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Toward a Systematic Approach to Educational Media Use in the Republic of Kenya: A Field Survey of Tools and Technologies for Learning

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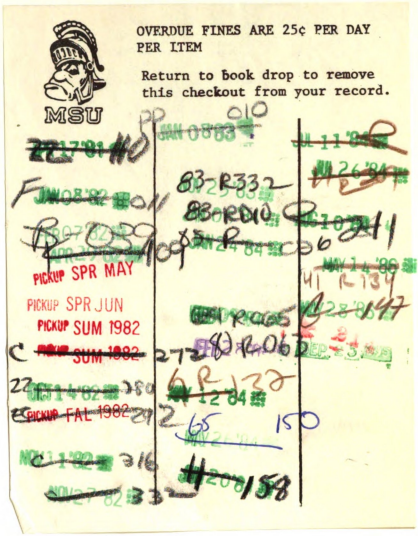
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TOWARD A SYSTEMATIC APPROACH TO EDUCATIONAL MEDIA USE IN THE SECONDARY SCHOOL EDUCATION OF THE REPUBLIC OF KENYA: A FIELD SURVEY OF TOOLS AND TECHNOLOGIES FOR LEARNING

By

Christopher Wekesa Mukwa

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ABSTRACT

TOWARD A SYSTEMATIC APPROACH TO EDUCATIONAL MEDIA USE IN THE SECONDARY SCHOOL EDUCATION OF THE REPUBLIC OF KENYA: A FIELD SURVEY OF TOOLS AND TECHNOLOGIES FOR LEARNING

By

Christopher Wekesa Mukwa

There are expectations that a systematic organization and utilization of educational media in Kenyan Secondary School education could improve learning and make it accessible to more people. This study investigated the availability of audiovisual media to schools; the role played by available media in upgrading classroom learning and classroom teachers' and school administrators' perceptions of the value of audiovisual media. The study findings were supplemented with media use information from developed and developing countries. Then a systematic approach to media use that could be applied in Kenyan schools and institutions not adequately staffed with qualified teachers was evolved.

The subjects studied were 250 classroom teachers and 25 head-teachers, selected from a stratified random sample of 25 girls', boys' mixed, private, government, boarding and day secondary schools representing all provinces of Kenya. Subjects selection was based on administrative offices held and courses taught. The sample was 5 percent of the total government schools and 2 percent of total government, private and community supported harambee schools combined. One common questionnaire was used to collect data on availability of media

materials to schools, role played by available media and teacher and school administrators perceptions of media value. There were seven research questions and four hypotheses. Descriptive statistics, t-test, Oneway ANOVA test and Kolmogorov-Smirnov test were used to describe and analyze the data.

The literature review was based on field evidence of media use to reform national curricula, experimental and descriptive studies of media to supplement classroom learning and media application to extend schooling through correspondence.

Study findings showed that the media available to schools were: printed media, posters and flat pictures, tape recordings and radio programs, TV programs and techniques such as drama and folk media; fieldtrips, educational games and simulations. Of media available to schools, 45 percent had motivational and learner participation learning techniques designed in the media. Apart from TV programs, multimedia, filmstrips and transparencies, most media available to schools were perceived effective in upgrading teaching and learning. School administrators are more motivated in perceiving the value of media than classroom teachers. Business course teachers were more motivated in perceiving the value of media. They were followed by science, social studies, mathematics and language teachers. There was no difference in perception of media value between rural and urban teachers. There was a difference in perception of media value between school administrators and classroom teachers and with teachers who teach these courses: business, science, social studies, mathematics and languages. The differences were indicated at alpha = .05 level with appropriate

degrees of freedom. Lack of local media, need of training in preparing media material, equipment operation and maintenance were constraints only in 29 percent of schools studied. Lack of motivation on students, teachers and school administrators was not a constraint. About 76 percent of teachers studied indicated a need for an Instructional Development In-Service Program. About 65 percent of the teachers showed a need that communication between media materials producers and teachers should be improved. To encourage productive media use, money, equipment and time should be made available to all teachers.

A provisional systematic approach to media use was proposed featuring around these organizational and administrative vantage levels: thoughtful needs assessment, explicit statements of objectives in operational terms; identification and examination of available alternatives, resource allocation and utilization, logistic considerations and feedback, research and evaluation. Experimental research needs to be conducted on the media perceived as valuable by teachers to determine the suitability of media that could be used to learn specific courses. Assessment of media available to teaching training institutions and how well in-training teachers are being prepared to use such media in the teaching learning process. A replication of this study to teachers not covered in this study.

DEDICATED

To all the people that I know and
those who know me: friends, relatives
and others whose positive contributions
have transformed my dreams into reality.

To my Mother and Father in their
prayers I am delighted and in their
encouragement I am motivated.

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me to continue schooling while away from her.

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CHAPTER I

THE PROBLEM

Background and Rationale

For nearly the past one and a half decades mankind in the third world developing countries has been experiencing changes that have brought about development and modernization. One social-economic sector of the society in these countries that has been affected by the changes is education. UNESCO observed such changes when it said, "Mankind is passing through a profound mutation, the speed at which certain knowledge becomes outdated and technical progress advances; and political emancipation. As a result, education must also undergo a radical mutation on a scale which can hardly yet be fully appreciated. Many more people have to be educated for a continually increasing span of their lives so that they may absorb an ever-expanding and changing body of knowledge."[1]

Many developing countries see education important as political, economic and other societal factors that constitute means of attaining personal, social economic, political and cultural advancement. Parents invest the money they have in the education of their children. The governments look at education as a powerful weapon against ignorance, poverty and diseases. Education is considered as a means of training and producing the needed human resources to man the economic, social and political sectors of a country at a cost supportable by the resources available to

the given country. Since education has such a vital role to play, governments in developing countries apportion big percentages of their recurrent budgets to education. Oluoch, G. P.; Muthoka, P. W.; and Mutua, R. W. (Mrs.) supported the argument in Kenya when they reported, "The Government attaches the greatest importance to education and hence the service receives the largest share of recurrent public sector expenditure. In 1971/72, this amounted to about £K.30 million or just below 30% of the Central Government Budget."[2]

In order for education to cope with the challenges of development and modernization it is essential that traditional methods of education be modified and improved and schools brought in close harmony with the life requirements of a modern society. Several developing countries share similar educational problems. Clifford H. Block takes a look at some of the common problems confronting developing countries.

The issue of enrollment constitutes one major educational problem and this is what Clifford H. Block had to say:

> The number of children who are in school continues to rise, as a result both population increases and the growing public demand for education....since schools cannot be built nor teachers trained fast enough to provide the quantity of education needed, existing classrooms have become more and more overcrowded--with corresponding detriment to the quality of education. Dropout rates have risen and the result is a growing number of people who cannot keep pace with today's complex world.[3]

Clifford H. Block continued and stated that the problem of enrollment is part of the problem affecting the costs of education when he observed:

> Countries now must spend more each year on education even to maintain the status quo. The costs of education are rising--yet education, as traditionally structured, cannot emulate industry and offset rising productivity; education is labor-intensive, with teachers' salaries accounting for the bulk of of the annual budget.[4]

The shortage of trained, capable teachers is another problem that faces developing countries that Clifford H. Block indicated when he stated that:

> As now organized schools cannot expand because the country lacks enough teachers to properly staff all the necessary grade levels and different courses. The country may not be turning out enough educated people and schools can't afford to hire even those available. Furthermore, recruitment of unqualified teachers in order to enroll more students only aggravates the basic problem.[5]

Allocation of manpower and money for education purposes is an issue Clifford H. Block observed as part of the problems facing developing countries when he said:

> Methods of financial control, information systems, efficient utilization--all remain at a traditional level. For example, equipment and buildings used in education cost the same irrespective of how often they are actually used.[6]

The curricula and teaching methods was an aspect Clifford H. Block saw as a problem shooting area when he commented:

> All too often education is judged....or judges itself--by standards that bear small relation to the actual products of the system, or to the requirements of today's world. Teaching methods and curricula tend to remain the same year in and year out. While society is undergoing fundamental economic and political changes.... Instructional methods that may have worked in elitist systems for the relatively few are no longer efficient or effective for mass education. As a result student dissatisfaction feeds the educational crisis, and the products of the system enter society, either untrained or with knowledge and skills that are not necessarily relevant to society's needs of their own.[7]

The Republic of Kenya is one of those developing countries which has at least been affected by some of the aforementioned educational problems. The development of the curriculum and making it relevant to Kenya's social and economic needs is an issue educational planners and decision makers have concerned themselves with when they reported:

> The Government will also continue its efforts to render the curriculum of secondary school more relevant to the country's social and economic needs. In practice, this means that there will be a rapid increase in the lower secondary schools offering practical studies in agriculture, commerce, industrial arts and home science. Courses of this kind will create a desire on the part of some pupils to undertake vocational training upon leaving secondary school.[8]

A second issue that has been of major concern is one to do with attempts to raise the level of instruction in classrooms served by poorly qualified teachers. This issue, was observed by top level educational officials when they reported:

> The school system is not producing a sufficient number of students with science qualifications to fill existing and proposed places in higher education system .... The cause of this failure is the poor quality of science teachers within the secondary school system, there are also many with inadequate training in both subject matter and teaching techniques.[9]

Related to improving instruction in the classroom is another concern that has to do with upgrading large numbers of poorly qualified teachers already on the job and similarly filling up gaps of the shortage of trained, capable teachers.

The three issues, filling critical curriculum gaps and making the curricula relevant to social and economic needs of the people of Kenya, raising the level of instruction in classrooms

served by poorly qualified teachers; upgrading large numbers of poorly qualified teachers already on the job and others not observed here can be solved in a number of ways. Teachers can be better trained, schools can be reorganized so that facilities, expertise, and teaching materials can be shared, but measures along these lines are slow, inefficient and costly as it was observed by Clifford H. Block when he said:

> There is growing recognition among responsible officials and observers in and out of developing countries, that measures like these are not likely to bring about basic improvement except at a dangerously slow rate. If resources, inadequate to start with, are stretched to patch up and expand the existing educational institutions along traditional lines, it is hard to see how current educational pressures can be resolved or brought under control for a long time....if ever.[10]

One radical approach that several developing countries have turned to while solving their educational problems is the application of the process of instructional development. "Instructional development is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication and employing a combination of human and nonhuman media to bring about more effective instruction."[11] Nonhuman media include radio, television, films, overhead projectors, programmed instruction, computers and instructional techniques such as: field trips, educational games and simulations, dramatizations and folk media.

Educational leaders and planners have considered the process of instructional development as an effective and efficient means

that can increase learning, bring learning opportunities to more students without a corresponding increase in cost. Wilbur Schramm indicated the effectiveness of instructional media when he said:

> The developing countries, in particular, have seen communications media as a way to raise the quality of instruction faster than it could be raised by increasing and upgrading the teachers, to supplement even good teaching with learning experiences impossible to create locally, and to extend the reach of education to areas where schools and teachers are not otherwise available. If new technology could raise the educational output without greatly increasing the budget for teaching and without requiring too many more schools to be built, equipped, and staffed, then it would indeed offer great dividends in productivity.[12]

Already several developing countries have made a move to use instructional media in their educational system. Thailand uses low-cost radio broadcasts to equalize some of the learning opportunities between metropolitan schools and village schools. American Samoa, El Salvador, Niger and The Ivory Coast have used television as a major element in their educational program. Until recently, India relied primarily on puppets, filmstrips and the radio as media to supplement classroom instruction. Now India has introduced a sophisticated communication satellite ATS-6, with which to beam educational and development television into its many villages. Tanzania, in accordance with their philosophical concepts of socialism, considered television too expensive as a medium of instruction and thus has continued to use the radio.

Since 1963, the radio, along with supporting printed and pictorial material, has been used to supplement classroom teaching at all levels of education in the Republic of Kenya. Roy Thompson, reporting on the past and future of school broadcasting in Kenya,

stated:

> When the unit started, it broadcast for one hour a day. There were eight programmes for primary schools and four programmes for secondary schools each week. Over the years, the broadcast time and the number and the range of programmes gradually increased. The 1976 Radio Timetable for Term 2 shows 66 programmes: 27 for primary classes ranging from standards II to VII; 19 for secondary schools ranging from Forms I to VI; 20 for primary teachers, with seven specifically for untrained teachers to support their in-service training course. Educational broadcasts are on the air from 9:30-12:00 and from 2:10-4:30 from Mondays to Fridays for eight weeks in each school term.[13]

Further, the radio has been also used in Kenya as far back as 1969 to extend the school through correspondence. Peter E. Kenyanjui[14] reported that The Institute of Adult Studies, University of Nairobi, with support of the Ministry of Education and U.S. Agency for International Development, were conducting two years of secondary school courses for in-service teachers, leading to Kenya Junior secondary exam and promotion. The radio, correspondence study guides and books, occasional face-to-face teaching and home study exercises are used in this program.

Although communication media, especially the radio, have been used to supplement classroom teaching and to extend the school through correspondence studies in Kenya, the issues of the making the curricula relevant to social and economic needs of the Kenyans; raising the level of instruction in classrooms served by poorly qualified teachers and upgrading large numbers of poorly qualified teachers already on the job are still disturbing educational planners, parents and educators. Some top level decision makers and subject specialists believe expanding the present communication

media facilities, services and activities could probably contribute in solving some of these problems. Already some of the expansion decisions are being implemented, as Roy Thompson observed these activities:

> An International Bank for Rural Development Loan for a third Educational Project has been granted to Kenya.... The Educational Media Service would be deeply involved in the qualitative improvement of Primary Education in the short term, but it will also have an important part to play in secondary school education.... The Educational Media Service will prepare mostly audio materials for secondary schools with some printed back-up materials.[15]

Self help schools called Harambee have been adversely affected by the problems already stated and Roy Thompson suggested that they should take advantage of the communication media when he said:

> One of the projects which the Educational Media Service will work on once it is fully established is the preparation of correspondence materials with media support to use in Harambee schools.... Secondary schools will need to be equipped with radios, tape recorders, slide and film projectors in order to make full use of the materials being produced, and frequent seminars and workshops will need to be mounted....[16]

Focusing to technical and vocational training, Thompson observed that:

> The media will be in a good position to support this orientation by providing audiovisual materials to technical schools, Institutes of Technology, Village Polytechnics and to secondary schools so that shortage of staff and equipment can be alleviated.[17]

Research and experimentation was another issue Thompson addressed when he stated:

> To enable effective educational media materials to be developed for a wide variety of educational uses, it will be vital to investigate the needs of target audiences, the capabilities of these audiences to make use of various types of media materials and the best means of bringing the materials to the audiences....[18]

Teacher Education and the curriculum, was another area that was referred to as Thompson said:

> The Media service will work very closely with the Kenya Institute of Education in producing audio and visual support programmes for curriculum development and innovation and for support to both pre-service and in-service teacher education.[19]

Although these expansions are being undertaken, the question arises, how effective are the communication media in the present system of secondary education and how can these expansions improve the effectiveness of the on-going secondary school program and activities?

A review of the literature on evaluation and research about educational broadcasting in Kenya shows that not very many studies have been conducted on the production, selection, transmission and utilization of communications media in the school system. Roy H. Thompson, confirms the allegation when he reported:

> The need for research and evaluation in the field of educational media is generally recognized, although some people would argue that the effort would be better spent on production, particularly in a developing country.... Until September, 1975, the only research projects which had been undertaken were an in-depth study of a single series of secondary school history programs and their attitude changing effects; a research experiment on the use and value of sound effects in radio lessons for primary schools and a brief research project on the school broadcasting service itself which was carried out by a Management Studies Team from the Kenya Institute of Administration.[20]

Even though some research has been carried out, the findings and recommendations of these studies do not provide sufficient information on the kind of solutions that could be implemented to enable the learners to acquire necessary skills and knowledge for higher education and employment. Further, the report does not include information that could be used to improve the present school system so as to do about the same job now being done but at substantially lower costs but also in the long run remain compatible with the educational goals of the nation. Roy Thompson backs up this statement regarding insufficient research findings information when he stressed:

> "More sophisticated research is required into the very reason for existence of the schools broadcasting service. What real impact do radio programmes have in the Kenya context, on the educative process? How effectively does radio impart knowledge, affect attitudes and foster innovative educational practice?[21]

John C. H. Ball, reporting on the future of school radio as concerns producing programs for school children observed:

> The school broadcaster should remember firstly, that the successes of his educational programmes depends on the preparation and organization carried out by the class teacher, and secondly, that teachers need to be convinced that the material he offers them is what they want and is presented in such a way that it can be effectively used by them and by their children.[22]

A case like this calls for efficiency communication between producers of audio-visual media and the classroom teachers who are to use them.

