showed that the role of the conceptual bar proposed by Beer's viable system model exists in the media division. The Bar in Beer's model represents an environment where staff at the same level of management can learn informally through positive and negative error-correcting mechanisms. In the Bar managers at the same level of management resolve differences, conflicts, misunderstandings, by participatory discussions. Such discussions stop when differences are resolved by agreeing or disagreeing. The bar provides a forum where peers can educate each other informally. The role of the bar in the Educational Media Service is a reality, and one which is highly valued. There is an everpresent mentor-relationships between the staff of the two sections. The staff are heavily involved in media related activities, for example, acting, directing and producing amateur theater, children's drama and schools' verse-speaking. These activities fall under the role of the conceptual bar.

The film and television section had planned to construct an area for informal interactions and for filming purposes. They had proposed building some few african huts where the Institute's staff could be kept in constant awareness of the reality of the environmental needs; especially the rural areas. The primary function was provision of rural scenerio for shooting film and

video inserts requiring rural representation. This was meant as a feasible alternative for reproducing rural settings at reduced travelling costs. The urban children could be used to represent rural learners. If implemented, it would serve as a useful forum for the role of the conceptual bar, since its primary function is related to the primary activity of the Education Media Service.

The analysis of the media division and the radio section showed that the Institute has provided a forum where staff can interact informally. This is the staff cafeteria whose role is equivalent to that of the conventional staffroom or faculty-clubs.

The analysis of the media division suggested that professional associations play the academic function of the bar. This is where staff operating at specific levels of control learn from the work of their collegues.

The Educational Media Service is an active participant of the Commonwealth Broadcasting Association's binary conferences. The division also competes in the educational broadcasting "Japan Prize" and attends several national and international conferences related to distance education or educational broadcasting. But still, EMS needs a "production" room which could fulfill the bar role. This observation leads onto the identification of the final management need. The media division needs a production room where management at the same level of management can meet and discuss issues.

Summary of Results and Discussion

The following are the key points identified by the analysis. They are summarized here for two reasons. First, the foregoing discussion was excessively and sufficiently complex that a concise listing of results will assist in interpretation. Second, these points provide the foundation for the revised system presented in the next chapter.

(insert about here Figure 8: showing existing and proposed system components)

. The Educational Media Service subsystem is nested within the Kenya Institute of Education making it a component of the Institute.

. The main activities of EMS were found to be different from those of the other components of K.I.E. The Educational Media Service is a distance education system, while the curriculum divisions conduct high-level research as a necessary input into curricula development. It is important to understand the distinctions in order to give EMS management system the autonomy and requisite capability needed to make it a viable system in accordance with Beer's system model.

Figure 8: comparison of existing and proposed system.

DESIGN OF THE CONTROLLING SUBSYSTEM OF THE EMS.

EXISTING   PROPOSED

SYSTEM 1

Current Sections: Sections: restructured
. Radio   . Radio
. Film and TV   . Film and TV
. Engineering   . Adult and continuing education.
. Graphics and Design   . Teacher training
. Library   . Primary Schools
. Resource   . Secondary Schools
                                  . Pre-school

SYSTEM 2

. Education Technology Panel   . Education Technology Panel
. Rules, regulations   . Rules, regulations
. staff meetings   staff meetings
. Procedures   . Procedures,
. Reporting system   . Reporting system
                                  : PRODUCTION MEDIATOR
                                  . EVALUATION SUBSYSTEM:
                                  . Monitoring and utilisation

SYSTEM 3

Programmes coordinator   .   CONTROLLER, MEDIA DIVISION

SYSTEM-3-STAR

                                  Sections:
System 3's Activities: .Graphic and Design
. attending sections'   .Engineering
  meetings   :MEDIA ADMINISTRATOR
                                  . media administrative
                                    supporting services
                                  System 3's Activities:
. visiting sections   . visiting sections
. auditing accounts   : auditing accounts
                                  . on-spot checking
                                  . media service

SYSTEM 4:

-ORIENTED activities:
. annual plans
. workshops, seminars
. publicity films
. conferences

FORMALISED activities:
. annual plans
. workshops, seminars
. publicity films
. conferences
. MEDIA PRODUCTION
  & DEVELOPMENT: planning,
. proto-type productions
. AUDIENCE RESEARCH:
  marketing, promotions
  public relatios

SYSTEM 5

. Management Committee

. Mass Media Panel

CONCEPTUAL BAR

. Mass Media Panel
. conferences,
. seminars,
. workshops

. PRODUCTION ROOM:
  planning, viewing,
  listening
. conferences,
. seminars, workshops

VARIETY CHANNELS

AMPLIFYING:
. air waves
. synchronized notes
. high quality
  productions

AMPLIFYING
. air waves
. synchronized notes
. high quality
  productions
. EXTERNAL INTERFACE
. UTILISATION SUBUNIT
. RESOURCE-LIBRARY
. IN-SERVICE TRAINING of users
. AUDIENCE RESEARCH:
    publicity,
    promotions,
    marketing

ATTENUATING

. audience reports

ATTENUATING

. audience reports
. evaluation data
. users views

ALGEDONIC METERS, LOOPS

. Telephones
. letters
. interpersonal skills

. Telephones
. letters
. interpersonal skills
. media administrative
. supporting services

.The curriculum divisions could be regarded as cost-effective since their end-products are used by the total environment. The cost-effectiveness of EMS is questionable since their end-products are not utilised by the total target population.

(A) Suggested library-resource division.

The activities of the library section were found to be mis-situated while those of the resource section were found to be dsyfunctional in their current state because they cater for the total staff of the Institute, yet from a management standpoint they are located exclusively in EMS.

. The analysis showed that there were no differences between the stated objectives and activities of the library and resource sections. Thus the two sections should be merged to form another division of the Institute in order to facilitate better utilisation of library-resource services.

(B) EMS: existing components.

EMS has two systems, one carrying out production activities, i.e., radio broadcasting and production of film, video and tape/slide materials. These two sections are the backbone of distance education in Kenya.

System 2. The analysis showed that teachers played a very vital role when measuring and correcting the effects of

the media division's end-products. This practice should continue.

.Within the media division, the activities of content analysis, message design, development of programmes, pre-testing, final team productions, i.e., publishing, studio or on-location productions, delivery systems, utilisation patterns, measuring, improvement: were on-going processes. These activities should continue and will be enhanced if the missing components are implemented.

System-3-star. The activities of the engineering, graphic and design sections were metasystemic in relationship to the activities of the radio, film and television subsystems. A symbiotic relationship existed between the engineering (metasystemic activities) and the production activities of the two sections (systems 1). This relationship should be continued.

System 3, The Educational Media Service has system 3, the programme coordinator of media who is also the leader of the division. According to Beer, the role of system 3 is to command systems "at level 1" by enforcing the implementation of decisions, and innovations, both popular and unpopular. This role should be continued and augmented by possession of the recommended metasystemic activities.

System 2 and 3. The management committee acts as system

2 and 3 because it discusses and makes decisions which EMS and other divisions, must obey. The management committee is composed of the three institutional subsystems: systems 1, system 2, system-3-star and system 3. This practice by system 3 involving systems 1 in the decision-making process is a good one and it should be continued.

. System 3's spans of control were found to be different-the sectional leaders controlled twelve media specialists, while EMS programme coordinator controlled two production sections and four production services' sections. If the two production sections are restructured then the divisional span of control could be increased from two to six.

System 4. The film and television section had a subunit for proto-type development. The work of the proposed subunit was considered to be a system 4 function. The subunit would provide feasible production design options.

Variety channels. The internal flow of information was found to be satisfactory. Media specialists carried out action research as part of requisite production input. This practice was found to be commendable and should be continued.

(C) Missing components of the management system of EMS.
Figure 3 showed that the media division lacked some components of system 2, 3-star, 4 and 5 which existed at the

institutional level of control.

Missing system 2 activities:

(i) An external interface similar to the curricula divisions' / schools inspectorate connecting the operational activities with the environment. The work of the interface would be that of a facilitator of distance education: its work would be that of a variety amplifying channel and system 2 of Beer's model.

(ii) An internal production mediator or coordinator. The production mediator would dampen "oscillations" between media division's systems 1, system 3 and system-3-star activities, i.e., conflicts, disagreements between the staff of the radio, film and television, graphic and design, engineering sections, media service and the programme coordinator of media (system 2).

(iii) An evaluation subsystem which would be a media comparator. The comparator would monitor the achievements of the divisional objectives by comparing its outputs against the divisional production criterion or paradigm and the learners utilisation of distance education. The media comparator would also amplify distance education by teaching critical utilisation skills, i.e., viewing and listening skills, to users through in-service training of teachers, field education officers etc. The evaluation subsystem could create a

field network for communicating discrepancies to the media division.

System-3-Star. EMS needs to be delegated distance education system-3-star activities currently controlled by the Institute's administrative subsystem as well as media supporting services. EMS needs media administrative officer who would provide administrative services to systems 1.

System 4. A **media research and development subsystem** carrying out applied research activities which would probe into the problematic future, seeking necessary and sound information, to input into future productions. For example, the planning, marketing activities. The planning subsystem would provide information about future options and the marketing data would inform on new target audiences wanting distance education. This would probably increase the consumption level of EMS learning materials.

System 5. The media division lacked a system 5 to provide closure. A subsystem that would approve future media directions on behalf of the Governing Council. The objectives of the **mass media panel** could be re-defined to provide closure for the division.

The Bar. The idea of the conceptual bar exists in EMS, nonetheless it could be improved by providing the staff with a

room where they could meet informally to learn from each other.

Conclusion.

In conclusion, cross-level comparisons of the three analysed levels of management revealed important structural gaps, mis-placed, dysfunctional components and the need for clarifying resource and library functions in relationship to the primary activity of the Educationa Media Service. The primary objective of EMS is to provide an efficient and effective distance education to its varied audiences at acceptable costs. To achieve this objective, the analysis has shown that EMS needs some adjustments to accomodate the management processes essential for its survival. The suggested managerial activities of planning, marketing, evaluating, measuring and leading were identified as necessary requirements for a self-evolving distance education management system: the Educational Media Service.

This analysis, along with the following chapter, will be subjected to internal discussions by the internal members of EMS, KIE, the inspectorate and the policy makers of the identified and formally linked organizations.