Paying specific reference to the utilization of instructional media, John C. Ball, reporting about the future of school radio, its use in the classroom and some aspects of teacher training said:

> The training of radio producers is only part of the battle of achieving meaningful school broadcasts.... Unfortunately, providing detailed notes, visuals, pamphlets and sending out advance information about programmes does not ensure that teachers use them. The trouble often lies within the training colleges.[23]

Commenting on teachers who are already in the service, Ball continued to say:

> Assuming that we achieve meaningful training both of school broadcasters and of teachers, then we are still faced with another problem--the problem of the trained teacher once he has started work at his school. Often isolated and faced with the inertia of older staff he struggles for a time against 'the system' and then gives up. Much expensive training is therefore wasted. More money must be found to provide special itinerant college staff, whose task will be to make regular visits to schools where newly trained teachers have been posted.[24]

According to the literature survey: "The Government will also continue its efforts to render the curriculum of secondary school more relevant to the country's social and economic needs."[25] The school system is not producing a sufficient number of students with science qualifications to fill existing and proposed places in higher education."[26] The school broadcaster should remember firstly, that the successes of his educational programmes depends on the preparation and organization carried out by the class teachers."[27] Assuming we achieve meaningful training both of school broadcasters and of teachers, then we're still faced with another problem--the problem of the trained teacher once he has started work at his school...."[28] The following are hypothesized to be the causes of the problem:

(a) Inefficient communication links between producers and users of instructional media.

(b) Inefficient skills and knowledge for organizing and utilizing instructional media on the part of poorly qualified teachers already on the job.

(c) Existence of deficiencies in the secondary school environment.

(d) Little motivation and incentives on more productive use of instructional media and lack of penalty on unproductive use.

The assumption that inefficient communication links may exist between producers and users of media is of prime concern as one of the causes of the problems. The producers need to have information about the needs and the characteristics of the learner, the needs of the teacher and the structure of the classroom environment in which the audiovisual materials they produce are going to be used. Teachers also need to know what instructional materials are being produced. Without better communication between teachers and producers, the problems affecting them will only aggrevate.

The assumption of inefficient skills and knowledge for organizing and utilizing instructional media as a cause to the problems affects teachers. Teachers are concerned with improving learning. To do this, the teacher has to apply recent findings in the behavioral sciences along side with communications media to make education more sensitive to the variety of ways in which students learn. Robert M. Gagne[29] has classified learning types which can benefit a teacher or a producer of instructional media material design and select his teaching techniques and media. Benjamin

Bloom,[30] classified the cognitive outcomes of education based on learning activities such as the knowledge of comprehension, application, analysis, synthesis and evaluation. The available literature on the status of media use in Kenya do not illustrate how the learning theories can be used by teachers in determining the appropriate domain of the objective, selecting appropriate instructional strategies and merging these strategies to bring about effective in-school and out-of-school instruction.

Related to little knowledge about learning theories is that teachers do have little training in the organization and utilization of media material and equipment. The producers too might have not have had specific training and a long experience in knowing the characteristics of a good program and how to incorporate these characteristics in producing audiovisual programs.

The other hypothetical causes of the problems are suspected to lie in the school environmental system which in turn is related to the structure of communication links between the subject matter experts, teachers and producers. Maybe when producers send the instructional material to schools and before reaching the classroom teacher they pass through many stages and hands. At one stage in the delivery system there might exist bottlenecks that hinder speedy delivery of media material and filter the evaluation and feedback from classroom teachers to producers. The structuring of the school timetable and the settings of classroom activities might have been planned in a way that they coincide with an effect of hindering teachers from using audiovisual media effectively.

The ultimate hypothetical causes of the problems were suspected to be little motivation and incentives on more productive use of instructional media and lack of penalty on unproductive use. This cause becomes critical, when the school environment and the educational system is flexible, when teachers have the necessary skills and knowledge and when media equipment and materials are all available--but teachers do not use them.

The evidence that can support the cause to be one of little motivation could be, teachers have either negative attitudes towards using communication media; or they are not aware about the effective value of using media in teaching; or they probably feel teaching with media is more time consuming than teaching using traditional methods of talk and chalkboard. Teachers are not motivated to use media maybe because there is very little reward in the form of promotion and salary increase to those using media than those using traditional teaching methods. There might be also a probability that teachers get very little feedback or none at all when teaching with media.

Against the above background, the major problem is hypothetically seen to be a lack of systematic and serious commitment, harmony and unity of purpose among all the participants who must cooperate in the organization and utilization of instructional media in the secondary school education.

Current literature on status of research in the use of instructional media in Kenya indicates that more research needs to be conducted to determine the needs of the teachers and the best ways

of supplying teachers with instructional media materials and equipment. But knowing the needs of the audience and the best ways of supplying media materials and equipment to them alone cannot guarantee effective and efficient teaching with media unless these other factors are also dealt with. First, the environment in the school in which the media is used should be restructured to accommodate the facilities and capabilities of media use. Secondly, the users of instructional media should be trained to acquire basic skills and knowledge on how to use instructional media. And finally, they should be motivated through feedback and reward, when they use instructional media more productively.

Up to now, concern has been focused on what the problem is, where and when it occurs and how it is caused hypothetically, but there is no way we can assert that this is the way the situation is in the secondary school education, in the absence of field evidence. This is why this research was designed and carried out in the field and provided the data that specifically identified the problem.

Purpose of the Study

There are expectations that increased use of instructional media in the secondary education of Kenya will contribute to improving classroom teaching and learning activities. Thus, the purpose of this study is to investigate the production, organization and utilization of instructional media in secondary school education. The study findings will be supplemented with information on how developed and other developing countries use instructional media to evolve a systematic approach of selecting

instructional strategies and media that can be used in schools and institutions not adequately staffed with qualified teachers.

Specifically, this study has a two-fold purpose. First, to identify instructional media material and equipment that are already being used in the secondary school educational system. And, secondly, to find out how headteachers, chairpersons and classroom teachers basing on the courses they teach perceive the role of instructional media and techniques in secondary school education.

Need and Importance of the Study

This study is important for at least the following three reasons. First, the existing studies on instructional media status in Kenya do not given evidence of the existence of a systematic approach of instructional media materials and techniques which is paralleled by the effects on a learner's cognitive, psychomotor and affective domains of learning. Such an approach is needed to guide the teachers in selecting media and matching it with specific instructional strategies, so as to bring out an effective and efficient teaching and learning environment.

A second reason for the study's importance is to find out the possibilities of expanding the use of instructional media at minimum costs to supplement classroom teaching, particularly in unaided community supported schools called Harambee. Harambee schools are usually faced with a problem of shortage of qualified teachers. Finally, Thompson shows a need for this research when

he said that "if research activities are pursued consistently by broadcasting organizations--should gradually build up a more general and comprehensive understanding of the complex, interacting factors which mediate communication between the producer and his school audience."[31]

Generalizability of the Study

First, since the teachers who will be studied work in secondary schools similar to other secondary schools in other parts of Kenya, it can be hypothesized that the findings of this study will hold true for a large proportion of secondary schools and may be implemented regardless of their location.

Secondly, secondary school education is a concern and a responsibility of the Ministry of Education, which is one of the other ministries that form the Kenya Government. Successful instructional strategies and media use techniques in secondary school education can be replicated and implemented in the teaching of students and in-service training of officers in other government ministries, companies and non-formal education. Further, some techniques can be adopted at other levels of the educational system of the country. For example, at the primary school level, primary teacher training college level, university level and in continuing education. Finally, it is thought educational planners and curriculum developers for secondary school education might find the findings generated by this study relevant to their short term and long term planning of educational goals.

Limitations of the Study

These are the reasons why this study is limited to secondary school education.

1. Secondary school education is a concern for the majority of the Kenyans. This is evidenced in the interests the Kenyans show in secondary education by setting up self help community sponsored schools called harambee. It is understood, harambee schools outnumber government aided schools.
2. Secondary school is a transition level between primary school education on one side and higher education or employment on the other side. Many secondary school graduates fill places in higher education, training institutions and employment. Because of this role played by secondary schools, the education the students receive is of prime importance to the social and economic development of the whole nation. Oluoch, G. P., Muthoka, P. W., and Mutua, R. W. (Mrs.) supported this assumption when they said, "For most of Kenya's secondary school youth the East African Certificate of Education marks the end of formal education."[32]
3. The study was self-sponsored and was severely limited by available funds, time and manpower--on the part of the investigator. Strong financial limitations meant limiting the study to one section of the educational system, i.e. secondary school education.

Definition of Terms

In order to establish some degree of commonality for different readers who might have other meanings for some terms, the following meanings are given as they are related to this study. Unless otherwise stated, these definitions are based on AECT.[33]

Individualized instruction techniques: are those techniques which involve interaction of any learning resources with learners and are completely self-paced.

Demonstration. An activity in which the teacher or another person uses examples, experiments, and/or other actual performance in order to illustrate a principle or show others how to do something.

Educational Technology is a complex, integrated process involving people, procedures, ideas, devices and organization, for analyzing problems, and devising, implementing, evaluating and managing solutions to those problems, involved in all aspects of human learning.

Instruction is the process whereby the environment of an individual is deliberately managed to enable him/her to learn to emit or engage in specified behaviors under specified conditions or as responses to specified situations, a specific subset of education.

Instructional Technology is a sub-set of educational technology, based on the concept that instruction is a sub-set of education. Instructional technology is a complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems and devising, implementing, evaluating and managing

solutions to those problems, in situations in which learning is purposive and controlled.

Technology. A complex, integrated process for analyzing problems, and of devising, implementing, managing and controlling and evaluating solutions to those problems.

Audiovisual Instruction. A sub-field of instructional technology concerned with the production and utilization of those materials (and related devices) which are used in formal instruction and which involve learning through sight and/or hearing.

Educational Media is the media born of the communications revolution which can be used for instructional purposes as alongside the teacher, textbook, and blackboard.

Multimedia is the integration of more than one medium in a complementary manner (e.g., slide/audiotape) in a presentation or module of instruction.

System(s) Approach is a process for effectively and efficiently achieving a required outcome based on documented needs; a form of logical problem-solving akin to the scientific method; a process by which needs are identified, or problems are selected, requirements for problem solution are selected from alternatives, methods, and means are obtained and implemented, results are evaluated, and required revisions to all or part of the system are made so that the needs are eliminated.

*Secondary Education is the part of schooling that follows after seven years of primary education and lasts for six years.

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*Definition used by writer for this study.

The first two years (in some cases) leads the student to take the Kenya Junior Secondary Examination (K.J.S.E.). After the first four years, the student takes the East African Certificate of Education Examination (E.A.C.E.). The last two years of secondary education offer specialization in either social or physical science and prepares the student to take the East African Advanced Certificate of Education Examination (E.A.A.C.E.).

Research Questions

The first purpose of this study is to identify instructional media material and equipments that are already being used in the secondary school educational system. This purpose will help to determine what media materials and techniques teachers use in schools. Some media materials are supplied to schools by the Educational Media Service and others are designed and produced by the teachers at the school level. Finding out what is already being used in schools will identify which of the available instructional media have succeeded or failed in the secondary school education. Information about what media has been effectively successful can be used to expand the use of instructional media in secondary school education. The second purpose of the study is to find out how headteachers, chairpersons and classroom teachers basing on the courses they teacher perceive the role of instructional media and techniques in the secondary school education. The importance of this purpose is to discriminate the types of instructional media materials and techniques teachers perceive as valuable and effective for various acts of teaching and learning in secondary

school education and also as valuable teaching aids teach. Based on these results, instructional media material and techniques that were perceived valuable will be recommended for adoption in the self help community based schools called harambee.

A systematic approach of instruction media material and techniques which is paralleled by the effects on a learner's cognitive, psychomotor and affective domains of learning will be used to make recommendations affecting instructional media use in classroom instruction.

Organizational factors such as communication between producers and teachers, including methods of evaluation and feedback will be explored. From the purposes of this study, several research questions were generated and will be answered in this study:

Research Question 1:

Will the proposed study provide data:

(a) to determine what instructional media materials and techniques are available in secondary schools?

(b) to determine the role available instructional media play in secondary schools?

(c) to determine how the teachers perceive the role of instructional media and techniques in teaching and learning activities?

Research Question 2:

Will the proposed study provide data to help determine which of these courses: languages, mathematics, social studies and science studies are the teachers motivated to perceive instructional media materials and techniques as valuable for teaching and learning activities?

Research Question 3:

Will the proposed study provide data to identify the chief constraints that are encountered by teachers when using audio-visual media and techniques in teaching and learning activities?

Research Question 4:

Will the proposed study provide data to be used to help determine a program of instructional development that can be used by in-service teachers?

Research Question 5:

Will the proposed study provide data to help determine the status of communication links between producers and teachers?

Research Question 6:

Will the proposed study provide data to help determine the possibilities of teachers and students designing and producing their own instructional media materials that students can use to improve learning in schools having less qualified teachers or no teachers?

Research Question 7:

Will the proposed study generate other areas in which further research should be conducted?

Overview

The format for the study is presented in Chapter 1. The format covers the background and rationale for the problem, purposes, need and importance of the study, generalizability of the study, limitations of the study, definitions of terms and research questions.

In Chapter II the literature pertinent to the study is reviewed.

In Chapter III the design of the study is presented, included are research questions, hypotheses, procedures, description of population and sample, development of questionnaire and methods of data analysis stated.

Analysis of the data is examined in Chapter IV.

Ultimately, in Chapter V, a summary of the study a systematic approach to instructional media material and techniques use is outlined, conclusions and recommendations are presented.

FOOTNOTES

Chapter I

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[5]Ibid., page 2.

[6]Ibid., pp. 2-3.

[7]Ibid., page 3.

[8]Kenya Government Printer. 1970. Kenya Economic Plan, 1970-1974. (Central Bureau of Statistics, Ministry of Planning, Nairobi-Kenya), page 460.

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CHAPTER II

A DESCRIPTION OF THE APPLICATIONS OF INSTRUCTIONAL MEDIA IN DEVELOPING AND DEVELOPED COUNTRIES

This description is organized into three sections that are based on common uses of instructional media. The first section focuses on how instructional media have been used to make changes and modification in a national educational program with an aim of making the education suit the needs and objectives of a particular country. The second section deals with case studies on how instructional media have been used to supplement classroom teaching. And the third section deals with studies on how instructional media have been used to extend the walls of the school through distant teaching called correspondence.

National Educational Reforms

Since 1960 there have been five projects whose goals were to try to accomplish a swift reform of a national system of education. These projects were in the countries of Niger and Ivory Coast in West Africa; El Salvador, American Samoa and Republic of Korea. The projects of El Salvador and Ivory Coast will be examined in detail here because they were studied in detail in the literature and the results of these studies' experience provide a valuable source of information relevant to other developing countries. The remaining projects, for instance the one in the Republic of Korea, have not been studied in such detail or are not completed at this time.

Ivory Coast

Ivory Coast is located along the Gulf of Guinea in West Africa. It is bordered on the north by Mali and Upper Volta, on the east by Ghana and on the west by Liberia and Guinea. It has an area of 127,520 square miles. While French is the official and commerical language, Dioula, an African lingua franca closely related to Bambara, is widely spoken.

Ivory Coast, once a French colony, modeled its educational system after the French. It has six grades of primary education, after which a student passes a national examination before going to secondary school. Secondary school education is divided into a four year first cycle and a three year second cycle. Post secondary education includes: university programs, technical studies, agricultural studies and teacher training.

Purposes of the Project. The decision to reform the educational system was seen in the context of economic considerations. An apparently increasing reliance on French expatriate staff and advisors in many economic sectors was seen as a problem. A traditionally modeled system of primary education that could not meed the needs of the country was a problem, differential rural to urban migration of school youngsters and limited opportunities for further education after the primary level were other major problems that disturbed educational planners and decision makers.

In Ivory Coast, various experimental and often uncoordinated projects had been mounted during the 1960's in an attempt to improve the quality of classroom instruction. These included programmed instruction applications, correspondence courses for

teachers, audiovisual "modules" (tapes, slides, and illustrated brochures), and occasional cinema, radio, and TV programs for teacher upgrading.[1] During the planning stage of the project, initial studies were conducted and the role of television was conceived as part of a total educational reform that included the following: adaptation of the curriculum (up to that time very largely inspired by the French primary-school syllabus), in-service teacher training, establishment of new teacher-training institutions, conception and preparation of printed support materials, and development of out-of-school post-primary education schemas for primary-school graduates who would not be continuing into secondary education and rural adults.[2]

Early preparation for TV programming comprised of a daily training of teachers who will be working in the new schools using instructional television. The curriculum was planned in conjunction with improvement of teaching qualification and principles of teaching various types of courses. For example, the teaching of French was to be restructured radically in the teaching of what is now known about the principles of second-language teaching to young children.

Plans for the project were organized as follows: (a) preparatory phase that involved the development of teacher training facilities, setting up the production facilities of TV and printed material; (b) starting up of broadcasting at grade-one level in autumn 1971 with first grade pupils, then addition of one grade per year so that all six grades would be covered by 1977; (c) achievement of total enrollment of the entire 6-to-12-year age group in ETV schools by 1986. To complement the reform at the primary school level, there were further plans of introducing television and other

audiovisual methods into secondary schools in time to receive the ETV primary school graduates when they get to secondary school. Another plan was to do with setting up TV reception facilities for the provision of out-of-school, vocationally based, part-time education for primary school leavers unable to continue with formal secondary education.[3]

Organization of the Project. France gave $5 million for the project over the first five years and included technical experts, equipment and operating expenses. UNDP, UNESCO, IBRD and Canada were other contributors making a total of $18 million.

The project organization was part of the Ministry of Education under the responsibility of a Secretary of State for primary education and educational television reporting directly to the Minister of Education. The TV production network was set up in Bouake. The project had two TV studios, one radio; and national TV network to provide time. The production of TV programs were 7 to 8.5 hours a week; and these programs were for the teaching of French, mathematics and general education. The production of accompanying printed support material was entrusted in the hands of French-speaking Canadians and their Ivorian counterparts.

Although this roject initially involved television, other systems of delivery were used to communicate the subject matter to audiences. Up to 1976, there were about 20 daily broadcasts for the primary school sector. There were also weekly radio broadcasts that provided in-service training to teachers in non-ETV schools who were to be eventually incorporated in the ETV system.

Printed teacher guides and pupil texts for the primary-school TV programs were delivered to primary school inspectorates at the beginning of each term from which teachers had to collect them individually. A biweekly 24-page supplement for ETV teachers in the weekly government-controlled paper "Fraternite-Hebdo" carried articles of general interest concerning the development of the project, answers to readers' letters, additional explanatory material on curriculum subjects, and on the psychology of teaching. Printed animation guides and wall charts for the teachers involved in assisting out-of-school programs.

Television installation and maintenance was an issue that was fully explored in the original documents.[4] It was recommended that the receivers should be transistorized, low-voltage sets with adequate protection against damp and insects, that the circuitry should be contained in a small number of removable subunits or modules to facilitate speedy repairs and that the teachers should have access only to the brightness and volume controls. Each first-grade class in 1971/72 (first year of broadcasting), was equipped with two receivers so that a spare would be available in case of breakdown. The following year, the same receiver would be used by second-grade classes, and then a new receiver would be added for each grade year by year. These recommendations were followed when the project started. There was a private company, Compagnie Africaine de Télévision (CATEL), that was responsible for activities such as, measurement of transmitter field strength, installation of receivers, aerials and batteries, maintenance and renewal of equipment and research and development of equipment improvement. The company runs a fleet of maintenance vans

and supervisory vehicles that visits each school monthly.

Use of the Media in the Teaching Situation. The general scheme for classroom activities in the early grade lessons included:[5] pre-broadcast preparation (five minutes), a period in which the children settled down and the teacher prepared the lesson; viewing of broadcast, during which the teacher watched pupil reactions; postbroadcast evaluation (ten minutes), a period in which the teacher questions the pupils on reactions to the broadcast; and, follow-up, a time when the pupils, in groups or individually, carry out exercises based on the guidelines in the teacher's manual or those included in the pupil workbooks. The subjects taught through television broadcasting were: French language, reading, writing, mathematics, hygiene, morals, civics, serial basic education, environmental studies, physical education and recreation.

Formal in-service training "Ecole Normale Permanente" were provided every Wednesday afternoon. On other occasions, teachers could meet together at the inspectorate where they receive face-to-face teaching given by an expert from the TV project on modern methods of teaching and learning.

The Results of the Project. Evaluation of this Educational Television has not been conducted according to Antony Kaye. "It is even more impossible to judge to what extent the output of the reformed system will correspond to the basic social, political and economic objectives for development..."[6] One of the objectives of the project was to reduce repeater and dropout rates under the reformed system to as low as around 5 percent per year; this had

had implications to lowering unit cost for each graduating pupil. However, one waits for the evaluation data to justify the claim. The projects' goal of universal primary education is moving forward very strongly. According to Schramm,[7] during the first year, 20,000 pupils were taught with the aid of television in the first grade; in the second year, 20,000 in grade two and 40,000 in grade one. During the third year of the project, 100,000 pupils were enrolled in the new system classes. As already indicated, no reports on learning gains and attitudes have come forth through the available literature.

El Salvador

El Salvador is located in Central America. It is bordered on the north, northeast and east by Honduras, on the south and southwest by the Pacific Ocean and on the west and northwest by Guatemala. It has an area of 8,260 square miles. Spanish is the official and predominant language; while Nahuatul is spoken by a large number of Indians.

Purposes of the ITV Project. El Salvador, faced difficult problems in the expansion and improvement of its educational system. Many children dropout of school after a short time, and secondary school enrollment was greatly constricted. For these reasons and because more than seventy-five percent of the nation's secondary school teachers had not received adequate training, El Salvador's leaders selected their junior high school level schools as the initial focus for a systematic reform of their whole educational system.

After survey studies were carried out by the Japanese National Broadcasting Company, UNESCO, The World Bank and the United States Agency for International Development, El Salvador decided to initiate a comprehensive educational reform centered around the use of Educational Television in the third cycle of basic education.

Educational reform was conducted system-wide and encompasses these chief facets:

(1) Reorganization of the Ministry of Education

(2) Extensive teacher retraining

(3) Curriculum revision

(4) Development of new study materials

(5) Modernization of the system of teacher supervision

(6) Continuing feedback and evaluation of reform programs

(7) Extensive building of new schools

(8) Eliminating tuition in grades 7, 8, and 9 in 1971

(9) Using double sessions and reduced hours to teach more pupils

(10) A new student evaluation system incorporated changes in promotion and grading policies.

Organization of the Project. Based on Dr. Clifford H. Block's report,[8] El Salvador's project is outstanding because it is all-embracing. Television has not merely been inserted into an outmoded curriculum taught by tradition-bound teachers. Rather, the reformers have tried to design a system which more closely meets the individual needs of each student and the general welfare of El Salvador.

Under the direction of a Division of Educational Television within the Ministry of Education, ducational television program production

began in September 1968. Each program was planned and carried out by a production team consisting of five people. Part of the team's work was to produce the teacher's guide to the television lessons. Teachers, who might have seen the new system as a threat to their status, were encouraged to prepare their own classroom plans and to see themselves in a more human, innovating role than the traditional classroom allowed. In a typical class, each television lesson is preceded by at least ten minutes of introduction by the classroom teacher. After the televised lesson, the teacher and students participate in questions, demonstrations, and discussions.

In 1968, the Commission of Plans and Programs made a national educational survey and set forth guidelines for a new national curriculum which for the first time included consideration of objectives, activities, teaching methodology, guidance and evaluation. The commission's guidelines became the basis for the actual rewriting of all curricula by subject and grade level.

Before the reform, teacher training institutions failed to produce qualified secondary school teachers, whereas official, semi-official, and private normal schools trained primary teachers far in excess of the national demand.[9] Teachers were trained by attending a nine-month course which focused on the teacher's field of specialization (e.g. maths, social science, etc.), as well as lessons in teaching methodology (including television utilization), guidance, and evaluation. The importance of retaining teachers to the overall educational reform was essential. The retraining courses seem to give Salvadoran teachers a new professional self-respect and better understanding among the teachers and educational administrators.

Other important components of the reform included developing workbooks and other teaching materials; training Salvadoran specialists to carry on with every phase of the new education program when the specialists provided by developed countries are withdrawn and establishing a testing program within the educational system will measure achievement year by year and which will also provide continued feedback on the effectiveness of the new program.

Costs of Educational Television. According to Dean T. Jamison, Steven J. Klees and Stuart J. Wells,[10] the cost of the educational reform through 1973 totalled $30 million. Of this amount, approximately $7.3 million will pay for educational television. Over fifty percent of these educational television costs have been paid for directly by the government of El Salvador. Thirty percent will be covered by the Salvadoran government in the form of loans. The remaining twenty percent of the educational television costs have been paid in the form of foreign grants and donations, mainly the United States. Annual cost of educational television per student viewer fell from $1164 in 1969 to an estimated $13.20 in 1972. This works out to be 8.2¢ per student per hour of educational television viewed. The cost per hour of third cycle education without television was 11¢. When ITV was introduced, there occurred two changes that affected cost per student. The average classroom sizes were increased since smaller third cycle schools were closed and more students matriculated at the schools remaining open. The teachers' teaching load was increased from twenty-five to thirty-five hours a week. Such changes, according to ministry officials,[11] would have not occurred unless ITV had been introduced.

Results of the Project. The major purpose of El Salvador's educational reform was to improve student learning whose graduates will be able to function in the industrial and technical business sectors that would be developing El Salvador. Students' improvement in learning was measured by general ability and reading tests. Such tests made it possible to evaluate the success of the television in teaching specific content.

The evaluation team administered general ability and reading tests, as well as mathematics, science and social studies achievement tests to three cohorts of Third cycle students. Cohort A, which began with seventh grade in 1969, included students studying with television and other elements of the reform and students learning in the traditional way. Cohorts B and C, which started with seventh grade in 1970 and 1971, respectively, included only students from reform classes; these groups were divided into ITV and non-ITV subsamples. Specifically, the learning results, as reported by the research-evaluation team,[12] indicated that: in all three cohorts (A, B and C), the ITV students gained from 15 to 25 percent more on the general ability tests than did their non-ITV peers. Students in ITV classrooms in each cohort also gained more than non-ITV students on the achievemnt tests administered in seventh grade. The ITV advantage in mathematics was particularly evident and maintained through ninth grade. Overall, ITV students in all three cohorts completed ninth grade with an achievement advantage over non-ITV students.

Reform classrooms with ITV, retrained teachers, a revised curriculum and new printed materials proved to be a better learning

environment than either traditional classrooms or classrooms with all elements of the reform except for television. The teaching materials were designed to accompany the telelessons, because teachers were retrained with the specific understanding that future instruction would involve television. Although ITV classrooms were favored, the overall level of learning in specific courses were not satisfactory; this was particularly true in learning science, social studies and sometimes mathematics. Recognizing this problem, El Salvador invested considerable resources in remaking programs and improving the teaching capabilities of its production staff. Such difficulties are stressed here, both to endorse the ongoing effort in El Salvador to improve program quality and also to forewarn future investors in ITV systems.

The learning advantage of urban over rural children was smaller in the ITV subsamples, as judged by basic skills test performance. Rural classrooms had poorer facilities than those in urban areas and their teachers were less well-trained and less experienced. Television was apportioned equally to rural and urban classrooms with results that rural ITV classrooms achieved about the same as urban ITV classrooms. This offers hope that where unequal performance among classrooms is the result of unequal provision of resources, ITV can help to equalize student performance.

Concerning the effect of ITV on students' and teachers' attitudes, there were variations. Both TV and non-TV students were positive toward social science and science classes, negative toward mathematics and Spanish language. English language was well liked by TV students, little liked by students who did not have TV classes.

The most important attitudinal finding, however, was that the high initial enthusiasm for ITV declined steadily as students moved through the three years of school. Reasons explaining for this are the reality of ITV could not match anticipation and secondly, the continuing dissatisfaction on the part of teachers with employment conditions, which caused many of them to relate the cost of ITV to their own small salaries; which led to a strike in one year. Over several years, attitudes towards ITV in primary school remained quite favorable, whereas in the high school, the decline was steady by grade and evident over time. The explanations given were, as students move into upper school years, they become increasingly impatient with one way educational communication, particularly when it is less than truly expert. Another interpretation is that teachers in higher grades become increasingly impatient with the invasion of their classroom by an outside teacher and with having to make their schedule and their judgment of the needs and readiness of their own pupils fit the inflexible schedule of a television broadcast.

Hornick et al.,[13] carrying out two studies of student aspirations, stated that El Salvador's chief reasons for experimenting with television in the seventh through ninth grades was the necessity of producing more middle-level technicians for the economy. The results of the study revealed that the students were not aiming at the middle-level jobs where there was pressing need, but rather towards professions. A study of what actually happened to the first third-cycle students to go through the new system found that 86 percent of the graduates had been able to go on with their

education, hoping finally to go to a university and 4 percent were studying and working part time.

The Ivory Coast ITV project and that of El Salvador discussed above can be used to form conclusions about the effective use of instructional television that could be focussed on Kenya.

Basing on Schramm;[14] Hornik, R.; Mayo, J. and McAnany, E.[15] some observations and implications are stated in this section to follow.

(i) None of the two projects could have gone forward successfully without support--financial, logistic, and technical.

(ii) None of these television projects could have come into existence and none of them could have continued for very long, without strong national leadership, there was accomplished in El Salvador by a strong Minister of Education and in Ivory Coast by the support of President Houphoet-Boigny.

(iii) Each of these two projects encountered strong resistance at some time in its development. In El Salvador, the chief opposition came from the Teachers Union, which was dissatisfied with salaries, and struck at television because they felt the money it cost should have gone into higher pay for classroom teachers. In Ivory Coast, not all members of the Ministry were convinced that television should be brought into change the established patterns. A minister had to be replaced, because of his opposition with a new Secretary of State for Television and Primary Education.

(iv) It is at least a reasonable hypothesis that after a certain time the newness of television wears off after which its use must be somewhat changed. For example, in El Salvador, television is being turned toward other targets--such as primary schools, the adult audience, the primary teachers who need in-service instruction.

(v) It is clear that none of these projects is really a "television" project, except in the sense that television is a principal component. Television is hardly a self-sufficient instructional tool. It needs teachers' guides, study material for students, visuals for classroom, and all the other tools of instruction that a live classroom needs. El Salvador's experience, for instance; retraining of teachers, was at least as important an influence on educational opportunities as was television and similarly provision of new and excellent teachers' guides and classroom study materials was not far behind in importance. Further, television must be built into a system, and its ability to help bring other elements of the system into existence may be more important than its direct effect on students.

(vi) In order to avoid serious administrative difficulties, television systems should be introduced one grade at a time into the educational system.

(vii) If a national educational reform project is expected to continue to reach national dimensions and to be absorbed into national budgets and plans, it needs to be integrated

from the beginning, not only into the local culture, but also into the local power structure. This was apparently done in the two projects examined above.

Educational Media to Supplment Classroom Teaching

Mexico's Radioprimaria. The country of Mexico has an area of 761,600 square miles. Spanish is the offical and predominant language. The country is located in North America; it is bordered on the north by the United States, on the east by the Gulf of Mexico and on the west by the Pacific Ocean.

The project, Radioprimaria, was begun in 1969 to extend access to the upper levels of elementary schooling to rural areas of Mexico that are presently unreached. At the beginning of the 1970-71 school year, the system was tried out on a small scale in the state of San Luis Potosi and remains in use there.

Spain,[16] in his analysis of Radioprimaria, reported that the system was mainly intended to allow a school with four teachers to handle the first three grades in the traditional manner; the fourth teacher has the fourth, fifth and sixth grades in one classroom and instructs them with the assistance of radio lessons. Some instructional radio programs are grade specific while others are directed to all three grades in common. A team of eight radio teachers prepares the instructional radio lessons at studios located in Mexico City, which are then broadcasted by the University of San Luis Potosi radio station within a 30-mile radius. The station broadcasts every school day from 9:00 a.m. until 12:45 p.m. Each lesson lasts 14 minutes and about five programs are broadcast each

school day. The subjects of the broadcast are taken from the textbooks. Every fortnight, classroom teachers receive a mimeographed document that contains the radio lessons schedule and suggested activities to complement the broadcasts.

Utilization. In 1972 there were 43 schools serving about 2,800 fourth-, fifth- and sixth-grade students. During the school year, about 1,200 14-minute programs are broadcast. About 80% of the programs are directed at the combined fourth-, fifth- and sixth-grade audiences, with the remaining 20% distributed among the three grades.

Effectiveness. Spain,[17] administered pretests and posttests over a semester period to a random sample of radio and nonradio students in the sixth grade. He concluded from the test results that Radioprimaria has produced test scores that are comparable to those of the children in direct-teaching schools. However, Jamison and McAnany,[18] expressed doubts about the reliability of the results generated by Spain. For example, although the rural radio classes had higher gain scores than the nonradio classes, only some of the radio classes are the type of class for which the Radioprimaria system was originally intended for. Inspite of the modesty of Spain's claims for the cognitive effectiveness of the radio system, and of the difficulty of drawing firm conclusions from the data he had available, his data suggest that students in the radio schools performed better than those in nonradio schools both in Spanish and Mathematics, and the difference in Spanish was statistically significant.

Spain's evaluation of other aspects of the Radioprimaria system is more enlightening than the analysis of cognitive outcomes described above. Through visiting radio and non-radio schools, it was uncovered that 15% to 20% of the classes miss the first half hour of broadcast due to teacher and/or student late arrival. Furthermore, of the 44 radio schools visited, one was inexplicably closed, 18 others made no use of radio that particular day--either because the receiver needed repair, or the power had failed, or the teacher had decided the lessons were useless. No federal funds are allocated for receiver purchase and, consequently receivers must be bought and maintained by the teacher or the community; in one case no receiver had been purchased because the teacher and the community were unable to agree on who would pay for it.

Spain attributes many of the above problems to a lack of resources allocated for school supervision. Perhaps for the same reason, schools have been dropping out of the Radioprimaria system; in the first year of operation there were 49 radio schools, in 1971-72 there were 44, and in the following year there were only 37.[2] Finally, Spain (1977) examines potential benefits of the Radioprimaria system's expansion in primary-school education in rural areas. Contrary to the avowed government intention to have the system aid in rural development, Spain found that parents and students see primary-school graduation as a means to leave the rural areas and compete in the urban labor market. Spain's assessment of the employment market in the chief urban area of the state, San Luis Potosi, indicated the existence of widespread unemployment and an excess supply of primary-school graduates.

Radioprimaria is an innovative attempt to overcome the lack of sufficient educational opportunities in rural areas of Mexico and most other developing nations. Because of its present experimental status, its cost appears somewhat higher and also low student-utilization format contributes to high costs which could be substantially reduced in number of students expanded. The unique configuration of the system, which combines several grades with one teacher, results in considerable cost savings over the traditional direct-teaching system. In terms of classroom learning achievement, the analysis is inconclusive, since the available test results were not made on a clear comparison between classrooms with radio and those using direct teaching with one teacher assigned to each grade. Thus there would be risks in adopting Radioprimaria approach in another country or expanding it in Mexico, before more rigorous effectiveness comparisons have been undertaken. However, the cost advantage of Radioprimaria, and its capacity to extend schooling to places where it would otherwise be unavailable, is an experience worth taking and introducing in other developing countries.