CHAPTER FIVE

REVISED MANAGEMENT STRUCTURE OF THE EDUCATIONAL MEDIA SERVICE

System 1

The two production subsystems; radio and film and television sections, could be re-structured to reflect the main content areas of the curriculum divisions, i.e., secondary and primary subject groupings, teacher education and non-formal education. The two production sections could have subunits specialised in the production of distance education materials for the following content areas:

- adult and continuing education
- teacher in-service training
- primary education
- secondary education
- pre-school education
- general public education information
- joint-productions with other agencies.

If the above subunits are created to serve the needs and demands of specific target audiences as well as public and voluntary agencies, EMS would solve the problem of split control because the new sections would reflect specific environmental

content areas and interests. It is being recommended that the productions sections be specialised in serving distance education needs of specific learning groups both formal, non-formal and informal audiences.

System 2

Since EMS does not have a formalised system 2, significant structural and staff changes are needed to accomodate "anti-oscillatory" functions and activities at acceptable and realistic costs.

Production mediator. The results of the analysis indicate that internally, the programme coordinator of media needs an assistant to reduce internal managerial problems, i.e., conflicts, disagreements by providing sound information for conflict-resolutions. The activities of the programme mediator would involve the coordination of the production processes to ensure that distance education materials are synchronized, coherent and reach the target audiences as scheduled (as implied by Figure 6). This change would mean co-ordinating production subsystems, i.e., system-3-star and systems 1 operational activities. The result would assist in harmonising the internal communication within EMS, i.e., within and between all the divisional components. It would also coordinate the programme content across the radio, and film and television sections with the intent of reducing content overlaps, conflicts and sectional competitions to an acceptable level. Some form of competition between sections is healthy and creative, but it is important

that the two forms of distance education develop distinct styles based on the best utilisation of the different media. The content overlaps could be reduced if content and relevant media decisions were co-ordinated across the operational activities of the two production subsystems. The changes should be based on utilisation data contained in the evaluation reports of the monitoring and utilisation subunits, and the users views. If content is co-ordinated by the assistant across the two production subsystems (systems 1), the efficiency and effectiveness of EMS would be increased because programming would be based on sound priorities. The assistant to the programme co-ordinator would also be the secretary to the Educational Technology Course panel ensuring that the panel decisions on priorities are based on sound evaluation and utilisation information.

Evaluation subunit. The assistant needs an external subunit to provide evaluative data: output, discrepancies and impact of the utilisation of the media materials. Thus, the revised structure of the Educational Media Service should have an evaluation feedback system under the direction of the assistant to the "controller, media division". The functional activities of the unit would be dampening of environmental "oscillations" related to the utilisation of distance education. A monitoring subunit would inform EMS about output mismatches, i.e., the discrepancies between the programme's expectations and actual outcomes, in broad and specific terms. The information should be drawn from teachers' and learners, both listeners and viewers.

Such a subunit could also evaluate EMS learning-teaching
materials. The evaluation should consist of comparing the
distance education content, materials and practices, with the
divisional internal criteria of stability. Beer's language of
viability points out that the criteria of stability refers to the
internal standards or parameters set by a system beyond which the
system cannot perform, i.e., its homeostat which is determined by
the organisms physiological limits.

Cross-level comparison of EMS and radio section showed that
the section has established over time an internal criteria. Some
of the crucial dependent variables or elements that constitute
the internal criteria of stability of operational activities of
the media division and which should be taken into consideration
by a divisional "monitoring and utilisation" subsystem should
include the following indices:

.ways of communicating specific content matter

.physical delivery of the total instructional components
to schools at specific deadlines to the satisfaction of
learners

.extending distance education by increasing gradually
the range of broadcasts, especially moving into the
non-formal (private) sector

.maintenance of close relationship with environments
both teachers and learners in order to increase the
capacity of the channels of variety, i.e., flow of
information related to distance education

.fostering of media-learning strategies

. selection of topics intended for distance education. Sometimes the content chosen may not be a priority in terms of the learners, needs.

. content relevance in reference to its intergration with the learners' environments and activities.

. coherence of a programme and series in terms of the internal consistency.

. synchronization and coherency of the electronic recorded materials with the printed materials, i.e., the coherence of the multi-media curriculum packages as a whole.

. comprehension by learners. In this instance, the monitoring subunit would determine the levels of difficulty, both content and instructional language structures used by the programme makers. The media division uses English and Kiswahili as the instructional languages. The utilisation of both languages is problematic because they are second languages for the majority of learners. In cognizance of the linguistic problems, the media division emphasizes production variables like explicit linguistic structures, voices, etc. The monitoring subunit would concentrate on the production variables that may cause conflict as a result of misunderstanding. The way in which content is communicated may lead to conflict. It is important for the operational activities to be informed about the

variables that cause learning problems or difficulties in terms of understanding.

. feasibility of the follow-up activities from the teachers' perspective.

. achievement of the programme's specific instructional objectives.

. enjoyment index as measured by the learners and teachers behaviour.

. learners and teachers satisfaction with the overall programme's performance.

The monitoring subunit could also provide data on the learnning strategies deployed by the users. The staff of EMS would welcome a subunit which acts as a comparator to ensure that the divisional standards of performance are being maintained, improved and increased. An evaluation subunit would perform this role. Such a subunit would provide information to the producton subunits about their performances when compared with the divisional standards. With such information the production sections would be able to correct and improve their products. The information would be made from an internal perspective which would be different from the one provided by the recommended "EMS-inspectorate interface". The system 2 function of comparing and suggesting corrections would not interfere with the current production practices.

The production sections of EMS are expected to carry out individual programme research, i.e., pre-testing and summative evaluation of the programmes and series. This practice encourages

operational-environmental embedment which is central to the designing and production of relevant distance education instructional programmes. The internal members of EMS have a high level of self-confidence which would enable them to withstand high levels of criticism and correction. The media comparator could also co-operate with the production subsystems in creating or evolving unbiased predictive research designs for pre-testing purposes, i.e., action or formative research.

The subunit could also collect utilisation data, related to the deployed trasduction processes which exist in the environmental and that which affects the level of utilisation of the materials. One of the activities of an evaluation subsystem would be collection of information related to the problems of utilization of scheduled broadcasts. For example:

. Are the teachers finding it easy to synchronize the broadcast schedule with their school and classroom timetables?

. What are the physical learning conditions like?

. Are there special rooms for listening and viewing?

. Are the conditions conducive to fostering of learning through broadcasts? For example, what are the schools' extra-curricular activities which interfere with broadcast schedules?

. What are the attitudes of the teachers towards distance education?

. What do the learners think about the broadcasts?

. What are the effects of the terminal examinations on media utilisation?

. How many re-coding (receiver sets, reproduction sets like audio-cassette, tape-recorders, film projectors, video-cassette, slide/tape projectors does each school, college, and community building have?

. Do the receiver sets work?

. What happens when they do not?

. Do schools have money to purchase batteries?

. How many learners per set?

. How many viewers per set?

. Is the signal audible throughout the nation?

. What is the state of the ionospheric conditions? To what degree do the atmospheric conditions affect the audibility level? At what times of the day is the audibility level high or low?

Kenya, being an equatorial country, suffers from the significant problem of "ionospheric conditions". EMS does not transmit its own programmes because broadcasting is controlled by the Voice of Kenya. However, the Voice of Kenya has always given priority to the scheduling of educational broadcasts. The Voice of Kenya engineers have co-operated with EMS in identifying rural and urban areas which experience high levels of atmospheric noise. The educational media service needs to know the geographical environments or areas which are highly affected by the ionospheric conditions. Such information would facilitate decisions about the distribution of audio cassette tape recorders to schools by the Kenya School Equipment Scheme. The cassette tape recorders should be given to schools which experience high levels of atmospheric radio noise.

To reduce evaluation costs the subunit could design effective variety attenuating channels from the environment to the Educational Media Service. These would be EMS feedback channels.

There is a grave danger of production subsystems ignoring utilisation data. The major objective function of a system 2 would be to ensure that evaluative data is communicated clearly and with empathy to the production subsystems. The information should be compatible with the producer's perception of their role in the production of distance education. This "anti-oscillatory" measure avoids the danger of reducing utilisation data to a state of impotence or inertia, for utilisation data which is not applied is costly. Often the staff who carry out the operational activities neither read nor heed the evaluative data because of lack of clarity, precision and brevity. The staff are busy carrying out daily production activities and they do not have the time to read long, technical reports. The research activities recommended for system 4 could balance the utilisation data at variance with the feelings and perspectives of the production subsystems (systems 1) by providing correlational audience research data.

The results of the analysis showed that the amplifying activities of system 2 are "anti-oscillatory" because they increase the utilisation level by teaching users requisite listening and viewing skills. If learners acquire such critical skills, it is assumed that their levels of learning and understanding from media teaching will be increased. The utilisation subunit could encourage correct methods of media utilisation. Table 1 shows some of the correct utilisation practices which would enhance the effectiveness of EMS.

Table 1: practices which enhance media utilisation.

. Create special rooms for storing, reading, viewing and
listening to EMS multi-media curriculum packages.

. Encourage secondary schools to use cassette tape
recorders. EMS has a large bank of relevant programmes
documented in EMS catalogue.

. . Encourage schools to intergrate schools broadcasts
with the total teaching schedules.

Utilization information could be directed particularly at
secondary schools. Most of the educational air-time is allocated
to the primary schools' programmes because they can easily be
synchronized with the classroom timetables. However, this is
difficult for the secondary schools because their timetables are
less flexible due to the complexity of the curriculum. Thus EMS
encourages secondary schools to buy cassette or reel-to-reel tape
recorders. Both are small scale technologies with exciting
potential for distance education in Kenya.

The proposed monitoring and utilisation activities would
reduce "oscillations" or learning difficulties by providing data
for correcting pedagogical differences or mismatches that
contribute to the learners utilisation problems, for example,
feedforward data related to the content areas that were
misunderstood. The feedforward channel is crucial since it is the
channel for learners and users (environments) interaction with
the producers. 'It must be kept open at all times to enhance

distance learning provided by EMS. To summarize, it is recommended that the existing system 2 "anti-oscillatory" or dampening activities be continued, but be augmented over time by the recommended subunits, i.e., evaluation subsystem for monitoring and utilisation purposes, production mediator for internal co-ordination.

EMS-inspectorate. The programme director of EMS should seek ways and means of creating an effective, facilitative interface between EMS and the schools inspectorate. The schools inpectorate implements and supervises curriculum utilisation in schools. The inspectorate has an extensive network of field officers from the central coordinating department in Nairobi and regional network headed by the provincial school inspectors from the two ministries. Such an interface would provide EMS with information gathered by an external subsystem. This information would increase the effectiveness and efficiency of EMS because the external interface would provide data from a wider environmental representative samples.