Educational Radio in Thailand. Thailand has an area of 200,000 square miles and is a parliamentary monarchy located in Southeast Asia, bordered on the northeast by Laos, the north and west by Burma, the south by Cambodia, Malaysia and the Gulf of Siam. The school system consists of pre-school, seven years of elementary school, then two streams of secondary education, i.e. vocational and general education.

Radio broadcasting was started in Thailand on 1 January 1954. The subjects taught through broadcasting were: English, music and social studies. The broadcasts had 286 schools to start with because there were very few trained, competent school broadcasters. Classroom teachers were selected to become studio teachers who were thought to be competent in the subject matter and in teaching. Based on Schramm,[19] the intial 286 radio schools have expanded to 2,000 in 1963, 5,000 in 1965, and between 800,000 and 1 million today. All programs originate in the Ministry studios in Bangkok. They are broadcast by a 10KW short-wave transmitter. Because of interference from the large number of stations in Thailand, tapes are also sent to and rebroadcast from nine other medium-wave stations in various parts of the country.

The annual program includes two social studies programs of fifteen minutes each per week for each of four grade levels, one music program of twenty minutes per fortnight, for each of the five levels and one English program of twenty minutes per week for each of the eight levels. Generally, the music programs go to all the seven grades of primary school; social studies, to the first five primary grades; and English to the upper three primary grades, 5, 6, 7, and the five forms of secondary school.

In 1958 and 1959, representatives of the Ministry of Education conducted a large field study to evaluate the learning from instructional radio, Xoomsai and Ratanamangala.[20] These two, selected schools at random from among those receiving the radio programs, and controls chosen from those nearest and most similar to the experimental schools. In grades two and three, 622 students were tested

on music and social studies; 572 from grades six and seven, on their ability to understand and write English, since the chief purpose of social studies in the primary grades in Thailand is to help pupils develop attitudes and values desirable in the Thai culture; the twenty-six of the twenty-eight items of the grade three test, and eighteen of twenty-eight in grade two, the radio students scored higher (i.e., more in favor of the desired attitudes) than the controls. Sixteen of the differences in grade three, and twelve in grade two were significant at the .05 level.

Music students were tested on their ability to identify songs and musical instruments and rated by classrooms on their singing and dancing. In the written tests of identification, experimental groups were reported to be superior to controls at the .001 level or beyond. Classroom ratings on singing and dancing were also signficantly higher in the experimental schools, and observers noted that variability in performance was reduced in the experimental over the control groups, hypothesizing that the radio instruction had brought the performance of the less skillful pupils nearer the level of the others.

No signficant differences were found between experimental and control groups on ability to understand English. On tests of writing English, the radio group was superior in grade seven, the control group in grade six.

On the basis of the above, the experimenters concluded that radio teaching appeared to be effective in social studies and music in lower primary, and that the results with radio English in the upper primary showed marked improvement over the group that did not use radio lessons.

In 1972, an opinion survey was administered to over 1,800 classroom teachers of which 64 percent were using music broadcasts in their schools; 53 percent, social studies and 25 percent, English. Other opinion questions asked and their responses in percentages included: why teachers use the school broadcasts and 71 percent responded, as supplementary teaching material. On the question "Do you agree that school braodcast programs can help the teachers?" 54 percent strongly agreed and 39 percent agreed. Another question asked was: Do you agree that teachers have a good opportunity to learn teaching techniques from school radio programs? Fifty-one percent strongly agreed and 42 percent agreed.

The Thai experience of using radio indicates that school broadcasting can be used very inexpensively to teach several different kinds of subject matter in primary and secondary schools. Further, it can be used to share expert teaching, to enliven the classroom, to provide a model of excellence for classroom teachers, and to provide learning experiences pupils otherwise would not have.

Schramm, Momluang Pin Malakul, Ambhorn Moedook[21] noted these problems as having occurred in Thailand and therefore are of experience to other developing countries. The issue of finance and budgeting was crucial to the introduction of school radio in Thailand. Low budgets made it harder to produce programs of professional quality, for example. Radio, it was experienced is relatively more expensive at the beginning but cheaper afterwards. Countries introducing radio are advised to consider closely the investments that will be required if their service is to reach the standards

they desire. Training scheme should be one aspect to be considered when planning for use of radio as an educational medium. To avoid radio programs' schedules coinciding with school timetables, joint planning with schools, and broadcasters is highly recommended. Arrangements should be made for the maintenance and repair of radio sets. The Ministry of Education officials, the producers of radio programs should work in cooperation with the classroom teachers.

Educational Media Programs of the Republic of Kenya

The Republic of Kenya, on the East Coast of Africa, extends roughly 4^{o} on each side of the Equator and stretches between longitudes 34^{o}E and 42^{o}E. The country borders Somalia in the northeast, Ethiopia in the north, the Sudan and Uganda in the northwest and west, respectively, Tanzania in the south and the Indian Ocean in the southeast. It covers an area of 583,000 square kilometers (225,000 square miles) and has a population of approximately 14 million which is growing at the rate of 3.3% per annum.

Formal education in Kenya is a three levels; primary, secondary and university or higher education. Primary education takes pupils through seven years of education leading to the award of the Certificate of Primary Education examination which is used to select students for secondary school education. Secondary education is divided into two phases of four and two years duration. After the four years, the students take a public examiantion called East African Certificate of Education. After the first two years of secondary education, there is an optional examination, Kenya Junior Secondary Examination (K.J.S.E.) which is taken by students in self-help

(harambee) and private secondary schools in an attempt to enter government-aided secondary schools. For some of Kenya's secondary school youth, the East African Certificate of Education marks the end of formal education. The last two years of secondary school offer specialization in either the social or physical sciences which give students formal preparation for university entry. East African Advanced Certificate of Education is awarded at the end of two years and those students who qualify for university entrance prerequisites proceed to the university while the others enter training and employment.

The use of the educational media programs described here are based on two reports given by Roy H. J. Thompson.[22]

What Types of Media Programs are Being Used? Educational media programs are used in the primary, secondary and teacher training colleges. The media programs consist of open radio broadcasts. For example, the 1976 Radio Timetable for term A showed 66 programs: 27 for primary classes ranging from standards II to VII; 19 for secondary schools ranging from forms I to VI; 20 for primary teachers, with seven specifically for untrained teachers to upgrade their in-service training skills. School radio broadcasts are on the air from 9:30-12:00 and from 2:10-4:30 from Monday to Friday for eight weeks in each school term. School radio broadcasts are accompanied with printed material including teacher notes, student notes, each of several pages, and posters of various illustrations. Besides open radio broadcasts, television programs are used particularly in teacher training colleges. The TV programs are available on video

cassettes. Audio recordings, slides, filmstrips, sound motion pictures are widely used at all levels of formal schooling and teacher training institutions.

At the primary school level, media programs are used in courses such as Kiswahili, Kenya's national language; English language, history, art, home science, geography, science (including natural history, health science), music and mother tongue. When it gets at the secondary school level, media programs are used in courses including: Kiswahili language, literature in Kiswahili, English language and literature, history, geography, religious education, science (including health and biology), mathematics, agriculture and French. Additionally, secondary schools use media programs to cover topics not limited by the syllabus such as secondary careers, guest forum and other related areas. Secondary careers media programs disseminate information about different types of career and prerequisites needed to secondary school leavers. Guest forum media programs are used in form 5 and 6 of secondary schools. They are designed to assist students in their general paper, one of the areas examined in the East African Advanced Certificate of Education Examination. The duration of each programme is between 20 and 30 minutes. The 1977-78 Educational Media Service annual catalogue lists 146 guest forum programmes. Related media programmes comprise those by UNESCO and the World Bank. These programmes focus on current activities that are happening in different parts of the world. Teachers constitute another group of educational media audience. In-training primary school teachers use media programs to learn courses in education, mathematics, English, Kiswahili, religious studies,

physical education, agriculture, geography, history, home science and science. In-service primary school teachers and secondary school teachers similarly use media programs to improve their instructional skills and techniques.

How Are Media Programs Organized? Educational media programs come under Educational Media Service, a section that is attached to the Kenya Institute of Education, the latter being a center of professional activity for teachers, government officers, and other educational activities such as conducting curriculum research and development. The Educational Media Service has Radio Broadcasts Programmes section, Visual Programmes unit, Media Research and Evaluation section and other units. The Radio Broadcasts Programmes unit has six radio producers and is headed by the schools' Radio Officer. The unit is responsible for producing educational radio programmes. The Visual Programs unit has five producers and is headed by the schools' Television Officer. This unit is responsible for producing educational television and film programmes. The Research and Evaluation unit has two research assistants. Its major activities are investigating problems which affect the organization and utilization of instructional media and also evaluating the utilization of media programs when used in the teaching and learning situation.

The Ministry of Education is in charge of staffing and equipping the Educational Media Service. The Inspectorate at the national level, provincial level, secondary and primary school levels assist in the promotion of the instructional media materials provided for schools; specific duties conducted include programme script writing,

organization, utilization and the evaluation of programmes.

The Kenya Institute of Education is involved in the planning and development of new curriculum material and the use of media material in course structures and upgrading curricula instructional innovations.

The Kenya Schools Equipment Scheme is responsible for marketing and prompt provision of media materials and equipment to schools.

The Voice of Kenya provides studio and transmission facilities, reception improvement services and technical advice on media equipment for schools.

District education officers (and their Divisional education officers) provide prompt supply of teachers' notes, programme timetables and other free materials to schools.

Teachers' colleges provide instruction to in-training teachers on the organization, utilization and evaluation of instructional media programs in teaching and learning situations.

The Educational Media Service publishes an annual catalogue which is provided freely to all schools, teacher training colleges and other institutions using media programs. The 1977-78 catalogue had sixty-five pages and the first page had this message:

> "A note to all users of our productions, we have prepared for you this catalogue of radio/tape programmes, films, TV programmes, slide sets and printed material contained in this catalogue is a very large selection of audio-visual aids, made especially for Kenyan schools, Teachers' colleges and, in some cases, the general public. We hope they will find their way where they will be of most use--into your classroom."

The catalogue is divided into three sections. The first section contains information on the types of available media programmes and

their audience, how useful the programmes could be, radio frequencies, tape copying services which are free, printed support material and the prices of various programmes. The second section of the catalogue lists individual programmes available to each level of the audience in the specific course of study. The third section of the catalogue includes forms for tape copying services, forms for purchase of media material and forms for evaluating each individual media programme. The form on the evaluation requests the programme user to make comments about the content, voice quality, style and how useful the program has been to her or him. When the evaluation form is completed it is mailed to the Head of the Educational Media Service.

How Effective Are the Media Programs? The Educational Media Service was established in 1976 which is too recent and it has not been in progress over a long span of time to yield results on the effectiveness of its media progrmas. Much of the initial efforts, and resources have been concentrated in the design and production of media programs. Even if this is the case, studies have been conducted on the effectiveness of media programmes in teaching and learning activities. A considerable amount of information is available on attitudes in the secondary school education system towards the effects of media programmes. A study of the attitude-changing effects of the secondary school history series suggested that educational radio could induce specific attitude changes in secondary school students. Another study was conducted in the use and value of sound effects in radio lessons for primary schools. The results

showed that sound effects could be confusing and therefore undermine the understanding of programme material unless they were sounds commonly heard in the child's own environment and should be identified in writing within the programme text. This research assisted in controlled use of sound effects in programmes and closely related script-writing.

In 1973, a management studies team from the Kenya Institute of Administration, who as part of their training activities conducted a brief research project on the Schools Broadcasting Service. This study focused on the structure and organization of the service. The findings of this study have been used as supportive evidence to modify and improve the Schools Broadcasting Service.

Reports on evaluation conducted by district and provincial inspectors of schools, using printed questionnaires sent to schools and collected at the end of each term, are used to modify and improve existing media programs.

The present research reports do show some evidence on the effectiveness of media programs but there is hope that as the Media Service expands and develops, more information on the effectiveness and efficiency of the programs will come forth. Proposals for research are already underway. The evaluation of the effectiveness of schools broadcasting, identifying and suggesting action on such things as reception, distribution of media materials, timetabling, use of taping services, language, pace, content and formate of programmes, teachers' need for assistance in subject areas, type and amount of support material required, new educational areas in which media material would be useful--are areas for future research.

What Do the Educational Media Programs Cost? At the time of writing this literature review, the report on the costs of educational media programs in Kenya was being assembled. It is believed that when this report will be ready it will offer vital information on the production, organization and utilization of media programs in terms of cost-effectiveness and cost-benefits of teaching and learning from instructional media. Further, the country of Kenya is among developing countries where educational expenditures, other public services and essential economic development compete for scarce resources including money, manpower and others.

What the Future has for Educational Media Programs. The Educational Media Service has plans for each of the formal and informal education levels in Kenya.

For the primary schools, the Service will have to develop more visual and textual materials to support the radio programmes. Investigation of efficient means of providing audio-visual support and possibilities of developing direct tape teaching material are also included. Establishment and organization of seminars and workshops for primary school inspectors, media advisory center tutors and tutors from teacher training institutions is another section that is being considered. Plans for coordinating Educational Media Service with the Correspondence Course Unit of the Institute of Adult Studies are being considered. Such plans will concentrate on developing media materials for teacher education, such as radio programmes, video cassettes and films. The media material produced will be supplied to the new learning resource centers to be set up at primary teacher training colleges and teacher advising centers.

In secondary school education, future plans cover preparation of correspondence course materials supported by media to be used in self-help schools called harambee. Supplying to schools media equipment such as radios, tape recorders, slides and film projectors and mounting frequent seminars and workshops are other future proposals.

With technical educational and vocational training, future media programs available include, provision of audiovisual materials to technical schools, institutes of technology, Village Polytechnics and small businesses and career opportunities.

People living in the rural areas need to improve their knowledge and skills in farming methods, health and sanitary care as well as maintaining their physical and social environmental living standards. Government ministries have employed personnel to carry out activities aiming at rural development. With the assistance of media programs, rural people can gain easy access to useful information. Hence, the Educational Media Service will provide equipment and media personnel who will work as consultants with experts from government ministries.

In conducting research, experimentation and evaluation, the Educational Media Service will work jointly with the Bureau of Educational Research of the university. Areas in which research is to be conducted include: investigation of the needs of target audiences, the capabilities of these audiences in using various types of media material and the best means of bringing the material to the audiences.

Training of media program producers, technical personnel such as film cameramen, film editors, studio technicians, operators and

engineering staff, is done locally in the country at the Kenya Institute of Mass Communication.

Although the Educational Media Service has been in operation for a short time, its organization and activities indicate an initial solid foundation which will enable the service to operate at its greatest effect when it reaches significant magnitude in the future.

School Television in India

The Republic of India has an area of 1,269,339 square miles. Hindi is the official language and English is an associate language. India is located in southern Asia; it is bordered on the north by Afghanistan, China, Nepal, and Bhutan, on the east by Bangladesh, Burma, and on the south by the Indian Ocean.

The first television station in India was in Delhi and much of the transmission time initially was for schools. In 1968, Paul Neurath[23] was called in to study the effectiveness of school broadcasts in physics and chemistry. The main hypotheses had to do with the kinds of knowledge that would be better learned with television than without it. He devised a test and divided the test questions into three types: factual things learned by heart from books or lectures; visual--where the student draws primarily on experiments, diagrams, pictures; and understanding--where the student has to draw on his ability to generalize, to make deductions, to recognize a problem or a connection even when it comes in an unfamiliar form.

Neurath, hypothesized that television students would do better with visual questions, and about the same as the controls on factual questions, he left open the questions of which group would do better

with the "understanding" questions.

His findings indicated, the television students did somewhat better overall and on all types of questions. Specifically, television students did best comparatively on visual questions, and the difference was least on factual questions, thus being in general agreement with the hypotheses. Television students did distinctly better on the understanding questions. Dr. Neurath administered one of the test over again, after a month's interval. Again, the television students did better on all three kinds of questions, but the difference between television and non-television students was less on the delayed test.

Dr. Neurath, on the basis of his findings, gave a good report card to instructional television as a teacher of physics and chemistry and this is what he said:

> "Whether he cheers or jeers at the television teacher, whether he finds him a better, an equal, or a worse teacher than himself, a friend, an aider....--the classroom teacher is forced so and so many times a week to become aware of another teacher's performance in front of his own students and thus to become aware of his performance as well."

His conclusions about the impact on the student and the school system also merit examination:

> "Television lessons provide a break in the routine, thus making school itself more interesting.
>
> The impact of the television lessons themselves is less than the impact of television as an innovation within the whole teaching process.
>
> [Quotations from Neurath, 1968: 71-81.]

On the basis of Dr. Neurath's findings, it can be concluded that television can improve the retention of subject matter during the teaching and learning activities.

Development of a Multi-Media Teaching Approach--Sweden

Making the right decision of which one is ready to take the consequences is usually not an easy action. This section focuses on the role which research in radio, television and other accompanying program material in education plays in the decision-making process in broadcasting. The decision-making process is described through a case study, dealing with the development of an extensive multi-media project for the upper level of the compulsory school, the project being called Trialogue.

Objectives of the Project. Claes Ruden,[24] summarized the Trialogue, research and development project as follows.

The aims of the Trialogue were, the programme series was planned for the seventh grade of the compulsory school (junior high school level). It was designed for the major part of the lessons in religion, civics, history, geography, physics, chemistry, biology and Swedish. It was based on the multi-media principle, i.e. radio and television combined with printed material and slides.

The Trialogue Survey. During the school year 1973-74, a comprehensive survey was conducted of the function of the Trialogue material in the work of the schools. The survey was conducted in six schools, spread all over the country, which use Trialogue in their work. The main purpose of the survey was to examine whether pre-planned teaching/learning aids of a multi-media type could facilitate an instruction along the lines of the double aims of the school--the imparting of knowledge and personality development. Twelve classes, comprising some 300 pupils, were involved in the

survey. The teachers of the classes concerned, approximately 45, assessed the study material in various ways.

The Findings of the Trialogue Survey. Teachers think that multi-media teaching/learning aids are better than ordinary aids regarding: stimulating and engaging students (according to 94 percent of the teachers); concretizing difficult subject matter and giving it life; activating students over the weak performance and giving students knowledge and skills. The greatest advantages of Trialogue, according to the teachers, were that the teaching/learning aid provides variation so that classroom work becomes stimulating and motivates students to work well; contains both printed material, sound and moving pictures and that the link between the media is good.

The implications of the Trialogue project to developing countries was summarized by the author in the conclusions as follows; first, the results of the Trialogue survey show that using multi-media principles, for teaching and learning makes it possible to attain the double goals of the curriculum i.e. both cognitive subject-matter objectives and overall objectives. Secondly, combining different media makes it possible to offer a variety of forms of presentations and suggestions for further work. Ultimately, with radio and television programs, it is possible not only to motivate the students and make the contents of instruction more concrete to them but also increasing the possibilities for both teachers and students of varying their ways of working and of developing new teaching methods in education.

Programmed Instruction in Central Africa

Hawkridge[25] reports a case that programmed instruction has not only worked successfully in the laboratory schools of the developed countries but also on the plains and forests of Central Africa. Monograph eighty by Hawkridge, has evidence on the teaching effectiveness of programmed instruction in Central Africa. An experiment was designed to compare two groups of agricultural extension recruits who had only primary schooling. They were to learn the necessary arithmetic to measure and peg soil contours. One group was taught by means of program instruction, and the other group by traditional classroom methods.

At the end of the course, both groups were tested on an achievement test and the results showed that the students who were taught by means of programmed instruction achieved higher than those who were taught by traditional methods of instruction. In most circumstances, the programmed instruction approach was tested and retested on several audiences until results indicated that there has been some marked improvement in using the program for instruction. The Central African experience of using program instruction leaves little doubt that program instruction can be applied for teaching and learning purposes in several other developing countries.

Use of Educational Games in Lesotho

Background Information. Lesotho is an enclave within the east-central part of the Republic of South Africa. It is bordered on the east by the Province of Natal, on the west and north by Orange Free State Province and on the south by Cape Province. Lesotho has an area of 11,720 square miles. Sesotho, the language of the Sotho

people, and English are the official languages.

Purpose. A pilot experiment, meant to provide indications of whether educational games could be used to help young people in Lesotho improve their literacy and numeracy. There was a need to know whether teachers liked the games, how often they played them and for how long, what games they considered most suitable for various standards, how they used them in a classroom situation and what criticisms and recommendations teachers had.

A Description of the Games Used. LEETO LA LITLHAKU (letter voyage) is a game designed to promote literacy and to a small extent, numeracy. It is a word building game using most of the alphabet and some simple phonetic words. The game comprises a board, a die, and two packs of cards. One pack of cards (yellow) is of vowels; the other pack (orange) is of consonants. The rules are printed on the board for easy reference. REKA (shopping) is a second game that is basically a numeracy game. This game consists of two packs of cards. One deck of cards (the green ones) is the 'money' (chelete). The other deck (blue) is the 'goods' (litho). The third game is MANTSOE (words) which is a simplified version of Scrabble. It is designed to promote literacy amongst people who already have some skills but wish to improve them. The game comprises a board and a bag of alphabet letters. The board was printed with black ink on orange or yellow card. The rules are printed on the side of the board for easy reference. MATAESE (syllable dice) is a literacy game which in difficulty falls between Leeto la litlhaku and Mantsoe. It consists of eight wooden blocks 2.5 cm^3 each. On the 48 faces are printed the most common

syllable frequencies which occur in Sesotho. Permanent felt pens of various bright colors were used.

These particular games were considered suitable because there were already facilities for producing printed material; auxiliaries to the games, such as counters and plastic bags were easily available in Lesotho and the fact that games need to be fairly durable in order to last for a long time. Having these considerations in mind, the four games were designed, pre-tested and analyzed by the time the main survey on literacy and numeracy was completed.

Sample Selection and Experimental Procedure. Ten primary schools were randomly selected from the schools list of the Ministry of Education. Each school was given one copy of the three games for every class from Standards 1 to 4. All the schools were visited in early November 1976. The games were explained to the teachers who were asked to play the games in any way, and at any times they felt was suitable. The teachers were friendly and helpful, and most of them were concerned by the lack of teaching equipment and facilities. The interviewer returned to the schools four weeks later with a fairly detailed questionnaire about how the games were played, teachers' opinions of them, modifications required, and how the children liked the games.

Results. Of the twenty five teachers in the ten schools who were given the games in early November, only 21 teachers were available to talk about the games four weeks later. Teachers, when asked how they taught their classes to play the games, the answer was, no teacher gave a whole class demonstration. All teachers chose a first group of children who then went on to teach other children. The games that

were literacy based were played in connection with subjects such as Sesotho, spelling and reading. Most teachers taught an area of a subject first, and then gave out the games. As to how many times and duration the games were played each week, more than half of the teachers played two or three times per week. And the time taken to play varied with the extent of the teacher's timetable. Leeto was proven to be a popular game.

Difficulties encountered related to the difficulties of comprehending the instructions by certain teachers and certain games being too advanced for beginners in some schools. Teachers' comments varied from game to game. Some teachers rated a particular game to be good for brighter children and also the capability of letting the children use their own vocabulary in playing the games.

Conclusions. The teachers used the games with groups of children and in connection with a special subject area. The fact that teachers had no trouble organizing their classes to use the games and some could produce their own games and children learned from games indicates that educational games, when properly designed and used appropriately, improves the quality of learning.

Testing the Amount of Learning Through Educational Games. As to how much the learners learned through the games: 90 six- to fifteen-year old children, who had dropped out of school at different grades of schooling, were post-tested in literacy and numeracy skills. There were no controls over the games. For example, children were not asked to play a set number of times a week, nor were children asked to play only with other children. Boys and girls did equally well in each of

the games tested. Age was only a factor in so far as it was affected by schooling; for example, a 10-year old in standard 1 did not score as well as a 10-year old in standard 3 or 4.

Results of the Experiment on the Amount of Learning. The results showed that for children who have never been to school, paying the game has very little learning effect. Standard 2 to standards 5 and 6, have marked improvements in learning through the games. Standard 7 students learn less through the games, caused probably because the games were designed for the first six grades of the school system. It is also expected that by standard 7 children will have acquired their basic literacy and numeracy skills which were tested, so these would not show a big improvement. The results showed that for every game and every standard there was some improvement in the children's scores.

The experiment tested how the children learned to play the games and the findings indicated that children from grade one to grade six understand the methodology of playing the games. Absence of a control group to parallel the experimental group in order to determine the difference between learning through educational games and learning without educational games was another shortcoming.[26]

Implications to the Republic of Kenya. The Lesotho case study has demonstrated with evidence from the field that educational games can be used to improve learning. The games can be cheaply and locally produced by teachers and easily used in venues of learning without requiring formal organization. The teachers in Kenya could design their own local games, based on the subject matter to be taught and the particular grade level of the school. The games should have many

versions of play with specific recommendations being given for learners of different abilities. Considering the cost and time invested in making one game and the materials, educational games are cost-benefit and cost-effective.

The Hagerstown Instructional Television System

The instructional television system in Washington Couny, Maryland was started in September 1956, to serve schools in the immediate area of Hagerstown, Maryland and Washington County. Wade[27] noted, Washington County wanted to improve classroom instruction notably by sharing its best teachers and by offering specialized teachers; to expand in-service teacher training; and to meet some of the growing problems of school overcrowding (for example, by teaching classes in large groups where appropriate and by sharing teacher over large numbers of pupils). Ford Foundation and Industry Associated provided funds to buy the equipment. During the first year of broadcast, about 6,000 students were served; as the schools grew, the number of students served reached 20,853 in 1965 and 22,000 in 1972-73.

The system broadcasts about seventy hours a week, fifteen of them elective. The largest number of television courses are in seventh, eighth, and ninth grades. Wade, (in UNESCO, 1967:64) reports that classroom teachers are assigned to television teaching on the basis of "rapport with teachers in the classroom...attendance record... dramatic flair...ability to handle criticisms, and...special preparation in the field." The television assignment is for one or two years; then the teacher returns to classroom teaching. Most television programs are live programs.

In 1965, the Ford Foundation (International Research Associates) conducted a survey on teachers' attitudes, whose findings indicated that the degree of favorableness towards television declined noticeably from elementary through high school. That is to say, the higher the grade, the less favorable the teacher towards television classes.

Washington County Board of Education[28] reports achievement results for students learning from instructional television as, during the first year of utilization (1956-57), fifth grade students gained an average of 1.9 grade equivalents on a national test. Achievement gains for students in mathematics for urban and rural students in grades 3, 4, 5 and 6 exceeded the national norm of 1.0 grade equivalents. Also, within Hagerstown, students in a given grade had higher average test scores than their predecessors at that grade level with less exposure to television. For example, students in rural schools in grade 5 scored, 5.34 in May 1958 with no television; 5.71 in May 1959 with one year of television; and 6.11 in May 1961 with three years of television.

Washington County Instructional Television Evaluation Committee[29] conducted an attitudes survey of parents, teachers and students towards the television system. Although the sampling methods used were not clear, the results they published in the local papers were negative. For example, 2,439 students felt that they learned more from the television teachers; 2,111 of 3,360 felt that television did not motivate them to learn; and 2,201 of 3,244 students felt that they would rather learn without television. A total of 180 responses was obtained from the general public. Nearly 60% of this sample felt that television even if a benefit to students learning could be demonstrated

of if costs would remain the same. Approximately 50% of elementary and secondary teachers responding to the survey felt that instructional television did not improve quality of instruction.

Jamison, Klees and Wells[30] concluded that because of the relatively low number of students involved in the system and the rather high costs of programming, the costs of the Hagerstown television project have remained high. The length of the experience of the Hagerstown project shows the declining relative price of equipment as a result of maintaining the equipment which has extended equipment life, an important advantage of technology in the past.

Although the project is expensive, the recommendations of the 1973 Evaluation Committee suggest that the system should continue but should be modified to increase effectiveness and reduce negative reactions. The Committee recommendations include:

1. The use of "direct" televised instruction for art, music and language for elementary levels and as a supplement for other elementary subjects.

2. The use of instructional television as a supplement only for secondary courses.

3. The introduction of new 'direct' instructional television use only when:
   a) there is evidence of a positive effect upon learning;
   b) an investigation has been made to determine if other material may be leased or purchased; and
   c) a continuing evaluation for modification or cancellation of the course has been established.

4. The use of videotapes to allow time for editing and improvements prior to presentation.

5. An investigation of the cost and feasibility of other instructional media to provide classroom teachers with a wide variety of resources.

6. The establishment of a system to rotate television teachers back to the classroom.

7. The replacement of classroom receivers on a regular basis with consideration given to the use of color receivers; and

8. The development by the studio teacher of a test of the performance of students, to be used as a measure of his or her effectiveness.

The foregoing description of existing systems and experiments shows that the media of instruction, used as supplement to classroom teaching is effective. The media work as well as other classroom teaching. Used in the right place, in the right way, for an appropriate purpose, instructional media will improve classroom teaching and learning experiences. Further, instructional media can introduce demonstrations otherwise impossible in the classroom, take the students to a part of the world he or she could not otherwise experience, bring into the classroom a distinguished visitor or an authority with special expertise. Besides this, they can offer a change of pace from the routine of everyday teaching.

Used appropriately, any medium of instruction can be effective. Television works well in the Indian schools of New Delhi or a county in Maryland, United States of America. Radio works in the uplands of Thailand or on the plains of rural Mexico. The use the radio, television, slides, tapes and printed material works well in Swedish schools of the Scandinavian countries. Games and simulations have proved successful in the rural schools of Lesotho in southern Africa. Programmed learning has proved effective not only in the laboratory schools of the United States, but also in the plains and in the equatorial forests of Central Africa. Different media will do different things; other things being equal, the ideal medium for supplementary use is one over which the classroom teacher has a maximum

amount of control. This is to say, supplementary instruction should be introduced into a given classroom when the class is ready for it. The teacher should be able to repeat it, or stop it in the middle, or delay it for a question, or combine it with such other classroom experiences as the situation seems to require.

Educational Media Used to Extend the School

Chicago--Television College at Home. The Chicago Junior College enrolls over 25,000 students on three campuses. However, it was felt that there might be a considerable number in the metropolitan community who needed and desired the first two years of college education (junior college) but could not attend regular classes, and consequently, would welcome college courses on television. In 1956, Chicago began to broadcast junior college courses to find out: (a) some of the problems and possibilities of offering higher education on television, (b) the demand for such service, (c) whether courses on television might alleviate the needs for additional classroom space in the campuses.

During the first years of the experiment, both experience and extensive research demonstrated that a junior college curriculum can be presented effectively on open-circuit television, and that in a metropolitan area like Chicago a large audience of mature, able, and motivated students is eager to enroll for credit in college-level courses.

The campuses of the Chicago city junior college are administered by an executive director who is responsible to the general superintendent of Chicago Public Schools. Television college is an

integral part of this junior college system, telecasting courses that are also available in the classroom. Students register for television courses on the various campuses and are considered as students of that particular branch rather than of Television College itself.

Teachers and Teacher Recruitment. Teachers for television courses are usually chosen from the regular full-time staff of the Chicago City Junior College. McCombs[31] reports that teacher response to invitations to take part in Television College has always been soon. In 1963, for example, eighty-seven applications were received from the junior college system and Chicago's Teachers' College for three openings as television teachers. One encouraging finding in Chicago is that a metropolitan junior college system can put a higher education curriculum on television and operate it successfully, using its own teaching material.

Curriculum and Course Preparation. Five groups of courses are offered each term and they consist of general education, social science, biological science, physical science, humanities and English composition. Courses are selected each term to meet the needs of three distinct Television College audiences: (a) credit students working towards the associate in arts degree; (b) the large audience of Television College students seeking to meet specific requirements in teaching preparatory courses; and (c) a general audience looking for cultural or vocational enrichment outside formal college or in-service training programmes.

Teachers are given enough time, suitable facilities and resources to prepare their own television courses.

Television College leases broadcasting facilities from Chicago's community operated educational television station. The technical production staff of Television College itself consists of three persons: an executive producer, a producer and graphic arts specialist. This staff is responsible for the design of sets, teaching aids and graphics, for an average of eight courses each year.

Television College Student Body. Television College reaches a student body for whom classroom instruction on the campuses is largely inaccessible. Nearly three-fourth's of the home television students are women, of which one-half are housewives. Among those employed outside home are clerical workers. A survey by Evans,[32] shows that credit students tend to be younger. Two-thirds of them are in their twenties and thirties. Nearly 75 percent of the credit students had some college education, less than half the non-credit students have any college background. Since initial enrollment of 4,392 in 1956, credit enrollment has climbed to over 10,000 a year, at the same time, the non-credit enrollment has declined somewhat. In 1956, television college telecasts, 61 percent of the students who enrolled completed their courses. In recent years, nearly 75 percent of the students receive final grades. A study made of the relationship between time of enrollment and retention revealed that the retion rate among the first fifty people to register for a course was higher than the retention rate for the last fifty to register. The cause being that late registration is limited to one session one week after the close of regular registration.

Effectiveness of the Home Television College. Based on the findings of International Research Associates[33] after three years of television lessons a research was conducted. On-campus students who registered for television were divided at random into television and conventional sections, and given an achievement examination. Six courses were chosen for various comparisons between home television, classroom television, regular day, and regular evening students. In the comparisons students were measured on the ability to write well, to take shorthand dictation, to speak well, etc. In mathematics courses, the students' ability to solve problems was measured. In social science courses students' progress in critical thinking was tested. Home television students achieved higher in five courses, of the five comparisons of television classrooms with regular day classrooms, there were two significant differences which indicated greater achievement by students in regular day classrooms. In the only comparsion of television classroom with an evening class, there was no significant difference. The two comparisons of evening classrooms with day classrooms indicated one significant difference in favor of evening classes.

On the basis of the foregoing findings, it was concluded that television has proved to be as good as classroom instruction for the more mature, highly motivated students attracted to home television courses. Television has not been so successful in the classroom. In most cases, students taught by television in the classroom did as well as students taught by a regular teacher, but when there were significant differences these favored conventional classroom instruction.