If EMS intends to fulfill the national objective of providing distance education to the non-formal audiences, then there is a need for creating a non-formal interface. Such an interface, should coordinate with the non-formal projects and organizations to avoid unnecessary duplication of distance education content. The mass media panel could re-define its objectives, to provide a national forum for media co-ordination. The role of the mass media panel needs to be re-defined to accomodate the function of a distance education co-ordinating

interface. Currently, the mass media panel provides a forum for exchanging of information and ideas related to media production and utilization, and distance education between makers or producers, users, delivery systems, and consultants.

The current programme co-ordinator of media, acting through the Director of the Institute, would need the support of the high level policy-makers in order to create an effective external interface.

System 3

According to Beer, system 3 occupies the most crucial position in EMS. It is crucial because system 3 represents the authority delegated by the Director of the Institute. The managerial position of system 3 is called "metasystem" by Beer because the programmes co-ordinator for media is aware of what goes on inside the Institute as well as what is happening inside EMS (see Figure 2 and 3). Thus the programme coordinator is aware of what is going on inside the institutional and media divisional levels.

System 3 is aware of the planned future activities since system 4 keeps system 3 informed about the possible future trends as shown by the powerful homeostat between system 3 and 4 of Figure 1. In order to control the overall EMS activities, the programme co-ordinator needs the anti-oscillatory activities of system 2; and metasystemic activities of system-3-star as shown by team coordination, demonstrated by Figure 6. The system-3-star activities are services which system 3 designs to enhance the work of systems 1. In the context of EMS, system-3-star activities consist of production resources provided by the following functions: graphics and design, engineering, media administrative officer, media services, auditing of accounts, spot checking system 3, etc. (see Figure 8).

Leadership. As system 3, the programme co-ordinator for

media controls EMS. She or he is able to do so because of occupying a metasystemic position in relationship to the production subsystems. The occupation of a metasystemic position enables the programme co-ordinator to provide good leadership to EMS sections see Figure 7. The concept of good leadership involves a variety of individual qualities, some of which are qualitative and therefore subjective. A few are demonstrable and can be rated using an attitudinal Likert-type scale. However, there are differences between demonstrations and the art of exercising sound leadership. Within the context of the proposed structure, good leadership means possession of managerial skills for efficient decision-making. Therefore, one of the necessary requirements for decision-making would be efficiency tempered with the concern for people. The programme co-ordinator would be abled to exercise this crucial skill if she or he controls the utilisation subunit, whose work is to provide brief evaluative reports to system 3 to enhance decision making. The reports would contain the work of production subsystems, their resources and the utilisation of distance education by the target audiences. Such brief evaluative reports would enable the programmes co-ordinator to make important organisational decisions leading to the increased effectiveness of distance education in Kenya.

Sometimes, the programme co-ordinator may be required to make emergency decisions prompted by the algedonic signals, i.e., the danger signals. The decisions may involve taking risky initiatives based on the information relayed by the futuristic system 4. The ability to make risky decisions based entirely on

intuitive feelings or gut feelings as well as work experience is another form of a key skill for system 3, and is a qualitative measure of a good system 3. Such decisions should be based on judicious balancing of system 4's suggested alternatives and possible future options weighed against the views of systems 1. The result should be feasible and realistic implementation plans. This would mean encouraging participatory decision-making between system 4, 3 and 1, with system 5 making the final decisions on fiscal and staff resources. System 3 should create a climate conducive to continuous discussions between system 4 and system 1 by fostering working environments which value individual staff as key resources. In such environments discussions should be characterised by honesty and sincerety to avoid misunderstanding (compare the role of the conceptual bar).

The programme co-ordinator of media needs to show staff that he or she is to be trusted, and worthy of their task performances by giving them editorial freedom. This means giving the production staff autonomy and freedom to perform and to make production decisions. (With reference to Figure 2, the Institute's director needs to extend the same concession to the "controller, EMS"). Thus the programme coordinator should give systems 1 and their operations freedom to make risky decisions in the studio and on-location productions. System 3 exercises authority over production subsystems (systems 1) by co-ordinating and fostering collaboration between them through the work of the production mediator (system 2). The controller of media division should encourage the productive sections to develop self-esteem,

and to aspire to high levels of creativity. This has been
achieved in the past by sponsoring productions for international
competitions, attending seminars, conferences, workshops, and
high-level training in media. Thus, the divisional head has
succeeded in establishing a strong, distinct media division which
is different yet part of curriculum development. The internal
members of EMS see themselves as educational technologists
specializing in distance education as a form of teaching and
learning as well as being facilitators of small rural
technologies.

The programme co-ordinators possession of systems 2
anti-oscillatory activities demonstrates a critical quality of
good leadership. It is the concern for people, since the staff of
EMS represent the most important resource, a crucial key to a
successful distance education system. This is because the
production subsystems, i.e., the media specialists, exercises
control over the final editorial programmes' decisions prior to
transmission and publication of the learning materials. The
controller must therefore design ways and means of motivating the
total staff of EMS. Daniel and Snowden have suggested that staff
motivation could be achieved "through higher order needs such as
the needs for esteem and self-actualization." (Daniel and
Snowden, 1980, p. 9). In order to do so, the controller needs a
media administrator and administrative supporting services. The
services would be system-3-star of Beer's conceptual model,
intended to look after media training and staff's career
development and promotion, as Figure 3 indicates. The second

method of motivating staff is by creation of a managerial culture similar to that of the Japanese. This is what Beer calls the built-in algedonic meter, or balance to continuously way and measure staff feelings, and to filter for action those feelings that need immediate attention through the interpersonal communication channels. The internalised managerial culture should inspire the staff, to commit themselves to the growth of qualitative distance education in Kenya by producing high quality programmes. In short, it is being recommended that EMS be committed to the concept of distance learning. It should be perceived from this perspective, in contrast to a producer of "teaching aids". The analysis has shown that EMS is a distance instructional system, operating as a mass medium to reduce educational imbalances in Kenya. As such it needs its own managerial philosophy to provide group identity, coherence and sense of purpose. This is possible in Kenya because the concept of national mutual responsibility, community spirit and extended family relationships are still the cultural norms. The staff of EMS could devise activities that would enhance the feelings of belonging to a prestigious distance education organisation. The <u>controller, media division,</u> could apply the algedonic meters to create a dynamic and creative EMS which aspires to excellence in programme productions and staff development. Both can be highly improved through high level media training. The controller of the media division has demonstrated the Institutional concern for the staff by making decisions which are based on individual differences and by encouraging staff to fulfill themselves

through participation in training activities for self-development, provided that the activities are congruent with the divisional activities.This means that the person must understand the distinct activities and elements which constitute activities and objectives of the team responsible for the development and production of distance education learning materials. This requirement means that the person in question has an understanding of the components which contribute directly and indirectly to the efficiency and effectiveness of EMS as a whole. The programme's co-ordinator as the team leader should accord equal importance to the information provided by the various subsystems. Knowledge of this kind reduces the tendency to ignore information from some components. Beer has emphasized that each part is important for it provides synergy for the whole. The concept of understanding the role of the various essential elements which constitute EMS leads to the discussion of another quality of a good leader.

The person must be able to function in different areas of distance education. Thus, understanding is related to the past experiences of the programme's co-ordinator in distance education related activities. Past experiences in various related fields would enable the controller of the media division to understand innovations and to support implementation of different distance education innovations. More crucial, the staff of EMS needs empathetic control. There is therefore a need to understand the work-related problems and to represent them empathetically to the Institute's Director as well as high-level policy makers.

It is worth noting that EMS has grown tremendously during the past ten years as a result of the high level ministrial support and nurturing by the Institute's director. In essence, the staff of the Institute have supported the media division in the intergration process. However, there is a need to extend this support by giving EMS and its systems 1 autonomy by allowing the controller to establish the identified missing components; which are necessary preconditions for the viability of a distance education system as this study has shown. It is recommended that system 3 should continue to provide the divisional leadership.

System-3-star

The analysis has shown that system-3-star is a vital subcomponent of system 3. Beer calls it the "ganglion". It purpose is to increase, system 3 variety so that it can control or be informed about the operations of the production subsystems (systems 1). The possession of system 2 anti-oscillatory activities and system's-3-star production resources makes it possible for system 3 to exercise apparent and hidden control over production subsystems, i.e., system 1 of Beer's managerial language. Once the system-3-star activities are reorganised, they staff of both system's 1 operational activities and production resources will be able to interact more closely. The production subsystems, both radio, film and television sections, need the production resources provided by the graphic design and engineering sections. The two distance education production subsystems and the supporting production resources should

understand the symbiotic relationship in order to reduce conflict between them and to create suitable working environments as shown by Figure 6 and 7.

The results of the analysis showed that the media division needs a media administrator. The Institute's chief administrative officer should delegate some of his support services to EMS to reduce queueing problems. This is because the centralization of the Institute's administrative support services encourages conflicts and competitions between the three divisions because of the scarcity of the support services (see Figure 2 showing the Institute's components fashioned after Beer's managerial language). It is recommended that the Institute's administrative division delegate to the media administrator the following functions and responsibilities:

.. The development of the media staff in terms of training and career promotions. The media administrator should take on the responsibility for staff training: on the-job-training, national and international courses, seminars, workshops. The functions of the media administrator should be handled by an individual familiar with EMS divisional needs, both for training, career development, and promotions, and for the needs of distance education. The media administrative officer has to be experienced in media productions in order to understand the requisite skills and knowledge essential for the production of distance education end-products,

i.e., system's 1 production activities, if the subunit
is to serve media needs.

The media administrative officer could also be
responsible for the support services which affect
directly the efficiency and effectiveness of EMS
division. The subunit could plan the overall distance
education personnel requirements with reference to
skills and knowledge. The responsibility would consist
of balancing the demands for programmes' production
personnel requirements with feasible supply of manpower
for recruitment and training. This aim should be
achieved through rigorous discussions within the total
management system of the division, i.e., the five
component subsystems at each level of control. For each
level of management, the training discussions should be
between the media administrator and the leaders of the
production subsystems, evaluation subsystem, research
and development, controller media, audience research,
graphic and design, engineering sections.

In order to carry out the above responsibility, the
media administrator would have to liase with the
national directorate of personnel to ensure that media
personnel requirements and training needs are
incorporated in the total national human resources
development plans. (In Kenya, there is a ministry which
co-ordinates and regulates human resources development
across the government ministries and public

organisations.)

This analyst also proposes that other system-3-star activities would be understood best if the title "media services" was used. The subunit would provide internal media service functions to the staff of both EMS and the Institute. These would be media services in the form of instructional design and production which are unrelated to the distance education objective function. A move of that kind would solve the problem of media neglect revealed by the Institutional analysis. The establishment of this subunit would solve the managerial problem of serving internal curriculum needs and the external environment.

The possession of the system-3-star channel's metasystemic activities would enhance the efficiency and effectiveness of EMS. The controller of the division would still continue to use the audit channel to conduct spot-checking.

System 4

The work of system 4 is to probe into the problematic future, by carrying out research activities, formulating possible solutions and creating future technologies that are likely to increase the competence of the organisation. This is in accordance with the function of a system 4 as explained in Beer's language of management, and as indicated by figures 1, 2, 3, and 4. In business enterprises, the organisations, which fail to invest in research and development find themselves obsolote in a period of probably twenty years. This trend is in evidence today as the world nations try to out-perform each other in the field of communications' technology.

The futuristic activities which EMS could engage in might be concenned with the optimal use of broadcasting frequencies, learning-teaching styles deployed by the media users and the media specialists of the Educational Media Service. The subsystem could attempt to create new distance-education teaching-learning styles, thereby increasing the Knowledge about some of the processes which learners and teachers deploy when they use broadcast and correspondence materials.

Media Production Research and Development. The proposed media production research and development of system 4 would carry out many futuristic activities in planning and prototype productions. These activities would prepare the division for

future innovations and trends in the discipline of distance education. It is necessary to establish a research and development subsystem, especially in distance education because teaching and learning through a broadcast instructional system involves the deployment of complex processes by learners, the majority of which remain unknown blackboxes to educational researchers. Distance educators in Kenya have to find some of the methods which learners use when listening, viewing and reading broadcast materials. The problem is heightened by the lack of research in distance education among the developing nations. Figure 3 which is the analysis of the Institute's curricular and media activities indicates that African educators have accorded priority to curricula research and development. The figure indicates the international projects based in the Institute carrying out curricula and media research. Eshiwani (1983) identified communication media as being one of the major research gaps in Kenya. A distance education research subunit should be implemented to study the aforementioned research problems, especially because distance education was introduced into a relatively unstudied rural-urban matrix. The research subunit could investigate the effects of media on the african rural and urban child. Such studies should take into cognizance the learning and mass communication research theories. The subunit could find the answers to some of the questions listed by the table 2. ,

Table 2

Questions needing answers

. Is distance education another form of conventional
teaching?

. What differences exist between conventional and media
teaching and in what ways do they affect
learning and teaching processes?

. Which production and editorial styles suit best the
learning styles of the rural and urban
distance learners?

. What are the learning needs of a culturally-embedded
African learner?

. How far do EMS programmes match the learning needs
of the different categories of learners?

. How far has the division attempted to meet the
learning needs for continuing education by both the
adults , the schools drop-outs,
harambee community schools and
poorly equipped private schools?

. Can the division contribute in the education
for social development through the
communications technology?

Further research. It may not be feasible in the near future
for EMS to undertake research activities involving some of the
outlined fundamental issues. However, if system 4 is established,
it could co-operate with the university departments carrying out
applied research in education and mass communications technology.
It is the responsibility of EMS to interest the university staff
in distance education research. The university has the key

research resources in Kenya at the moment.

However, there are feasible system 4 activities which can presently be established by EMS. These consist of prototype developments and marketing of distance education materials through publicity and public relations activities. Although EMS utilises mass media for direct teaching, it has not yet utilised the persuasion powers of the medium. It is important to inform all Kenyans that EMS provides a free distance education intructional system for the benefit of all Kenyans. EMS now communicates only with those secondary schools which utilise their materials. This practice excludes new schools and teachers who may have wanted to utilise distance education teaching. A publicity and promotions subunit would increase the utilisation level, thereby increasing the effectiveness of EMS in terms of raising the number of the different target audiences and increasing the categories of potential consumers of distance education.

The proposal to implement marketing activities in EMS is not a revolutionary idea, because the film and television section has produced documentaries intended to inform the public and the users about the Institute's materials and some of its activities. Figure 3 shows the role of the public films as a system 4 function. The films "This is KIE", "Curriculum Change", "The Radio Lesson", and "The School Education" provided a rare chance for the Institute and EMS to explain their activities to the public and to encourage public participation in the curriculum and distance education decision-making process.

The responsibilities of the proposed system 4 would be media production and development, i.e., planning, prototype productions. The subunit would also carry out audience research activities. These would be marketing, promotions, and public relations.

Audience Research. The audience research subunit would attempt to inform and persuade the existing and potential target audiences about distance education and the free benefits provided by the government through EMS. The target audience needs to know well in advance what to expect from EMS. The subunit would inform them about the nature of the projected series and thus prepare them for the changes inherent in the implementation process.

The major task of the section would be that of exploration of the environment to determine distance education needs and demands through needs and demands analysis. This is crucial because the future of EMS will depend on how well the media division defines and responds to the existing and potential distance education needs and demands of the existing and potential market. The information would be used by the section in proposing realistic programming options in terms of target audiences and relevant content areas or options. The projected options would help the media staff in making annual production serial plans. The results and the options provided would therefore, be used by the systems 3 and 1 in evolving realistic programming plans. This information is crucial, for without it, EMS would not be sure of the utilisation of its learning-teaching materials, and whether or not its end-products are based on

target audience needs and demands.

Beer has emphasized that the system 4 personnel should keep the division aware of its objective function by continually keeping in mind its main business as a distance education system, for all categories of learners. Thus, with system 4, EMS would keep adjusting its programming to suit the learning needs of its environment. In order to do so, the staff of system 4 must understand the existing and future potential markets for distance education by keeping in perspective the objective function of the Institute's media division. This analysis has emphasised that while the objective function of EMS remain unchanged, its operational activities will continue to re-structure themselves to reflect the ever-changing learning needs and demands for the different categories of education. This is why the conceptual bar is needed to provide a forum for discussion and decision making.

It is not possible in the near future for EMS to have an extensive networks carrying out marketing activities because of the staff and high operational costs. However, this could be offset by the creation of friendly networks consisting of the formally-linked organisations like the VOK, ministries of agriculture, health, social services and voluntary agencies. The formally-linked organisations would be the ones carrying out mass educational activities using telecommunications technologies as delivery and interactive systems.

The subunit, once implemented, may not possess requisite skills and knowledge as well as fiscal resources to carry out applied research. Therefore the subunit could create research

networks with organisations carrying out distance education media research. It is therefore recommended that the staff of system 4 create research links with the University of Nairobi and other universities carrying out similar activities. This could be done through formal membership, i.e., by becoming members of the media research associations and organisations. The friendly network could be extended to other organisations which are formally linked with EMS. These include broadcast organisations, like the Voice of Kenya, teachers organisations, both professional and the Kenya Union of teachers, curriculum implementing organisation like the schools inspectorate and the department of adult education, international organisations like UNESCO, and media training organisations like the All African Conference of Churches and the Kenya Institute of Mass Communication. All the above named organisation could help EMS in increasing the existing distance education markets.

EMS needs to maintain international relationships with the formally-linked and related sentient organisations like the Commonwealth Broadcasting Association, International Council for Distance Education, the Educational-Television Association and the Association for Educational Communications and Technology and URTNA. EMS values such associations, especially in carrying out joint-co-productions. These would be in relation to the production of distance education materials intended for enhancing international relations.

Associations like URTNA, UNESCO and the Commonwealth Broadcasting Associations promote co-productions and

cross-fertilisation through either syndicating of programmes or exchanging of cultural free programmes within Africa. In the past EMS has transmitted BBC educational programmes relevant to the Kenyan curriculum.

Aside from the above, system 4 could carry out research activities related to the tasks performed by EMS staff. These would be programme production styles like the effects of pausing, sound effects, and so on. The objective of the subunit would be to assess the performances of the current deployed styles and to evolve better options or alternatives which can be piloted in the projected future. This could be done in conjuction with the "monitoring and utilisation" subunit. To distinguish system 4 planning activities from those of system 2, the activities should be titled either the <u>"Audience Reseach and Relations"</u> or <u>"Research and Development".</u>

The production subsystems of EMS have enjoyed harmonious relationships with the management system. The relationship is professional, less authoritative and informal. This conducive relationship has created a friendly managerial climate which fosters creative planning. The results of the analysis showed that although EMS doesnot have a formalised system 4, the planning activities were still carried out through what Daniel and Snowden have called "bottom-up formal" planning (Daniel and Snowden, 1980, p.6). In Kenya, this process is called "annual budgeting". It is the most important annual activity in terms of collective, participatory decision-making staff activity. The "annual budget" consists of elicitating detailed "programmes of

activities" and subsequent total operational and resource costs.
This includes the costs of the operational activities of systems
1 and system-3-star activities: graphics, design, publishing,
software, hardware (see Figure 6). Daniel and Snowden have
recommended this planning process because it "can be a good way
of focussing the efforts of the staff" (Daniel and Snowden, 1980,
p.6). The management of EMS has always encouraged staff to define
and plan annual production activities so that the individuals can
set for themselves performance goals and objectives. These
planning activities of the staff of EMS should continue. However,
they require and need research inputs of system 4 in terms of the
probable future state of distance education. The inputs should be
based on objective and subjective scientific data, both
qualitative (naturalistic) and experimental.

Thus the activities of system 4 are crucial in Kenya because
EMS' has great production capabilities and tremendous potential
for evolving a distance education system that could bridge the
gaps created by urbanisation, illiteracy, differences in
languages and dialects, and teacher imbalances. The division
uses radio to reach most of its audiences living in both rural
and urban environments. The target audiences are varied in terms
of composition and characteristics. For example their mother
tongues consists of different languages and dialects. They live
in different geographical regions ranging from mountains, plains,
deserts, highlands and the coast. In order to know and fulfill
the audience needs and demands, EMS needs a system 4. The
possession of system 4 would increase the efficiency and

effectiveness of EMS, because programming would be based on information data derived from market analysis about learner categories, and their demands and needs. The subsystem would ensure that EMS is doing its business.