Attitudes toward television college were as follows. Chicago school board has positive attitudes toward television college, this is expressed through its continuing financial support--about a half a million dollars each year. The majority of television teachers are very favorable toward educational television. These experienced classroom teachers regard television lessons as superior because of the more time given in preparing them. The positive attributes of Television College most frequently cited by all Chicago's television students were the better preparation of the teacher, course opportunities not otherwise available, lack of interruptions during the lessons, and repeat broadcasts of lessons.

Costs. Basing on the minimum student enrollment, the maintenance, operation and depreciation of these college-owned and student owned sets is about $7,000 a year. Using maximum student enrollment, the costs are about $10,000 a year. Adding these costs raises the cost per student-hour of instruction which would be $3.55 minimum and that of maximum student-hour $1.50 per year. Television college did not involve any investment, since it uses existing educational and broadcasting facilities and existing student television sets. However, estimated costs in the absence of these facilities were made. Building and furniture would cost $40,000; receiving sets (maximum) would cost $28,000, and Television College's share of the investment in the Chicago educational television station would cost $650,000. Thus total investment necessary would be about $718,000. Unit investment would be $4.50 per minimum student-hour and $2.00 per maximum student-hour per year.

Implications for the Developing Nations. Chicago Television College serves and operates in an environment where television technology is highly developed. Chicago's television experiment was carried out in a thickly populated community where many thousands of people were interested in home study. There large numbers, when enrolled in any given course, made the project economically feasible. The television teaching was enhanced when supplemented by other devices of teaching, such as--conferences with the teacher, laboratory, practice meetings, written work and of course text materials. Further, the Television College was established upon fifty-year experience with junior college teaching, an experienced faculty, and physical plant for other activities related to Television College, including the campus time of the television students. Ultimately, it should be noted that Chicago's television were highly motivated. Any developing country proposing to start a program similar to Chicago's Television College should take into consideration the above experiences and what they imply.

Canada--Educational Television to Diffuse a Teacher Training System

Canada is located in North America, occupying all of the continent north of the United States, except for Alaska and the French islands of St. Pierre and Miquelon in the Gulf of St. Lawrence. English and French are the official languages.

Pérusse[34] presents an experiment carried out on a group of teachers using mediated cueing. The teachers, who were scattered over wide areas, were to be reached for in-service training activities. The problem is made worse by lack of available experienced

supervisory personnel and the time they can devote to come to training centers. One way of solving the problem could be by diffusing, with television, supervisors and innovative systems and suggested learning situations, to the teachers. The solution to solve this problem has to be based on feedback possibilities and must guarantee learning and positive changes.

To solve the problem, an experiment was designed whose main hypothesis was that the rate and level of learning a complex teaching skill varies as a function of the mode of discriminatory cueing. This was tested with a teacher-model tape presented differently to four experimental groups. It was predicted that the optimal treatment would consist of a mediated supervisor (televised), using symbolic cueing in presentation and feedback.

Fifty-one in-service experienced French-speaking college teachers were randomly assigned to these four experimental groups: (a) self-feedback, in which the subjects self-discriminated the teacher-model tape and the replay of their prior taped lesson; (b) Live-immediate feedback, a live supervisor gave discrimination to a trainee in presenting the model tape and on the trainee's tape in feedback; (c) Live-delayed feedback; as (b) but with a two-day interval between the trainee's lesson and feedback and (d) mediated-delayed feedback, where a supervisor was mediated through television carrying the same task as in (b) and (c), but using mediated cueing in presenting the model tape and in giving feedback.

A one-way analysis of variance was used to confirm the predictions. A covariance, a repeated measures, and a non-parametric analyses were also conducted. It was found that no significant

differences existed between groups (b, c, and d) ($P. < .001$). Throughout training, the mediated-delayed feedback group (group (d)) was superior to all other treatments in the study. It differed significantly from all other groups on trial four ($P. < .05$).

Based on these data it was found that, the mediated-delayed feedback group, in presenting the teacher-model tape and feedback with symbolic cueing, did lead however to greater gains in response frequencing of probing within groups.

It was, therefore, concluded that; presentation of various tapes (models) including different types of teachers and learning environment can be diffused. Tapes of teachers in real situations can also be used and evaluated on a discrimination basis with well defined criterion. In feedback sessions, mediated cueing can be incorporated easily. Even more so, peer supervision can be taught and a better use of educational television emphasized. Microteaching to macroteaching (real class situation and normal group of students) can be better implemented. Training students in the same manner may lead to significant change in learning.

Japan--Broadcast-Correspondence High School for Working Youths

Japan is an archipelago forming a 2,360 mile-long arc off the east coast of Asia, between the sea of Japan and Pacific Ocean proper. It consist of four main islands: Hokkaido, Honshu, Shikoku, and Kyushu, and more than 3,000 smaller islands. The country is covered by hills and mountains, many of them active or dorminant volcanoes. Japanese is the offical and universal language.

The inability of so many qualified students to continue their formal education beyond junior high school meant a loss of talent to the individual Japanese student and his country. When many students graduate from grade 9, the last grade of compulsory schooling, over 70 percent of them go on to senior high school--grades 10, 11 and 12. It was felt important to provide more educational opportunities on the upper secondary level for the able and needy children who cannot afford to attend high school. Out of this situation came the idea of teaching high school work through correspondence.

Basing on Schramm, Amagi, Goto and Hiratsuka,[35] the first high school correspondence course was offered in 1948. In 1963, Nihon Hoso Kyokai (NHK) school was introduced, initially as a kind of experimental and demonstration school and to operate on a national scale. But now the school carries out the function of bringing secondary education to many thousands of students.

The Curriculum. The correspondence school curriculum is similar to other schools and is divided into four years. If a student does not satisfactorily complete all his first-year subjects, he must take in the second year those subjects he did not complete or pass. The courses taught include, Japanese language, mathematics, social studies, science, English language, physical education, home-making, art and vocational education.

Students are expected to submit papers and reports on the courses they are taking at specific dates of the year. If fewer than required are turned in, credit is not supposed to be granted for the course, even though the examinations are passed. Preliminary examinations

are held in July, September and November, and final examination in February of each year.

In addition to doing the correspondence work and attending to the broadcasts, the student has to be present for about twenty days of schooling per year, at one of the correspondence school headquarters. The Ministry of Education selects the textbooks the students can use. The broadcasting workbooks are compiled by a team consisting of National High School Correspondence Education Research Unit, the writers of textbooks, broadcasting lecturers, and the NHK correspondence school broadcasting division. A monthly magazine, "The NHK School", is published to provide supplementary instructional materials and information about the school.

The Organizational Framework. The radio and television courses are broadcast six days a week at choice evening hours, 8:00 p.m. to 10:00 p.m. for radio; 9:00 p.m. to 12:20 p.m. for television and Sunday from 10:00 a.m. to 2:00 p.m. Japan has an educational television network which is used for school broadcasts during the day and for correspondence study broadcast purposes in the evening. The same lecturers and the same textbooks are used for radio and television broadcasts, and the same courses are taught. The planning and producing of the broadcast programs are under one director who is assisted by two directors for each of these programs: school broadcasts, correspondence school broadcasts, youth and children's programs, agriculture, science and industry, cultural programs, and general affairs.

The process of producing any of these programs begins in March

of each year when decisions are made regarding courses for the school year. A nationwide survey of opinions by NHK Radio and Television Culture Research Institute; the study results from schools commissioned by NHK to study the courses, and all other appropriate feedback results from previous years are used. A pamphlet of about fifty papges, describing in detail the broadcasting plan that will be put into effect in April, is prepared for NHK's local stations. The courses are carefully studied and evaluated twice a year, in June and October, by representatives of the National High School Correspondence Education Research unit; the NHK Correspondence High School, the broadcasting lecturers, and the NHK Correspondence School Broadcast Division.

Cost of the correspondence schools' education are in four categories: expenditures for broadcasting the lectures, expenditures of the correspondence high school, expenditures for cooperating schools, and expenditures borne by students. Unfortunately, this being a summary, the cost figures are not provided here.

Effectiveness of the Broadcast-Correspondence Teaching. One experimental study by UNESCO, NHK and Ministry of Education[36] demonstrated that television used over a three-month period was effective in implanting desirable social attitudes in the minds of young people. T. Ogawa[37] carried out an experiment whose findings showed that an NHK school broadcast on social studies resulted in a significant increase in learning among grade five students. Yet, Osaga Educational Research Institute[38] conducted a comparative experimental research on learning effects of an historical educational television

program. The subjects were two groups of which one viewed an NHK class broadcast on history and the other used conventional method of learning using a teacher. The students were given an achievement test and those who viewed the broadcast lessons achieved higher than those taught without television. These two experimental results and others not reviewed, leaves little doubt that well-planned educational broadcasts do contribute to learning.

The NHK officials felt that the broadcasts in addition to the correspondence assignments helped the student not only to schedule his studying regularly but also motivated the student to higher achievement and helped the student regularize his life and work habits in more or less the same way as he does during the school day.

Any correspondence school is subject to its students dropping out of school, the absence of a teacher to motivate them and offer counselling makes it easy for them to postpone assignments, and ultimately to be forced out of the course. In Japane the number of drop-outs in full-time school is low but high in correspondence schools, however the broadcasters have been solving this problem as far back as 1960.

Implications to Developing Countries. Japan's NHK correspondence school shows that a combination of correspondence study and broadcasts would be useful in developing countries to expand current in-service training facilities, to further the education of workers, to alleviate the shortage of secondary schools or university places and to help compensate for a lack of facilities for training in technical areas. Japan's three experiences are worth

mentioning. The rigid schedule whereby students are assigned times to send in their papers and to take exams eliminates the unsystematic pattern by which broadcast lectures are planned and prepared a year in advance and involving help and advice from participating teachers, subject matter and curriculum experts. Finally, enriching the correspondence student with abundant educational experience and leaving him free to hold a full-time job while he studies to prepare himself for a better one.

For developing countries to benefit from Japan's experience they should take note of the following suggestions given by Harufumi Kondo, assistant principal for the NHK correspondence school. A complete survey should be made of the level of scholastic attainments and understanding of those who are to be educated, before preparing for their education. Both educators and broadcasting organizations should work cooperatively. The educational program to be broadcast should be compiled for the whole year in advance, and the content of each program be made available to the student in concrete form before the course begins. Provision of constant feedback should be arranged for the educational field to be covered by the broadcasts should be clearly defined.

Kenya--Improving Primary School Teaching Skills Through Correspondence

Kinyanjui described the history, operations, and existing evaluation information concerning the radio correspondence approach to teacher upgrading being used in Kenya. According to his description, educational planners and decision makers in the years after independence, were faced by these issues: high percentage of illiteracy

amongst the adult and working population, increase in school enrollment and school leavers, urgent need to revise and modernize the curricula in schools and colleges, shortage of money, shortage of qualified teachers, trainers and administrators.

In order to provide education to more children, the Ministry of Education employed large numbers of underqualified and even unqualified teachers in schools. The Ministry of Educational also mounted in-service teacher training and upgrading programs as one way of providing more qualified teachers. One form of in-service teacher training was the use of radio-correspondence course program.

The 1964 Kenya Education Commission chaired by Professor Simeon Ominde first suggested the use of radio-correspondence instruction and in 1966 the Kenya government and Agency for International Development (U.S.A.), jointly established Correspondence Course Unit (CCU) in the Institute of Adult Studies, University of Nairobi.

According to the 1968 Ministry of Education Annual Report,[40] there were 37,923 teachers employed in Kenya's primary schools in 1968. Of these, 10,438 were not professionally qualified. Out of the 27,285 qualified teachers, there were 16,992 P3 teachers who were the mainstay of the primary schools, comprising about 60% of the qualified teaching staff and almost 45% of the total teaching staff. The two major teacher-training efforts of the Correspondence Course Unit, involved creating a program to upgrade an unqualified teacher to the "P3" teacher grade level and another to upgrade "P3" teachers to "P2" teacher grade level. The in-service training course for qualified teachers began in 1969 and was temporarily discontinued late 1977.

The Correspondence Course Unit for upgrading "P3" teachers, prepares students to pass the Kenya Junior Secondary Examination; after passing the examination, the teacher is eligible for promotion to "P2" teacher grade status. The program for unqualified teachers is conducted in two phases. The first is professional training in methods of teaching organized by the Kenya Institute of Education and consisting of a year's study dividied into three short, residential courses during school holidays. Between the residential sessions, the courses are supplemented by radio lectures. Candidates who successfully complete the first phase of the program are then admitted to the second year's academic course conducted by the Correspondence Course Unity. The unqualified teachers, however, study only three subjects (English, mathematics, and either history or geography) at the first-year secondary school level. Those who successfully complete the correspondence course and pass the final examination are upgraded to "P3" teacher grade status.

A survey conducted in 1968[41] described a typical correspondence course unit student as being between 21 and 40 years old, married, and has more than four dependants, including members of his extended family. His house has no electricity, and he owns very few books. He may have access to a very small library, but it is probably miles away and impossible for him to use regularly. He does not regularly buy a newspaper, but he does own a radio which is his principal source of news and information about the world outside his own small coummunity. It is mainly for this reason that the correspondence-course material is supplemented by a 15-minute radio program that is broadcast twice a week over the Voice of Kenya. The correspondence

radio programs are alloted a fixed air time from 5 p.m. to 6 p.m. every weekday throughout the year.

The instructional program provided by the Correspondence Course Unity comprises a synthesis of the following:

(1) Correspondence study guides, textbooks, and other teaching materials such as maps, mathematical instrument sets, science experiment kits, and so forth;

(2) Supplementary radio broadcasts covering the material in one or more lessons of the study guide;

(3) Marking of students' lessons by qualified secondary and university teachers; and

(4) Face-to-face teaching guiding occasional residential lessons.

The radio lessons are optional, and there are many students who work ahead of the radio programs; some of these do listen to the programs at later stages. The radio teacher tries to highlight the important points in a lesson and to provide a summary at the end of each teaching unit. Occasionally the radio teacher will arrange for a question-and-answer type of program in which problems common to many students are discussed and common mistakes are corrected.

The CCU is equipped with its own printing, duplicating and binding facilities, registration, mailing, records and accounts section, a self-contained radio recording and production studio, and a small science laboratory. The Adult Studies Center, adjacent to the CCU, provides all facilities for residential courses for up to 60 students. The CCU staffing complement comprises 12 members of academic staff, of these one is the Head of CCU and Assistant Director of Institute of Adult Studies, 7 correspondence tutors, a course development tutor, and a radio/TV specialist and a course tutor.

Effectiveness of the Radio-Correspondence Courses. After five years of CCU operation, an evaluation of its work was conducted by Treydte.[42] One section of the evaluation focused on the major difficulties the student faced. The findings showed that 60% of the student's obstacles to study were found to be environmental difficulties, particularly lack of sufficient time to study, personal and family problems and unfavorable conditions for study. In another questionnaire, the Research fellow estimated the drop-out rate of the CCU students as somewhere between 15% and 25%.

Yet another study conducted on the Kenya Junior Secondary Examination (KJSE) results by Nturibi,[43] revealed that the average pass rates for CCU candidates were 42% in 1968, 46% in 1969, and 51% in 1970, as compared with school candidates who achieved 16 to 30% in various provinces, while private candidates achieved 8 to 15% pass rates. In the various subjects offered by the CCU, the average pass rates when as high as 76% in Kiswahili language, 57% in English and 55% in history. In looking at these figures, it is perhaps unfair to compare the performance of private candidates with that of teachers because while the former must pass in at least five subjects at one sitting, the latter are allowed to take parts of the examination until they accumulate passes in five subjects.

Upgrading teachers from "P3" to "P2" teacher grade status on the basis of how well they achieved in the Kenya Junior Secondary Examination is a sharper measure of performance. Somehow there are difficulties in comparing CCU-trained students with graduates of traditional schooling. First, absence of control data that allows matching student's backgrounds and abilities and secondly as a source

of definite bias in favor of the CCU students, traditional students must take all five examination subjects at one sitting whereas CCU students need not. However, the difference in pass rates indicate that CCU students have an average pass rate close to 50%; for other students, for most years, it was less than 50%.

The Kenyan experience of radio-correspondence learning implies that mature and adult students are motivated through promotion and salary increase to develope and broaden mastery of subject matter they teach by studying and passing the Kenya Junior Secondary Examination. Because of a lack of data on whether passing the Kenya Junior Secondary Examination and promotion to a higher teacher grade status meant automatic improvement in abilities, skills and concepts of teaching effectively. For the CCU experience to be generalized and implemented in other institutions of learning and training in Kenya, the issue of improving job skills ought to be looked into.

According to a report by the World Bank of the CCU, system costs are substantially less than for traditional instruction, and, probably more important, it allows teacher upgrading to occur without demanding either an expansion of the teacher-training force or a withdrawal of teachers from their ongoing teaching responsibilities in the primary schools. Further, it is worth noting that the CCU radio-correspondence courses are principally correspondence and only supplementarily radio.