Such an important subsystem needs care and attention as Beer's managerial language was pointed out, for it is the subsystem that gives EMS the capability to continuously re-structure itself to accomodate itself to the learning needs of all Kenyans especially in distance education. It is therefore recommended that the system 4 functions be established and be nurtured by the management of EMS, the Institute, the ministries of education; to enable the staff to contribute to the positive growth of distance education in Kenya and Africa. The information generated by this component should be a form of positive feedback; unrestrained by balancing of the budget sheets. Finally, the possession of system 4 would ensure that EMS will continue to provide these learning experiences by continuously adapting itself to future delivery systems (technological developments), market and content (distance education) changes in both practice and philosophy as an evolutionary system.

System 5

Beer calls system 5 the reference point of the viable system conceptual model. Possession of system 5 enables an organisation to figuratively observe itself. The results of the analysis showed that EMS, does not have a system 5 to act as its reference point. The mass media panel could provide the media division with guidance if it re-defines its objectives. It would be able to balance system 4's suggested innovations with systems 1's production capabilities. In essence the mass media panel would exercise managerial control over EMS by approving its future directions. The mass media panel would be able to make such decisions because system 4 would provide information on possible future options, their cost-effectiveness and benefits, which the EMS might gain by choosing each option. System 3 would provide data based on current operational capabilities. With such information, the mass media panel would be able to formulate broad divisional long-term objectives and plans based on judicious application of systems 3 and 4 information. The decisions made would attempt to enhance the work of the media division. It is therefore highly recommended that the existing mass media panel re-define its purpose to accomodate the proposed functions of a system 5. Currently, the mass media panel provides a forum for networking of ideas and facilities. The members of the panel are media makers and users. This panel was established to encourage creation of coordination relationships between

media   users,   makers,   trainers,   and   consultants.   With
re-definition of its objectives the mass media panel has the
cabability to provide closure for the media division. It is
highly recommended that the mass media panel assume the role of
closure for the media division.

The Bar

The "Bar" in Beer's language constitutes an informal
environment where learning occurs indirectly, in a friendly and
informal atmosphere. The bar is the place where managers at the
same   level   of   management   verify   their   understanding of new
information through conversations with their colleagues.

EMS proposed bar would serve the same purpose as the
conventional staffroom where teachers seek information and
further understanding from each other. The proposed production
room would provide a place where the different categories of
staff operating at the same level of management can meet and
share information, seek further clarifications, verify their
understanding of certain reports, express their emotions, seek
guidance from each other, or have casual conversations. These
internal discussions should occur between managers within the
same level of control. For example, in EMS, the members of the
"bar" would be systems 1 staff (sectional heads), system 2
(production mediator, head of evaluation subsystem), system 3
(controller, media division), system-3-star (media administrator,
financial advisor, heads of graphic and design, engineering,
media service sections), system 4 (production research and

market analysts) and probably system 5 staff if they are present in the Institute. The "bar" should provide "the leader" or controller of the media division with a place where she or he can motivate staff by generating positive feedback inherent in praising, encouraging, understanding the staff. The staff of EMS who are creative people need to understand themselves and their operational activities so that they can exercise better editorial control over their productions. This is self-esteem or self-actualization, which exists only when the staff accept feedback generated by themselves, system 2 and system 4 staff. Positive feedback is essential for the staff of EMS because their activities are creative, very demanding of an individual's gut feelings, and full of stress and emotions. The staff of the EMS should find for themselves a "bar", a learning place where they can give and accept positive and negative information or just simply relax. The bar would provide the media division with an environment where the division can know itself for it is only then that the division can be able to control and make choices about its future role in providing efficient and effective distance education.

Variety Channels

The variety channels are embedded within the nature of the various activities carried out by a viable system. They are intertwined, dynamic and in a state of flux. Table 4 indicates some of the crucial variety channels which should be maintained

and nurtured.

Table 3.

EMS variety channels: organizations, activities and processes.

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        Variety amplifying channels
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. The Voice of Kenya   . air waves

. Systems 1   . Highly synchronized notes
        . high production quality,
          i.e., studio and publishing
        . clearly written print materials
        . well thought out production

styles,

          i.e, content delivery, pacing,
             pausing etc.
        . high quality re-coding, i.e.,
            receiver sets, teachers,
            models of learners

The external interface   . the schools inspectorate

System 2   . utilisation subunit through
        . in-service training of users

System 3   . good leadership and
        judicious use of the bar

System 4   . audience research
        . prototype development

System 5   . approval of plans

The Bar   . informal learning channels

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=======================================
       Variety attenuating channels
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Systems 1   . pre-testing data
System 2   . monitoring results
        . utilisation data
        . evaluation data
        . office routines

<u>Audiences</u>   . audience reports

<u>Formal learners</u>   . user reports.

  The effect of the information carried by the variety
attenuating and amplifying channels depends on the re-coding
processes, because information undergoes change when it crosses
boundaries as a result of translation by the re-coding processes.
The re-coding processes refer to the encoding and decoding of
infomation signals by receptors and transmitters. Beer has
emphasized that the information carried by the variety amplifying
and attenuating channels is as good as the translators which
encode and decode it. It is recommended that the media division
implement some of the variety channels to inform the division
about the state of its re-coders, such as the information which
the proposed system 2 and system 4 variety channels would provide
as indicated in the table 5. EMS does not have control over the
learners re-coding processes. It is therefore important that EMS
have systems 2 and 4 so that distance education can fashion
itself to suit the learning-teaching styles deployed by the
users, when they interpret, process and internalise content,
embedded in media both print and electronic.

  Alternatively, system 4 research activities could find means
and ways of teaching learners how to transduce content delivered
at a distance through media. This would mean evolving new and
creative study methods and strategies, whether critical viewing,
listening skills or other innovations. The important criteria is

increasing the levels of content interpretation and understanding. This would increase the effectiveness of EMS in terms of learning gains.

Algedonic meters, filters and loops

Beer has emphasized the role of the interpersonal relationships which he calls algedonic meters, i.e., the scale for measuring staff overt feelings and relationships. The algedonic filters are the methods used by the management to communicate informally with staff. The algedonic signals are the channels for communicating information requiring immediate attention. It is crucial for the management to appreciate and understand the task being performed by staff and the corresponding pressures of the workload. The managers of EMS can only deploy the algedonic meter when they understand staff. Understanding creates a climate which balances interpersonal conflicts, discontents, dissatisfactions by application of the pain and pleasure behavioural syndrome. The managers of EMS should understand the staff and thereafter deploy the requisite interpersonal skills in consonance with the individual differences.

Resource-Library Division

The analysis has shown that the functions of the resource and library sections should be given a division platform. This is because the activities of the two sections are not production-oriented. They are, rather, information/data-oriented.

The activities of both sections are viable since they can exist distinctly either as a learning resource centre or library service. The two sections should find a way of co-existing as one whole since their activities are related and they tend to overlap in their present form. The functions which overlap have been elicited in the analysis of the media division. Some of them are:

. provision of multi-media library services.

. lending of learning and teaching materials both print and non-print.

. relationship between the two sections and primary teachers' colleges.

. literature searches for the staff of the Institute.

. tracing, retrieving and dissemination of information.

. distribution of print materials to the formal environment.

It is recommended that the activities of the resource and library sections be combined to form another division of the Institute, as shown by the Institute's mapping of Figure 2. The division could re-design itself to reflect the Institute's activities at the sectional level. For example, there could be a subsystem in charge of the central library, EMS print materials, audio and video cassettes tapes, films and tape/slides, creation of learning resource cells in colleges, schools and other crucial region cluster, training of the managers and initiators of learning resource centres, and creation of dissemination networks. It is recommended that the activities of the two sections be combined and nurtured for they are not dissimilar.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

The improved management system of EMS.

The analysis has shown that the controlling subsystem of EMS management structure lacks crucial controlling components. These are the components related to its defined objective function, i.e, distance education, which, in turn should define the operative boundaries of EMS. Thus, the results of this study have questioned the efficiency and effectiveness of the current media division because of the identified missing and dysfunctional components. It is therefore highly recommended that the internal members of EMS discuss the recommendations and solutions contained in this study and come up with interim implementation plans.

In suggesting changes, the study has seriously taken into consideration the language used to frame the main issues. For example, how well will the internal members of EMS and other distance education managers interpret the suggested improvements, and how explicitly has the language communicated to the policy-makers the managerial needs of EMS both fiscal and human

resources' requirements. Several figures, diagrams used to amplify understanding by reducing the use of cybernetic, technical language, and explicating the management processes, problems and possible solutions of the management system of EMS by use of conceptual visual mappings of the viable distance education management system, see Figures 6, 7, 8, 9, and 10. These figures and tables 1, 2, and 3 have been used to increase understanding through creative visualization schemata.

Recommendations. The proposed management system will provide EMS with a managerial structure which is evolutionary rather than revolutionary: an evolutionary system that is adaptive, and responds flexibly, re-structuring itself to meet the broad and specific expectations, needs and demands of its target audiences.

Insert Figure 9 and 10 about here

Figure 9 is a conceptual abstraction of the major components of an adaptive management system. It is a conceptual mosaic representing some of the major requisite components of a viable management system of the Educational Media Service of Kenya. The figure is based on the concepts of a viable system model proposed by Beer's managerial language. The conceptual mosaic is recommended as a springboard for further discussions. This approach recognizes the importance of staff discussions in the implementation process of any change, i.e., participatory decision-making. If implemented, the management structure will

increase learning gains because it has been designed to respond to the internal managerial needs of its members and the external needs of its varied users, thereby, increasing the internal efficiency and effectiveness of EMS. The proposed management structure is expected to increase (quantitatively) the number of learners and users; to improve the quality of instruction and to extend the educational opportunities to new markets and new consumers, thereby, increasing the effectiveness of distance teaching in Kenya. The management structure would be able to do so because it has been designed to keep the media division in continuous "conversations" or interactions with its varied environment.

EMS management structure would be able to interact with its environment because it would possess a built in monitoring and evaluation subsystem that would supply it with analytical data about the environment's learning and utilisation problems. The external EMS-inspectorate interface would provide data from an external perspective. This data would supplement the internal data of the evaluation subsystems, i.e., from both the media specialists and the monitoring and utilisation subunit. The information provided by system 4 activities, audience research, media production research and development, would keep EMS aware of its main business. This awareness would keep the media division on-line with its objective function, thus enabling the division to continuously fashion itself, to meet the consumer needs and expectations, and to open new markets for distance education. This would make EMS a more creative organisation,

evolving its structure and creating knowledge, both subjective and objective, through the activities of system 4 and 2.The research and development activities carried out by system 4 would enable the management structure to keep its main business and objectives in perspective, and to adapt itself to future distance education needs, demands, practices (methods), and technological changes in communications, particularly regarding delivery methods. It is therefore crucial that EMS and other distance education management systems incorporate within themselves, built-in system 4's planning, research, and marketing activities, and system 2's requisite comparators who would monitor, compare, measure and communicate the observed and analysed discrepancies through feedback and other attenuating channels to the management systems of distance education. This could be achieved by incorporating the aforementioned attenuating and amplifying components into the design of distance education management structures.

This study has recommended that the mass media panel re-define some of its objectives so that it can guide the media division in carrying out future distance education activities, innovations and solutions which are based on tested and proven options and alternatives by system 4 function, i.e., planning, prototype development, market research and publicity.

The possession of an "external-environmental interface" would enable EMS to perceive its activities from an external perspective, because the inspectorate would perform the role of a system's observer. This would make the media division an open

system, absorbing the dynamic, varied energy emanating from its environment. This would enrich EMS, saving the division from reaching a state of either pathological death or becoming a self-reproducing management system. A system is said to have reached its pathological state if it exists to serve itself, and to reproduce itself, i.e., it exists to serve itself and not to fulfill some of the objectives for which it was established. In a sense, it is a closed system — a system which has closed communication with its environments.

Beer's client-consultant managerial language emphasizes the importance of the flow of information within and between the five component systems of the conceptual viable system model. The proposed changes demonstrated by Figure 9 and 10 have emphasised this aspect of the viable system model, for the model is a learning system based on the flow of information for the decision-making process. The information gained changes the state of the management structure, thus, making it a learning system. The proposed changes, if adapted, will balance and enhance the flow of information within the management system because information flow is central to the concept of a system's viability, as explicated by Beer (Beer, 1972; 1981; 1979). The information flow will enhance the decision-making process since managerial decisions and subsequent actions will be based on sound and proven knowledge, both objective and subjective. The external interface and the internal evaluation subsystem would both provide subjective data based on field naturalistic observations and interviews. The system 4 function would provide

research data based on exploration of distance education future state through the activities of: production prototype development subunit, marketing research, publicity, and planning.

While emphasizing sound information signals, Beer also places importance on "gut feelings". Often, managers have to make decisions based on their gut feelings, "I-We feel it is right", especially when making risky, futuristic decisions without data. In such cases, the management process becomes one of forecasting and managing the future.

Limitations. This analyst recognises the fact that the teaching-learning environment will always have undifferentiated and unintergrated properties due to the existence of complex variety, especially in the field of education; and significantly, when trying to understand the learning process with its multiplicity of "blackboxes": Educational research has yet to come up with distance education theoretical framework upon which educators can best fashion media to learners' cognitive, affective and psychomotor domains (Beerm, 1982) in terms of listening, interpreting, storing, retrieving, remembering, and forgetting. Therefore, the model of the viable system does not claim to solve all the managerial problems of organisations. It attempts however, to reduce the complex variety. Hence, throughout the study, some of the management limitations were kept in mind. This analysis recognized the fact that at the macro-level, organisations resist internal management changes because changes are perceived as threats to the security, existence and survival of the members of the organizations.

Organisations are threatened because changes question the organisations' competence. It is therefore natural and logical for the organisations to resist internal changes which threaten the survival of their long-established management systems. In cognizance of the above, it is prudent and rational to suggest gentle changes at first. Once some changes have been implemented, the accrued benefits brought by an efficient and effective EMS will force the management to implement the crucial changes.

The next limitation is related to the human models and the varied viewpoints contained in the minds of the staff who constitute the management systems. Human models generate complex variety, hence, they will always interpret and understand differently the suggested possible solutions. Beer has emphasised this aspect of variety reduction by the human mind. He argues,

> "it will readily be seen that observers in different grandstands will offer quite different accounts of the same events, not only because each model of those events will be uniquely perverted, but also because the parallelism between sets and trajectories has no underlying causatory explanation." (Beer, 1982, p.10).

Therefore, management systems like EMS's will always live with stress because the staff who constitute the management system 's operational activities and the target environments (users) will always be turbulent, dynamic and in a state of flux. For example, the staff may become worried about the management

system's high control of their operational activities through the work of system 2 and 4. Others may fail to cope with the "bar" as a result of personality and sex differences: the sensitive, the shy, the introverts, etc. Hence there will always be differences because management systems constitute social organisations which will always exhibit qualities like competition and disagreements based on either sentient groups' or individual's philosophy. There are therefore limitations beyond which social systems can not be regulated and guided by the management systems. This is the degree of freedom and choice. Hence, the perceived organisations' realities will always be based on the conceptual models contained in the heads of the internal and external observers of the system, thereby delimiting the organisation's range of possible options and alternatives. Beer has pointed out the danger when he said, "We fail to solve problems that are couched in terms of the very categories which have already proven useless as parameters of recognizable solutions." (Beer, 1982, p.15). However, this state will change as more managerial research elicits requisite management design structures which take into consideration the critical factors and aspects contained in this study, and when problems are approached from a wholistic systemic viewpoint.

If correct information is gathered and applied, a reduction of fears, insecurities and anxieties about the competence, purpose and status of the management systems will result. This is true because decisions will be based on proven knowledge supplied by systems 2 and 4 as well as internalised gut feelings

that "things are right". The continuous and constant training of the internal members of EMS will increase their efficiency, thereby reducing fears and worries related to the managerial competence and change. Training is a prerequisite for management success at all levels. This includes mentor-relationships, on-job training, courses, seminars, and workshops. This is why the study has recommended that the training function be embodied within the system-3-star activities. It was highly recommended that the training function should be undertaken by staff with work experience in both radio and film/television production activities.

Thus the results of this study are limited in the sense that they are derived from a conceptual, rational analysis of the management system of EMS. The study has been undertaken from an internal perspective: personal, and therefore subject to variety reduction with the main argument of this study. On the other hand, the rational analysis is augmented by the analyst's past experiences as a secondary school teacher (an EMS environment), a national examiner (the environment's measuring component), a media specialist (radio section's operational activities), and as the current "head" of the educational radio broadcasting in Kenya (management unit of EMS system 1).

While the study is subject to the aforementioned limitations, it value is increased by its utilisation of a powerful conceptual tool of analysis, diagnosis and improvement: i.e., the language and process of Beer's descriptive viable system mode. The ideas proposed by Beer have been augmented by

managerial Knowledge contained in the reviewed management literature about broadcasting and distance education. Thus, the suggested possible solutions and innovations for the improvement of EMS have been drawn from a broad cross-section of management research and experiences, and have been derived from the experiences of broadcasting and distance education managers as they constantly attempt to solve and cope with varied management problems. These are the problems which are unique to the management systems of educational broadcasting and distance teaching organisations like EMS.

This study has demonstrated the analytical power of Beer's managerial language. In utilising it, the analyst has been given freedom to incorporate management and programme evaluation theories. The language embodies within itself, the invariant systemic theoretical concepts that it possesses because it is systematic in terms of organization (from system 1 to 5) systemic, and coherent in terms of the relationships, interactions of the five component systems, and client-consultant conversations which limit the analysis to specific defined boundaries. For example, it is not dogmatic in terms of rules and procedures, implying that "this is the answer". It is a creative language giving the analyst and the client freedom within the theoretical framework of conversational theory to come up with answers as to: "what is" the main business of the organisation; what is the system doing; where is the variety; and so forth. Therefore the questions assisted the analyst in analysing, formulating, and suggesting possible solutions of the

stated managerial problem, in terms of what this system doing and what it is supposed to be doing. The discrepancies constituted the problem. Once the problem is understood and specified, then it can be solved by the client. The client and analyst are therefore given freedom to make decisions on the critical aspects and components of the management system. But they are also constrained because they have to operate within the conceptual framework of the "defined" concepts constituting the management language. This study has demonstrated the fact that Beer's language of management strives to be creative, universal and culture-free.

From the results of this study, it is evident that Beer' managerial language has provided managers at all levels of control with a powerful conceptual tool for analysing the management systems at different levels: abstract, concrete, macro, and micro within the theoretical framework of conversational theory and General Systems theory. The continuum for analysis is infinite on both ends hence the limit of this study to three levels of management. The five subsystems of the viable system model, systems 1, 2, 3, 4 and 5, have definite characteristics and distinct boundaries. These characteristics demand that the analyst operate within their boundaries. Hence, the tool embodies within itself the invariant concepts, that the managerial language has proposed for analysising, evaluating and controlling complex variety. The tool, therefore participates in the analysis, diagnosis and synthesis process in terms of deriving possible solutions or options. Beer's language and the

resultant descriptive conceptual model does not offer solutions. Rather it focus the user to make a complete map of the system. Having done so, the problems become more evident, which is the most critical and difficult task. The client is then given the freedom to make the final implementation decisions.

Conclusion. This analysis has presumed that EMS is a distance teaching/learning system. This objective function defined the management boundaries of EMS in terms of what its main business is. All the components which were judged to be outside the defined system's boundary were considered to be dysfunctional. From this standpoint, the activities of the resource and library sections were considered to be outside the boundaries established by the objective function of the media division, i.e., the main business of EMS. The provision of education through the capabilities of the mass communications technology was judged to be the main business of EMS. All other activities existed to serve this objective function. The analysis recognized the fact that the concept of a learning resource centre was central to the facilitation process of distance teaching. However, they were not in themselves considered to be the main business of EMS because distance education in Kenya is much more than the provision of learning resources. The concept of distance education implies a structured , controlling, teaching/learning system, while the concept of a learning resource centre implies the centralization of learning materials at macro or micro levels.

In concluding, this study has shown that the Educational Media Service lacks important and crucial components which define the necessary and sufficient conditions of its survival as expressed by Beer's language of management.