Summarily, the cases examined using correspondence approach to instruction demonstrated that distant teaching, well-conceived, well-support with proper media and systematic planning and management,

really works. It works in developing countries; for example, Kenya has shown that students in the correspondence school on the average did as well as students in comparable classroom systems in an achievement examination. It works also successfully in highly industrialized countries; for example, extending learning to college juniors in the densely peopled neighborhood of Chicago town in the United States, and offering complte high school curriculum to out of school students in the hilly and mountainous villages of Japan. It was noted that the basic medium of distant teaching is print, but radio, television and face-to-face activities also were used. A point to remember is things are not always equal, in choosing what media to use in distant teaching. For example, it was illustrated that Japan spends five times as much to produce an hour of television as to produce an hour of radio. Japan can afford to use both radio and television with its distant teaching programs. But some other countries, Kenya for example, might prefer to deliver visual experiences through printed media and make maximum use of the capabilities of radio at one-fifth the cost of television. Any country or school district involved in distant teaching has realized that there is always the tendency of the system to grow into multimedia systems. The University of Delhi, for example, Pant [44] reports that, it started to use correspondence study to relieve the demands it could not meet for entrance to its undergraduate program, soon decided to add radio programs to its instruction, and has now made some use of television also. Planners of correspondence course systems have found they would be well advised to provide additional study and practice materials where possible

such as programmed instruction, kits, reading assignments, problems or experiments to be done in the students' own environment and also two-way communication comprising; occasional classes, between term breaks, study gorups, telephone consultation, and tutorial community learning centers.

Conclusion

The review of literature has illustrated that instructional media can be used to facilitate and conduct a national education curriculum reform; supplement classroom teaching and extend the walls of the school through distant teaching called correspondence.

The use of instructional media in the Ivory Coast and El Salvador projects illustrated how educational television was used to make major changes by expanding, upgrading instruction and making the curriculum suit the local needs of the two countries. In each of these two cases, television demonstrated its ability to catalyze change in a change-resistant system, and to enforce a schedule on that change. It was stated that none of the two projects would have gone forward without solid financial, technical and logicistical help from donor countries, and strong national leadership that was involved and integrated in the project. Further, none of the projects used television alone, instead retraining of teachers was carried out, teachers' guides and student workbooks were also included. Since the two projects of national educational curriculum reform were tied around television, I need to cite common themes systematically emphasize by various scholars who have had experience working with projects similar to national educational reforms in developing countries. Arnove, Carnoy, Ingle (eds.)[45] argue that, for television to benefit the

target population, the following should be examined: (a) the need to examine critically and diagnose educational problems of a country, how these problems relate to overall development issues, and exactly how television in combination with other learning resources can help meet specific educational needs. (b) The need to determine that television--as against alternative technologies and means--is cost effective and will not strain the economic resources of a country. (c) The need for careful planning and pilot testing of a television project before large-scale implementation begins. (d) The need to take into account how the classroom-teacher role is threatened or changed by the introduction of Educational Television and under what conditions teacher and technology interact effectively. (e) The need for systematic research and evolution which will assist production staff with the development of relevant learning materials and assist administrators with decisions pertaining to effective utilization of the medium. (f) The need, in any assessment of the educational potential of television, to take into account its long-term consequences--like the effects of importing this technology, on the cultural autonomy of a country, and problems which are likely to arise from expanding schooling and raising expectations without tackling basic problems in the economy and polity.

Supplementary classroom teaching was another application of instructional media examined above in the review of the literature. This seems to be the most common use of media, and evidence given from experimental studies, for example, the Trialogue multimedia experiment in Sweden, teaching through television in India and Maryland in the United States; programmed learning in Central Africa

seem to show that any medium can be used for teaching and learning if well used and if wanted by the classroom teacher. Supplementary use of the media of instruction is most likely to win the approval of the classroom teacher. The classroom teacher usually suspects large educational reform projects when they are built around media to carry out core teaching to the extent of replacing the classroom teacher. Other things being equal, the ideal medium for supplementary use in the classroom is one over which the classroom teacher has a maximum amount of control. That is, the media to supplement teaching should be introduced into a given classroom when the class is ready for it. The Kenyan radio broadcasts showed that teachers use tape cassette programs; using a tape recorder, the teacher can repeat the program, stop it in the middle, or delay it for a question or for that matter combine the tape program with other classroom experiences because he has control over the medium he is using. Such a medium of instruction can also be used by students.

Extending the school through distant teaching was another form of application to which instructional media is put to. Field evidence showed that distant teaching can upgrade in-service teacher activities, for example, the Institute of Adult Studies of the University of Nairobi, Kenya; extend classroom lessons to working students, for example the Chicago Television College in the United States, and the Japanese NHK High School in Japan. It was noted that the print is the basic medium of instruction in distant teaching, but radio, as in Kenya and Japan, television, as in Canada, Chicago in the U.S.A. and Japan, and face-to-face activities can be used also. Any school district or country intending to participate in distant teaching

should be aware and plan in advance for the system becoming multi-media. This is to say, in addition to the basic medium, radio or television, the correspondence system uses: programmed instruction, kits, reading assignments, problems or experiments to be done by the student, study groups, tutorial consultation and meetings during the school holidays.

FOOTNOTES

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CHAPTER III

DESIGN OF THE STUDY

This chapter focuses on the design of the study. The design is for a study on the organization and utilization of audiovisual media and techniques in the secondary school education of the Republic of Kenya. The findings of this study will be supplemented with information on how developed and developing countries use audiovisual media. Then a systematic approach of audiovisual media and techniques will be evolved. This systematic audiovisual media program could be recommended for adoption in schools and institutions not adequately staffed with qualified teachers in the country of Kenya. Within the chapter, the research questions and hypotheses are outlined and the general procedures of the study are stated. The population and sample are described, preparation of the questionnaires and procedures followed for data collection and analysis are covered.

This was a field survey study on the status of audiovisual media in the secondary school education of Kenya. The study was intended to identify the following:

1. The kinds of audiovisual media material and techniques that are used in rural and urban secondary schools.
2. Which of the audiovisual media materials and techniques stated under (1) do teachers perceive as very valuable for upgrading in-school and out-of-school instruction?
3. The constraints that face teachers when teaching using audiovisual media.
4. The kind of communication links that exist between the producers of audiovisual media and the classroom teachers.

5. What additions, if any at all, could be made to improve and increase the use of audiovisual media for upgrading learning.

6. Of the courses taught in secondary schools, which courses are teachers more motivated to teaching using audiovisual media?

The status of audiovisual media use focusing on the six areas isolated above was measured by a questionnaire in which the respondents were asked to react to statements which had five possible answers that go from strongly agree to strongly disagree, make comments, and state why they responded the way they did. An example of the statement, and a comment are given below. (For a detailed account, refer to Appendix K.)

A. Radio Broadcasting Programs:

Your are going to find a series of statements. There are five possible answers for each statement from "Strongly Agree to "Strongly Disagrees." You are expected to choose the answer that most closely approximates your opinion and make a check (✓) on the corresponding line.

Example:

0. Parents these days are concerned about the quality of the education their children receive:

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

1. Students learn more with radio broadcasting and accompanying material than without them.

SA	A	U	D	SD

Comments _____

_____

Why did you respond the way you did above? _____

_____

Research Questions

The following are the research questions for this study:

1. Will the proposed study provide data:

   (a) to help determine what audiovisual media and techniques are available to secondary schools?
   (b) to help determine role played by the dominant available audiovisual media supplied by Educational Media Service to secondary schools?
   (c) to help determine how the teachers perceive the effectiveness of audiovisual media and techniques in teaching and learning activities?

2. Will the proposed study provide data to help determine which of these courses: languages, mathematics, social studies, science studies and business studies do teachers and school administrators perceive audiovisual media as valuable and effective in the teaching and learning process?

3. Will the proposed study provide data to help identify what constraints encountered by teachers when teaching using audiovisual media?

4. Will the proposed study provide data to be used to help determine a program of Instructional Development that could be used by In-service teachers?

5. Will the proposed study provide data to help determine the status of communication links between producers of audiovisual media and the classroom teachers.

6. Will the proposed study provide data to help determine the possibilities of teachers and students designing and producing their own audiovisual media materials that students can use to improve learning in schools having less qualified teachers or no teachers?

7. Will the proposed study generate other areas in which future research could be conducted?

Research Hypotheses

These null research hypotheses were generated and tested at alpha = .05 level.

1. Perception of audiovisual media and techniques does not differ between teachers working in rural secondary schools and those working in urban secondary schools.
2. Perception of audiovisual media and techniques does not differ between classroom teachers and school administrators.
3. Perception of audiovisual media and techniques does not differ between teachers who teach: languages, mathematics, social studies, science including technical, industrial studies and business studies.
4. The observed distribution of the sample does not differ from the theoretical distribution.

Design Over Variables

1. Independent variable: Classroom teachers, departmental chairpersons and headteachers of secondary schools.
2. Dependent variable: Classroom teachers, departmental chairpersons and headteachers responses to the statements of the questionnaire.

Procedures

The group under study consists of secondary school teachers who were randomly selected from twenty five secondary schools found all over the country of Kenya. The teachers were selected on the basis

of: (1) administrative position held by each other, (2) the type of course(s) each teacher teaches. Each teacher responded to one common questionnaire mailed to him through his or her headteacher.

The questionnaire was designed to obtain information in the following areas: (1) radio broadcasting program, (2) perception of the effectiveness in the teaching and learning process of audiovisual media and techniques, (3) reasons for teachers not using productively audiovisual media, (4) teacher perception of potential audiovisual media and techniques in Kenya, (5) exchange of information between teachers and producers of audiovisual media, and (6) the teaching system and the environment where it takes place.

Examples of the statements used in the questionnaire to obtain the information for this study are presented below.

Information on the reasons for teachers not using audiovisual media was collected through statements such as:

28. Sometimes you cannot take advantage of audiovisual media. What is your opinion about these reasons?

1. Lack of locally- available media material in the subject(s) I teach.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

2. I need more training in preparing and selecting audiovisual media.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

The completed questionnaires were mailed back from the schools. They were tabulated to determine the proportion of the teachers who

had responded on the basis of the courses they teach and the administrative positions held. For details see Tables 1-1 through 1-7. The data collected through the questionnaires were processed and analyzed in various ways. Descriptive statistics such as mean and percentages, frequencies were used to describe perception of audiovisual media by teachers included in the sample. The t-test was used to determine if there was a difference in the perception of audiovisual media between rural and urban teachers. Oneway ANOVA test was used to determine if there was a difference in audiovisual media perception between teachers on the basis of the courses they teach and administrative offices held. The Kolmogorov-Smirnov (K-S) test, a non-parametric statistic, is used in this study to determine if the same was selected from a normally distributed population. (For explanation see Chapter IV.)

Description of Population and Sample

The Population. The population to which the findings of this study are to be generalized comprises the headteachers and classroom teachers. These teachers work in girls', boys', mixed, private, self help, public, vocational, and academic secondary schools found all over the Republic of Kenya.

The Sample. The sample that was studied comprised two hundred and fifty (250) classroom teachers and twenty five (25) headteachers selected from a stratified random sample of twenty five (25) schools selected from all parts of Kenya. There were seven (7) girls' schools, thirteen (13) boys' schools and five (5) mixed schools. Of these, four (4) were technical, four (4) vocational and seventeen (17)

academic. Three (3) were day, sixteen (16) were boarding and six (6) were both day and boarding. Thirteen (13) were rural and twelve (12) were urban schools. In terms of physical location, five (5) schools were in Eastern and North-Eastern Provinces; six (6) in Central: three (3) in Nairobi Province; three (3) in Rift Valley; two (2) in Coast Province and six (6) in Nyanza and Western Provinces.

The twenty five (25) secondary schools included in the sample under study is five percent (5%) of the total of government secondary schools and two percent (2%) of the total of government, private and community supported self help (harambee) secondary schools combined. The list of the schools that were included in the sample under study is presented in Appendix A.

The Selection of the Sample

A stratified random sample of girl schools, boy schools, mixed schools, technical, vocational, academic schools; day, boarding; rural and urban schools were selected. The sample selection was based on the eight (8) administrative units or Provinces of the country of the Republic of Kenya. For each province, a list of secondary schools was compiled alphabetically. This alphabetical list of schools was numbered from one (1), being assigned to the name of the school that came first on the alphabetical list, two (2) to the second school and so on. Then the total number of the schools on the alphabetical list in each province was divided by the number of schools to be included in the sample from that province. The resulting number was used to determine the schools to be included in the sample. The first school to be included in the sample is the

school bearing that number on the alphabetical list of schools. The second school is one bearing the number multiplied by two (2) and the third school is one bearing the number multiplied by three (3) and so forth. After the school had been selected from the alphabetical list, other factors were considered and used randomly to select the final schools to be included in the sample. These other factors included: good examination results of the school, the age of the school, courses offered, number of students, sex of the students, and location of the school in terms of rural and urban status.

For example, three (3) secondary schools were selected from Nyanza Province. The alphabetical list of private and government secondary schools in Nyanza Province totalled up to eighty two (82). When the total number of secondary schools in Nyanza Province, eighty two, was divided by three (3), the number of schools to be included in the sample from this province, the resulting number was approximately twenty eight (28). Hence the twenty eighth (28th) school on the alphabetical list of schools in Nyanza Province was chosen as the first, followed by the fifty sixth (56th) school as the second and so on. For details refer to Appendix B.

For each school included in the sample, the headteacher, five (5) departmental chairpersons and five (5) classroom teachers were studied.

The following are departments whose chairpersons were surveyed:

(1) Language(s)

(2) Mathematics

(3) Social Studies

(4) Science, including Technical, Industrial and Vocational Studies

(5) Business

These five (5) departments were chosen because they encompass together the contents of the courses included in the curricula used in most secondary schools in Kenya.

The five classroom teachers who were studied were selected from the five departments already stated above. One teacher was selected from each department. For example, one (1) teacher was selected from the Languages Department, another one from the Mathematics Department and so on until the number totalled up to five. The selection of classroom teachers within each department was carried out on an alphabetical procedure such that a classroom teacher whose name came first on the alphabetical list of teacher names in a department was selected and included in the sample.

In summary, for every school included in the sample, the headteacher, five departmental chairpersons each from one of the five departments, and five classroom teachers each from one of the five departments were studied.

Treatment of the Study

The headteacher, five departmental chairpersons and five classroom teachers in every school included in the sample responded to statements of one common questionnaire. The perceptions of the respondents towards the value and use of audiovisual media and techniques in learning and teaching processes provided a measure of the relative status of audiovisual media and techniques in secondary school educational system. This relative status of audiovisual media and techniques perceptions could be generalized to reflect the perceptions of headteachers and classroom teachers working in schools

all over the country of Kenya.

Developing the Questionnaire

The instrument used in this study is in the form of a questionnaire. The literature review on instructional media use in Kenya provided a background of what information to look for. The following areas were of prime concern:

(1) The instructional media materials and techniques that are available for improving teaching and learning in secondary school education.

(2) The headteachers' and classroom teachers' perception about the effectiveness in the teaching and learning process of selected audiovisual media and techniques.

(3) The headteachers' and classroom teachers' perceptions about statements on several common constraints that impede effective use of audiovisual aids by teachers.

(4) Communication between producers of instructional media and the classroom teachers.

(5) The educational media programs and services that teachers perceive as valuable and would like them introduced or expanded if already available in secondary school educational system.

The above areas were used as dimensions along which the questionnaire as an instrument for data collection was developed. The questionnaire has a map of Kenya on the cover, illustrating the location of the field study in relation to the rest of the continent of Africa. It has the five areas isolated above as the major headings and was

designed focusing on the details of each of the areas and had twelve pages.

The questionnaire was approved by the dissertation guidance committee and the Office of Research Consultation, College of Education at Michigan State University.

The questionnaire as a data collecting instrument was tested in May 1978 by means of a pilot study in one school included in the sample. During the pilot study, it was discovered that teachers did not know certain terms used, for example "instructional media." The questionnaire was revised and the word "instructional media" was substituted with "audiovisual media," the more commonly used and easily understood by the respondents. Further, it was determined that the questionnaire takes twenty three (23) minutes to complete, responding to its statements. A copy of the questionnaire is included in Appendix K.

The revised and validated copy of the questionnaire was typed on stencils at M.S.U., Michigan and along with the following items, it was mailed to one of the research correspondents in Kenya.

(1) sticker labels bearing the names of the schools in the sample, and the name of the study investigator.

(2) 50 9" x 12" envelopes.

The research correspondents duplicated the questionnaire in one of the schools in Kenya and attached Kenya postage stamps on the return envelopes as well as the school name stickers. A letter sent to the headmistress of the school, asking her for an access to duplicating facilities is included in Appendix I. Letters authorizing the research correspondents in Kenya to collect data

are included in Appendix J.

Collecting the Data

To conduct research in Kenya, a research permit must be obtained from the Government of the Republic of Kenya.

On May 2nd, 1978, the application for a research clearance for this study was made to the government of the Republic of Kenya. The government was very cooperative so that by July 7th, 1978, the research clearance was through and the study was authorized and conducted within the proposed time. Copies of the letters used to apply for a research permit are included in Appendix C and the letter from the government authorizing the research to be carried out is included in Appendix D.

To have a clear picture of what instructional media are available in each school, it was considered appropriate to collect data on the production of instructional media materials. The data on what instructional media materials had been produced and sent to schools was collected in August 1978 through the research assistant of Kenya's Educational Media Service. A list specifying the kind of information needed was mailed to the research assistant. An example of the type of statements used on the list is given below, for the complete list see Appendix L.

Please, I would very much appreciate if you could supply me with the information listed below:

3. An appropriate list of the types of audiovisual media material and equipment the Educational Media Service has already supplied to secondary school teachers through the Kenya Schools Equipment scheme.