7

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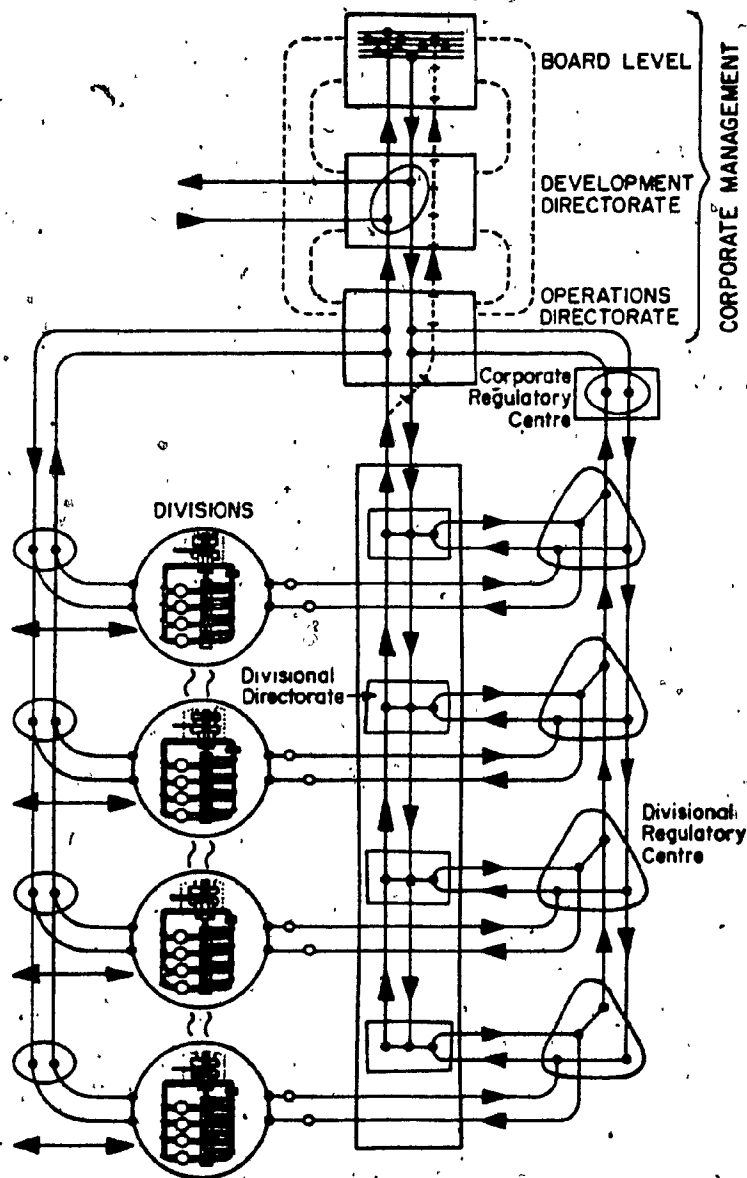
Figure 1: "Brain of the Firm" by Stafford Beer, 1981
p. 157. John Wiley and Sons Ltd.

Figure 2: Mapping of the Institutional activities onto Beer's
viable system model

Future:

    School
Environment

Non-formal
Environment
Kenya Society

Film: why change
Special projects
Pre-school
Education

System-3-star

Graphics & Design
service
Administrative
services
Library services
Resource services

Environment

production
activities
resources

Primary
Schools
and
Colleges
Non-formal

curricula
Research
Development

Secondary
Schools
and
Colleges

Curricula
Research
& Development

Non-formal
Entire
Society &
School
Environment

& Media
Research
& Production

English
Language
for grades
1,2,3 Lower
Primary

Production
of Radio
programmes:

African
Education
Formal and
Non-Formal

Curricula Research
& Development
Training in curricula
Development

System 5

Governing
Council

System 4

Academic
Board

System 3

Director
of the
Institute
Deputy
Director

System 1

Programme
Coordinator
Basic
Education

Programme
Coordinator
Higher
Education

Programme
Coordinator
Media

Programme
Coordinator
Experimental
Study

Leaders of
International
Projects

System 2

Academic
Board
Chief
Programme
Coordinator

Research
and
Evaluation

Primary
Course
Panel

Secondary
Course
Panel

Mass Media
Panel
Media

Adapted from "Brain of the Firm" by Stafford Beer, 1981 p. 157.
John Wiley and Sons Ltd.

Figure 3: Mapping of the Divisional Activities onto Beer's viable system model.
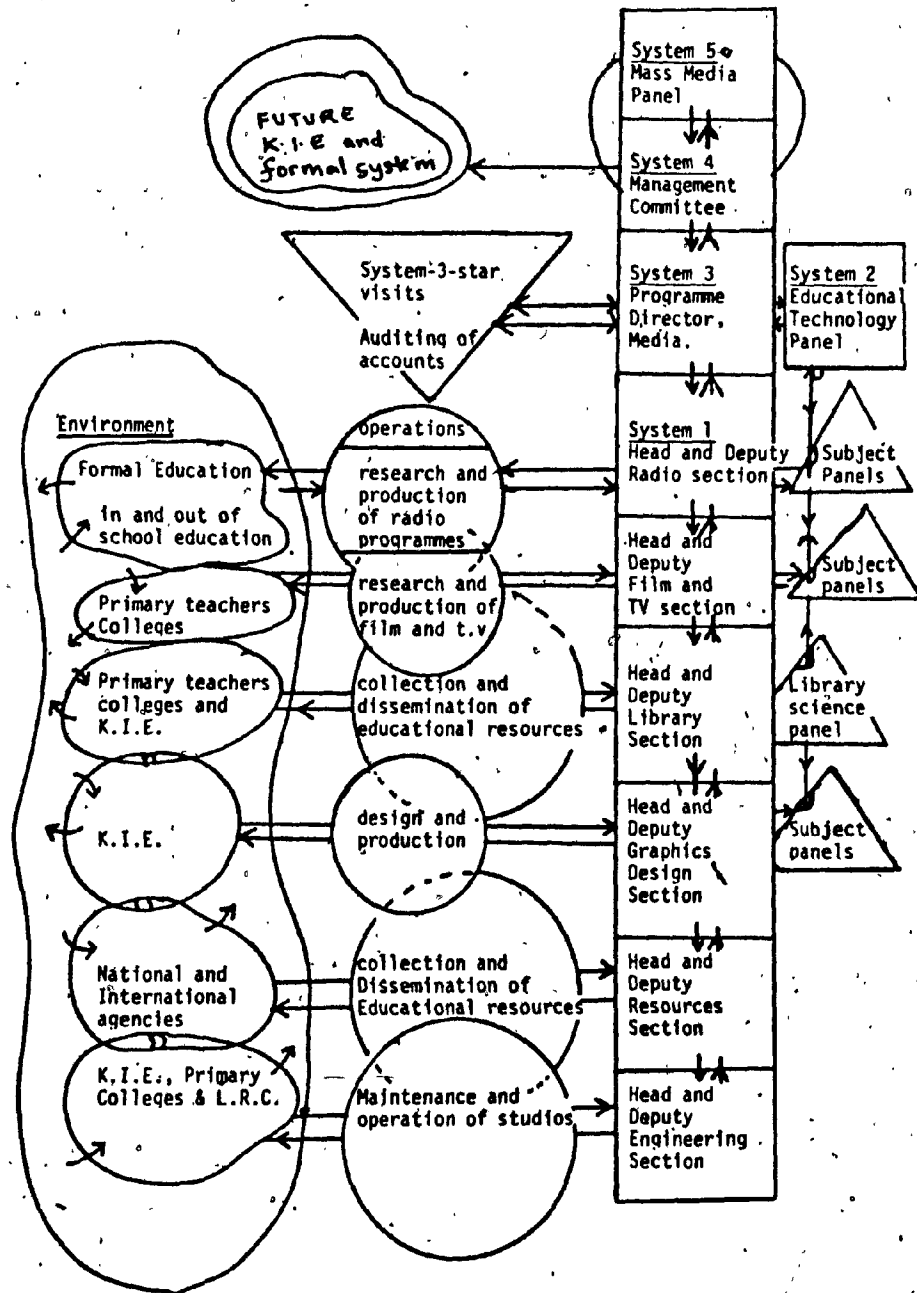
(Adapted from "Brain of the Firm" by Stafford Beer, 1981 p. 157. John Wiley and Sons Ltd).

Figure 4: Mapping of the Sectional activities onto Beer's viable system model

school system Kenya & Society

Film, radio Lesson

System 5

System 4

System 3 Head & Deputy

System 2 Subject panels system

System-3-star audit channel

DEVELOPMENT PRODUCTION

environment

Primary Schools Learners

312:20 minutes programmes and supporting print materials

13 Primary school series

4: media specialists

media sub-committee panels

3,000 teacher trainees

720:20 minutes programmes and supporting print materials

13 Teacher-in service series: teacher education

8: assistant media specialists

media sub-committee panels

Non-formal audience

Secondary social sciences & English subjects

24:20 minutes programmes and supporting print materials

3 Secondary school series

media sub-committee panels

Secondary teachers

8:20 minutes

Secondary teachers

media sub-committee panels

general public

media sub-committee panels

(Adapted from "Brain of the Firm" by Stafford Beer, 1981 p. 157. John Wiley and Sons Ltd.)

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┌─────────────────────────────────────────────────────────┐
│                                                         │
│     KENYA INSTITUTE OF EDUCATION                        │
│                                                         │
│       ┌───────────────────────────────────────┐         │
│       │       EDUCATIONAL MEDIA SERVICE        │         │
│       │                                       │         │
│       │      ┌──────────────────────────┐     │         │
│       │      │    EDUCATIONAL RADIO      │     │         │
│       │      │    SECTIONAL LEVEL        │     │         │
│       │      └──────────────────────────┘     │         │
│       │                                       │         │
│       │       DIVISIONAL LEVEL                │         │
│       └───────────────────────────────────────┘         │
│                                                         │
│     INSTITUTIONAL LEVEL                                  │
│                                                         │
└─────────────────────────────────────────────────────────┘
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Figure 5a: Showing nesting of the three levels of recursion.

Kenya Institute of EDUCATION	Educational Media Service	Educational Radio Film and TV
INSTITUTIONAL Level	DIVISIONAL level	SECTIONAL level

Figure 5b: Showing the three levels of recursion torn apart

Figure 6: TEAM COORDINATION SYSTEMS 1-2-3.
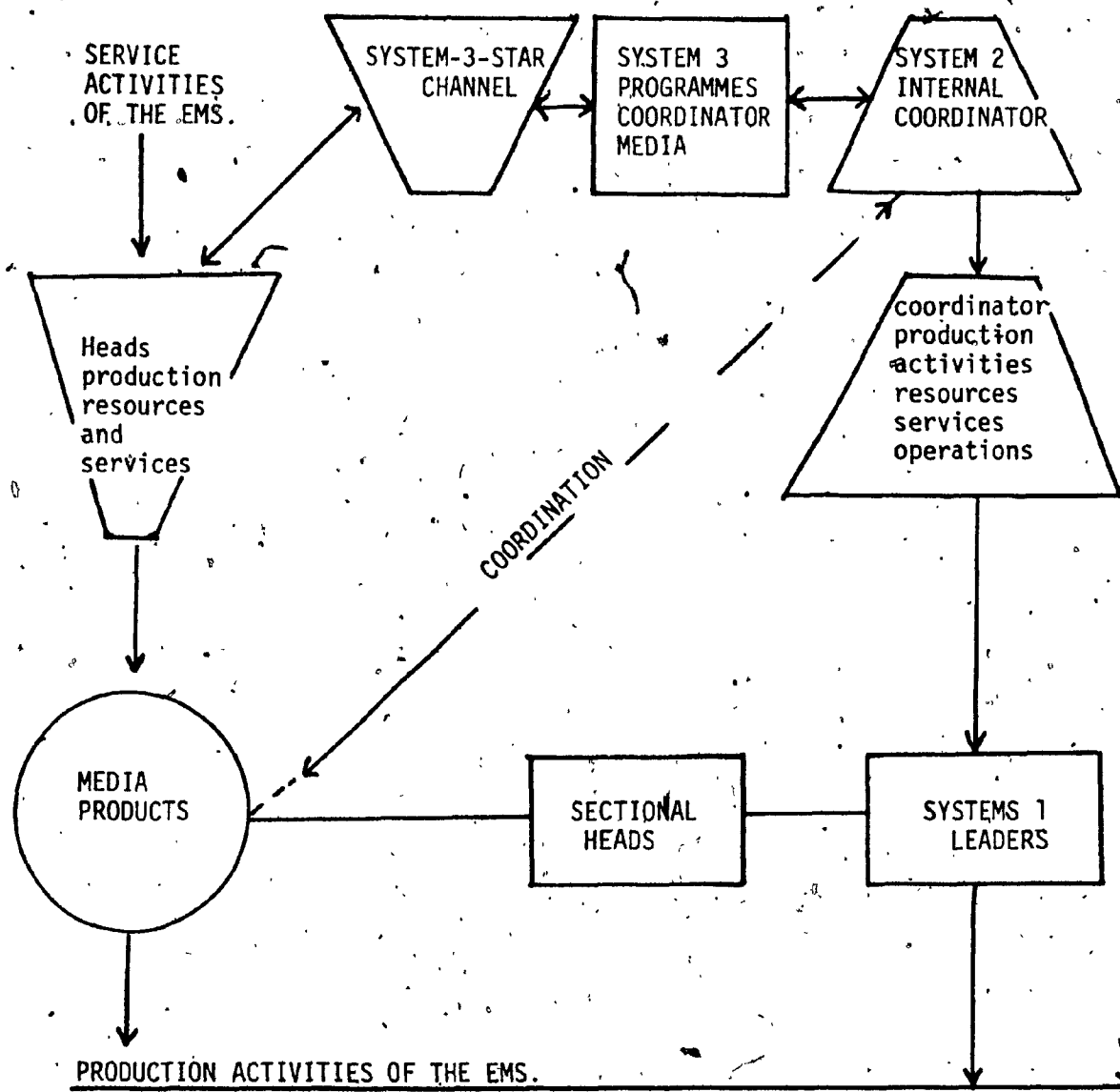
Figure 7: The function of system 2 in the management of the EMS
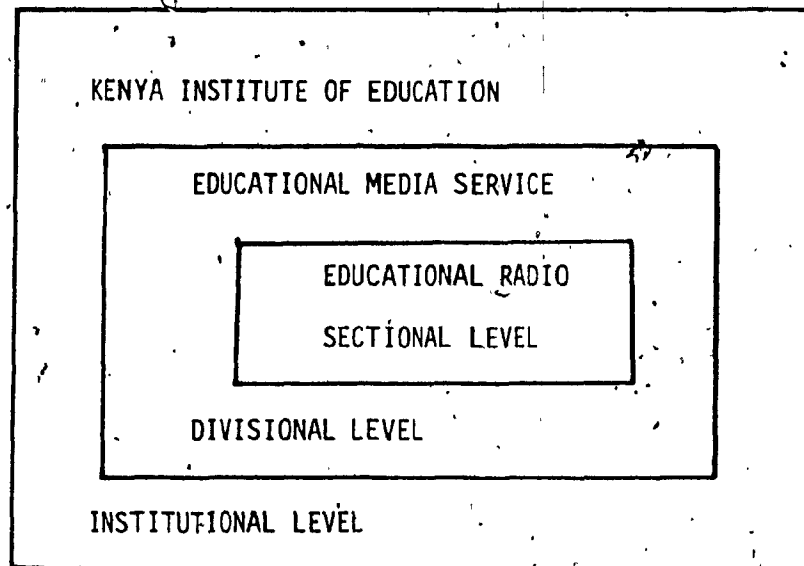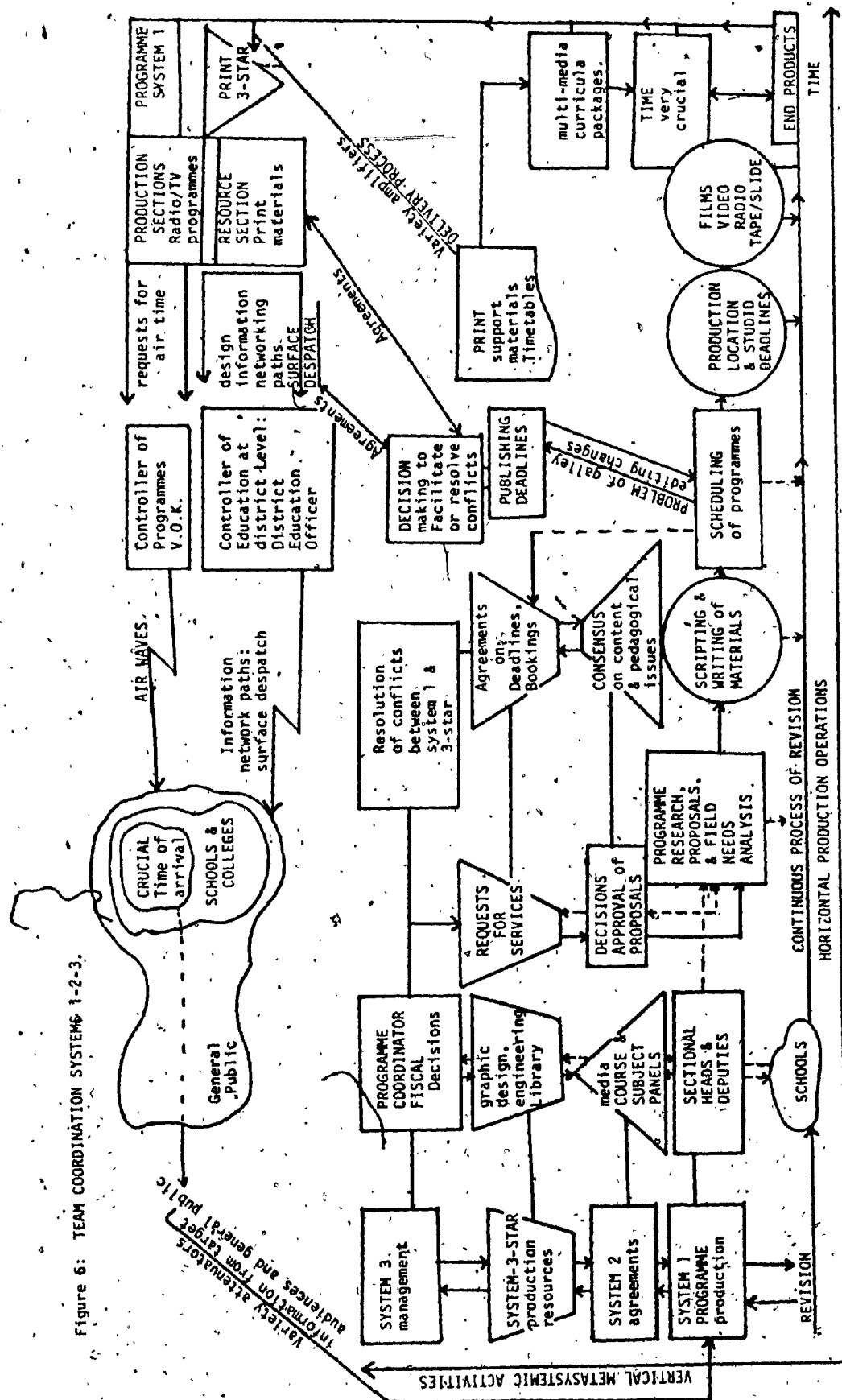
Figure 9: The Management System of EMS

SYSTEM 5: approves new directions

options

approved innovations for implementation

decisions

SYSTEM 4: Audience, production research and development

Future options

SYSTEM 3: discussion of options, implementation leadership

participatory discussions

implement command

delegate

delegate

SYSTEM-3-STAR: media services engineering graphics and design

resource-library subunit

SYSTEM 2: Internal Coordination

coordinate

implement

evaluation reports user views Educational Technology panel

coordinate disseminate

RADIO section

SYSTEM 1: HEADS of sections

CONTENT: operational activites; Teacher education, Pre-school ecucation Primary education Secondary education Adult and continuing Education

provide media internal service

Film and TV section

- - - → informal channels ——→ formal channels of communication

Figure 10: Institutions, Functions/Responsibilities and Relationships

LEVEL: ORGANISATION PROCESS   OUTPUTS: USERS/CONSUMERS

1. National: K.I.E. high-level

curriculum research and development

guidelines: for all teachers-learners.
syllabi: content, methods, media &
guidelines, setbooks.
learners' textbooks.

2. National: Schools' Inspectorate

supervision in-service training: workshops seminars

implementation guidelines plans and practices

application of: correct methods of instruction

3. Classroom:EMS Distance Education: improvement of teaching and learning

instructional materials:

recorded materials, print support materials

direct teaching

4. National:KNEC Designing, testing instruments:

Taking: National terminal Examinations

Revise, improve   revise and improve

Dynamic loops illustrating the continuous process of input-output

continuous process of syllabi curriculum, teaching measurement, research and development

KNEC-Kenya National Examination Council