6.1. Methods of sending instructional media materials, equipment information services to secondary school teachers and those of receiving feedback and evaluation from teachers.

6.2. The kinds of instructional media in-service training programs for secondary school teachers that are currently existing.

6.3. The constraints that teachers face who use instructional media for teaching and learning activities.

This available data on production was sent in September 1978 by mail from the Educational Media Service at the Kenya Institute of Education.

Data on the headteachers, departmental chairpersons and classroom teachers were collected through their responses to one common questionnaire. On July 9th, 1978, the questionnaires were sent through the mail to all the schools included in the sample under investigation. The procedure for sending out the questionnaires were as follows:

1. Envelopes, each containing eleven (11) questionnaires, cover letters, and a stamped return envelope were mailed through the headteacher of each of the participating schools. One (1) questionnaire was for the headteacher, five (5) for the selected department chairpersons and five (5) for the classroom teachers whose names come first on the alphabetical list of teachers in each department. Each of the five (5) classroom teachers came from each of the five (5) selected departments.

2. The questionnaires were mailed to those teachers in schools which indicated that they were willing to participate in the study. On June 26th, 1978, a letter was sent to all the headteachers of the selected schools. The purposes of the letter was to inform the headteachers and members of their staff about the purposes of this study and also to find out if they were willing to participate in the study. For a copy of the letter, see Appendix E.

3. After a period of one month, those teachers who did not respond were sent a second copy of the questionnaires with a follow-up cover letter (see Appendix F).

At the beginning of December 1978, only teachers from fourteen (14) schools out of 25 had responded. Out of these fourteen (14) schools only nine (9) schools provided complete data. Other schools, for example returned five questionnaires, three questionnaires and so on. One hundred and thirty three (133) questionnaires were received and out of these only one hundred and twenty one (121) were complete. Therefore, the one hundred and twenty one (121) questionnaires were the ones used in the analysis of the data.

Of the one hundred and twenty one questionnaires, twenty five (25) were from girls schools, sixty one (61) from boys, and thirty five (35) from mixed schools. Forty one (41) came from four year secondary schools and eighty came from six year secondary schools. Sixty five (65) were from rural schools and fifty six (56) from urban schools. Twenty one (21) came from headteachers, twenty nine (29) from departmental chairpersons, forty (40) from classroom teachers and thirty one from classroom, headteachers and departmental chairpersons combined. Based on the courses the teachers teach, eighteen (18) questionnaires came from language teachers, sixteen (16) from mathematics teachers, twenty five (25) from social studies, forty eight (48) from science and fourteen (14) from business studies teachers. For details, refer to Tables 1-1 through 1-7.

The fraction of questionnaires used in the analysis constitute fourty four percent (44%) of the total of the number of questionnaires--two hundred and seventy five (275), sent out to participating teachers of the study.

TABLES ILLUSTRATING DISTRIBUTION OF THE QUESTIONNAIRES
BY THE TEACHERS WHO RESPONDED

Table 1-1. Sex of Schools.

		GIRLS		BOYS		MIXED		TOTAL	
		NO	%	NO	%	NO	%	NO	%
SAMPLE	Mailed out	77	28	143	52	55	20	275	100
	Received & Used	25	21	61	50	35	29	121	100
POPULATION		3080	28	5720	52	2200	20	11,000	100

Table 1-2. Length of the School.

		Four Year Secondary		Six Year Secondary		Total	
		NO	%	NO	%	NO	%
SAMPLE	Mailed out	132	48	143	52	275	100
	Received & Used	41	34	80	66	121	
POPULATION		5280	48	5720	52	11,000	100

Table 1-3. School Academic Programs.

		Academie		Technical		Vocational		Total	
		NO	%	NO	%	NO	%	NO	%
SAMPLE	Mailed out	187	68	44	16	44	16	275	100
	Received & Used	76	63	30	25	15	12	121	100
POPULATION		7480	68	1760	16	1760	16	1100	100

Table 1-4. School Residence.

		DAY		BOARDING		DAY-BOARDING		TOTAL	
		NO	%	NO	%	NO	%	NO	%
SAMPLE	Mailed out	33	12	176	64	66	24	275	100
	Received & Used	21	17	65	54	35	29	121	100
POPULATION		1320	12	7040	64	2640	24	1100	100

Table 1.5. School Location.

		RURAL		URBAN		TOTAL	
		NO	%	NO	%	NO	%
SAMPLE	Mailed out	143	52	132	48	275	100
	Received & Used	65	54	56	46	121	100
POPULATION		5720	52	5280	48	11,000	100

Table 1.6. Teacher Administrative Status.

		Headteachers		Departmental Chairperson		Classroom Teacher		Total	
		NO	%	NO	%	NO	%	NO	%
SAMPLE	Mailed out	25	10	125	45	125	45	275	100
	Received & Used	21	17	40	33	60	50	121	100
POPULATION		1000	10	5000	45	5000	45	1100	100

Table 1.7. Courses Taught by Teachers

		Languages		Maths		Social Studies		Science Studies		Business Studies		Total	
		NO	%	NO	%	NO	%	NO	%	NO	%	NO	%
SAMPLE	Mailed out	55	20	55	20	55	20	55	20	55	20	55	100
	Received & Used	18	15	16	13	25	20	48	40	14	12	121	100
POPULATION		2200	20	2200	20	2200	20	2200	20	2200	20	11000	100

Data Analysis

Data from the questionnaires returned were coded and key punched.

The teacher responses to the statements of the questionnaire were assigned numerical values ranging from one to five (1 to 5) as follows:

1. Statements such as:

1.1 Classroom teachers learn to organize their schedules better with radio broadcasting and accompanying printed material.

5	4	3	2	1
Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

1.2 Other statements such as:

1. Which of the following audiovisual media and techniques do you use in your school? Please check (✓) the boxes that apply to you.

	1	2	3
	YES	NO	NOT AVAILABLE
1. Real things, models and resource people			
2. Flat pictures, charts, maps and blackboards			

were assigned numerical values as indicated above.

1.3 Other statements such as comments; were coded

(76) 1. Media is highly recommended to improve educational facilities.
2. Need media section in the Ministry of Education.
3. Media can assist teachers solve problems in learning.
4. Preview and experience with media needed before making any decision.
5. A need to conduct Needs Assessment that involves in-training and in-service teachers.

Frequencies and descriptive statistics such as the mean and percentages were used to answer research questions 1, 3, 4 and question 6. The mean described if the average teacher responses followed a bell-shaped curve and appropriate normality. The percentages described the frequency of teacher responses to each statement of the questionnaire.

Research question one was refined into research hypothesis one and was analyzed by the t-test. Research question two was refined into research hypothesis two and was explored by oneway analysis of the variance (i.e. ANOVA). Research hypothesis three was also explored by oneway analysis of the variance (i.e. ANOVA). Research hypothesis four was analyzed by a non-parametric test, Kolmogorov-Smirnov (K-S). Each of the four hypotheses was to indicate a difference at alpha = .05 level. Research question seven was answered with the information derived from the data and the review of the literature on the use of audiovisual media in the secondary school education of Kenya.

Summary

A questionnaire was developed to investigate the production, organization and utilization of instructional media in secondary school education in the Republic of Kenya. The questionnaire was designed to obtain information on the instructional media materials and equipment being used in the secondary school educational system, and the role instructional media play in upgrading classroom learning and teaching activities. The questionnaire was approved by the dissertation guidance committee, Office of Research and Consultation

and four (4) Kenyan students studying at Michigan State who were once teachers in their lives. A pilot study of the questionnaire was conducted before mailing the questionnaires to all the teachers included in the sample. Follow-up letters, questionnaires, face-to-face contacts were made as necessary.

The data was analyzed in a format to explore six research questions and three hypotheses. Frequencies and descriptive analysis were used to respond to questions 1, 3, 4, 5 and 6. The three hypotheses were to show a difference at alpha = .05 level.

In the chapter to follow, the data analysis is presented, the research questions answered and the hypotheses tested and analyzed.

CHAPTER IV

ANALYSIS OF DATA

This chapter presents the analysis of data. The data are analyzed along three basic concerns. First, data are analyzed to determine the availability of various audiovisual media to the secondary school educational system of Kenya. Second, the data are analyzed to determine the role the available audiovisual media play in upgrading classroom learning. Third, the data will be analyzed to determine the perceptions of classroom teachers and school administrators concerning the value of audiovisual media. Included in the chapter are: seven research questions and their answers, four research hypotheses and their analyses. Various statistical techniques were used to answer the research questions and to analyze the hypotheses. Hypotheses were tested at alpha = .05 level with appropriate degrees of freedom.

Analysis Procedure

Various analyses were considered suitable to the description and interpretation of the research data.

Descriptive statistics and frequencies were used to describe average responses, variability of responses and the frequency of responses in the perception of audiovisual media and techniques.

The t-test was used to determine if there was a difference in the perception of audiovisual media and techniques between teachers working in rural and urban schools.

The Oneway ANOVA test was used to find out:

(a) if there was a difference in the perception of audiovisual media and techniques between classroom teachers and school administrators.

(b) if there was a difference in the perception of audiovisual media and techniques between teachers who teach languages, mathematics, social studies, science studies and business studies.

The Kolmogorov-Smirnov (K-S), a non-parametric one sample test, was used to determine if the sample was taken from a normally distributed population.

Available Audiovisual Media to Secondary Schools

Research Question 1: Will the proposed study provide data to help determine what audiovisual media and techniques are available to secondary schools?

Results--Research Question 1 (a). The statistical results of what audiovisual media and techniques that are available in secondary schools are summarized in Table 2-1, and are also used in the discussion of research question 1 (a).

Discussion--Research Question 1 (a). Basing on Table 2-1, it was revealed that among the audiovisual media and techniques used in schools: textbooks, workbooks and teacher handouts were the most common. Other commonly available and used media comprised: flat pictures, charts, maps, blackboards, fieldtrips, real things, models and resource people; dramatization, demonstrations and folkmedia; educational games and simulations; slides, filmstrips and transparencies; individualized instruction, tape recordings, radio

Table 2-1. Teacher responses towards audiovisual media and techniques Percentage agreement with statements about use and availability of audiovisual media and techniques in secondary schools.

(N = 121)

No.	AUDIOVISUAL MEDIA AND TECHNIQUES	PERCENTAGE RESPONSES		
		Available		
		Used	Not Used	not available
1.	Real things, models and resource people	84	2	14
2.	Flat pictures, charts, maps and black boards	93	2	5
3.	Slides, filmstrips and transparencies	66	7	27
4.	16 mm sound motion pictures	60	9	31
5.	Radio Broadcasting Programs	60	19	21
6.	Tape/disc recordings and records	65	14	21
7.	8 mm single concept films	57	7	36
8.	Textbooks, workbooks and teacher handouts	94	2	4
9.	Fieldtrips	86	4	10
10.	Educational games and simulations	68	11	21
11.	Dramatization, demonstrations and folkmedia	77	11	12
12.	Television Programs	57	9	34
13.	Computer Programs		45	55
14.	Individualized Learning	65	12	23
15.	Telephones	58	13	29
16.	Multimedia accompanization of two or more of above	67	9	24

programs, 16 mm sound motion pictures and television programs. The order in which the available audiovisual media and techniques is in the order of highest percentage of perception which in this study was textbooks with 94 percent of the respondents saying used, to the lowest which was computer programs with 45 percent of the respondents saying not used.

Of the audiovisual media and techniques not used, computer programs had the highest percentage of 45, followed by radio programs, telephones, individualized learning, tape recordings, educational games and folk media, television programs and motion pictures.

Computer programs had the highest percentage of 55 for the media not available in schools. This was followed by sound motion pictures, television programs, telephones, slides, filmstrips and transparencies; individualized learning, educational games, tape recordings and radio programs.

For more details of the instructional media items and techniques available, not available and used in secondary schools, refer to Table 2-1.

The data analysis indicates that there are certain audiovisual media and techniques which are available and are used in most schools studied. The media items which have the highest percentage of positive agreement on Table 2-1, are as textbooks and workbooks, flat pictures, charts, maps and blackboards, etc. There are other audiovisual media items and techniques which are available in sufficient numbers in most schools, but are not used; for example: tape recordings, educational games, drama and folk media. There are other

audiovisual media items not available in most schools, for example: television programs, motion pictures, etc.

Role Played by Available Audiovisual Media in Upgrading Classroom Learning

Research Question 1 (b). Will the proposed study provide data to help determine role played by the dominant available audiovisual media supplied by Educational Media Service to secondary schools.

Results--Research Question 1 (b). The statistical results of the role palyed by dominant available media are summarized in figure 1-1 and are also used in the discussion of research question 1 (b).

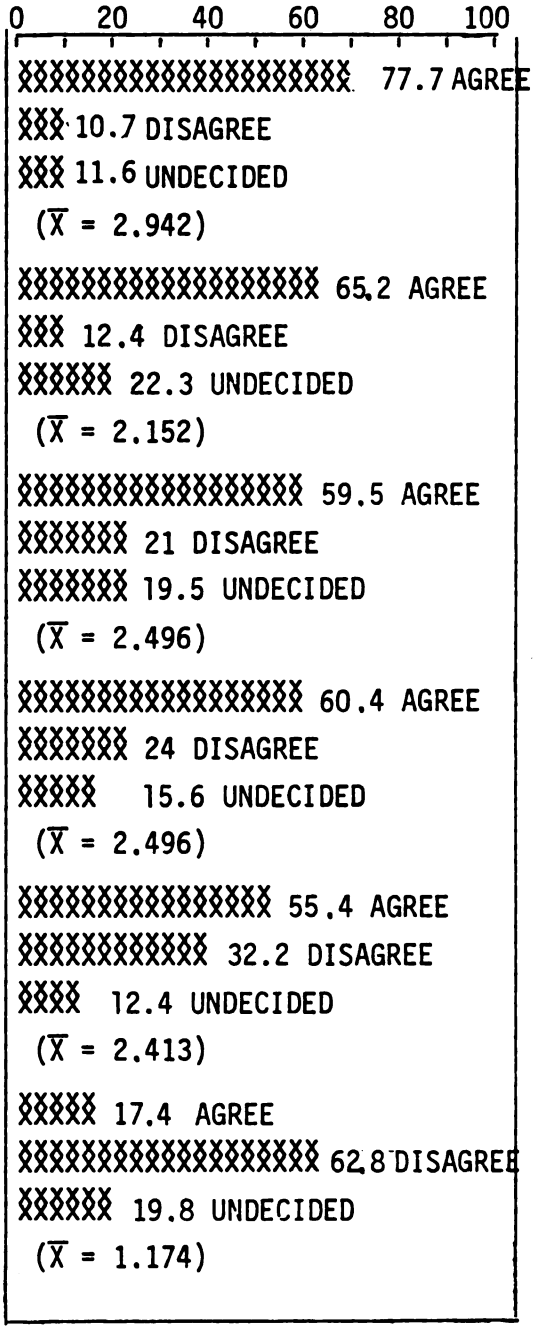
Discussion of Research Question 1 (b). Among the dominant audiovisual media used in schools are: slides, films, television programs and radio programs. (These media items are the ones the Educational Media Service has supplied to secondary schools.) Radio programs are found commonly in many schools and on that basis, this study concentrated on examining the role of radio programs.

Figure (1-1) gives a summary of the mean and percentage agreement with statements about the effectiveness of radio broadcasting programs. About 70 percent of the teachers who responded in this study agreed that students learn more with radio programs and accompanying material than without them. Only 10.7 percent of the teachers disagree and 11.6 percent were undecided.

Regarding the statement that teachers improve teaching skills with radio programs and accompanying printed materials, 65.2 percent of the teachers responded positively, 12.4 percent responded

Figure 1-1. Classroom Teacher Attitudes Towards Radio Broadcasting Programs

Mean and percentage agreement with statements about radio programs. (N = 121)



negatively and 22.3 percent were uncertain. 22.3 percent of uncertainty seems big, but the explanation give might be that these respondents who were uncertain do not have radio programs in their schools and consequently it becomes hard to give judgment in the absence of experience with teaching using radio programs.

The statement that students learn to study better on their own when they recieve classes through radio broadcasting had 59.5 percent of positive agreement, supporting the effectiveness of radio programs for learning purposes.

Classroom teachers learn to organize their schedules better with radio programs and accompanying printed material statement was seen positively by 60.4 percent of the teachers.

The statement that it is possible to teach more through radio programs had 55.4 percent of positive response and 32.2 percent of negative response. 32.2 percent of negative response might probably have come from teachers who work in schools where the school scheules do not have room for radio programs on the school timetable.

Radio programs help parents become more interested in the education of their children had only 17.4 percent of positive, 62.8 percent of negative response and 19.8 percent of uncertain responses. A high percentage of negative response seems to imply that radio cannot motivate parents to become interested in the education of their children. A high percentage of uncertain response over positive response seem to imply lack of experience with radio programs where parents are involved. At this stage, no conclusion can be drawn upon this statement until the parents' attitudes towards radio programs are surveyed and compared with those of the teachers to

make the final judgment.

The mean responses for each statement indicate general agreement which does not vary markedly from statements 1 to statement 5. Statement 6 has low agreement indicative of variation of perceptions towards the statement. Since there is small variation in the mean responses and high positive agreement towards statements about radio programs, it is reasonable to conclude that radio programs are effective compared with conventional classroom teaching and learning.

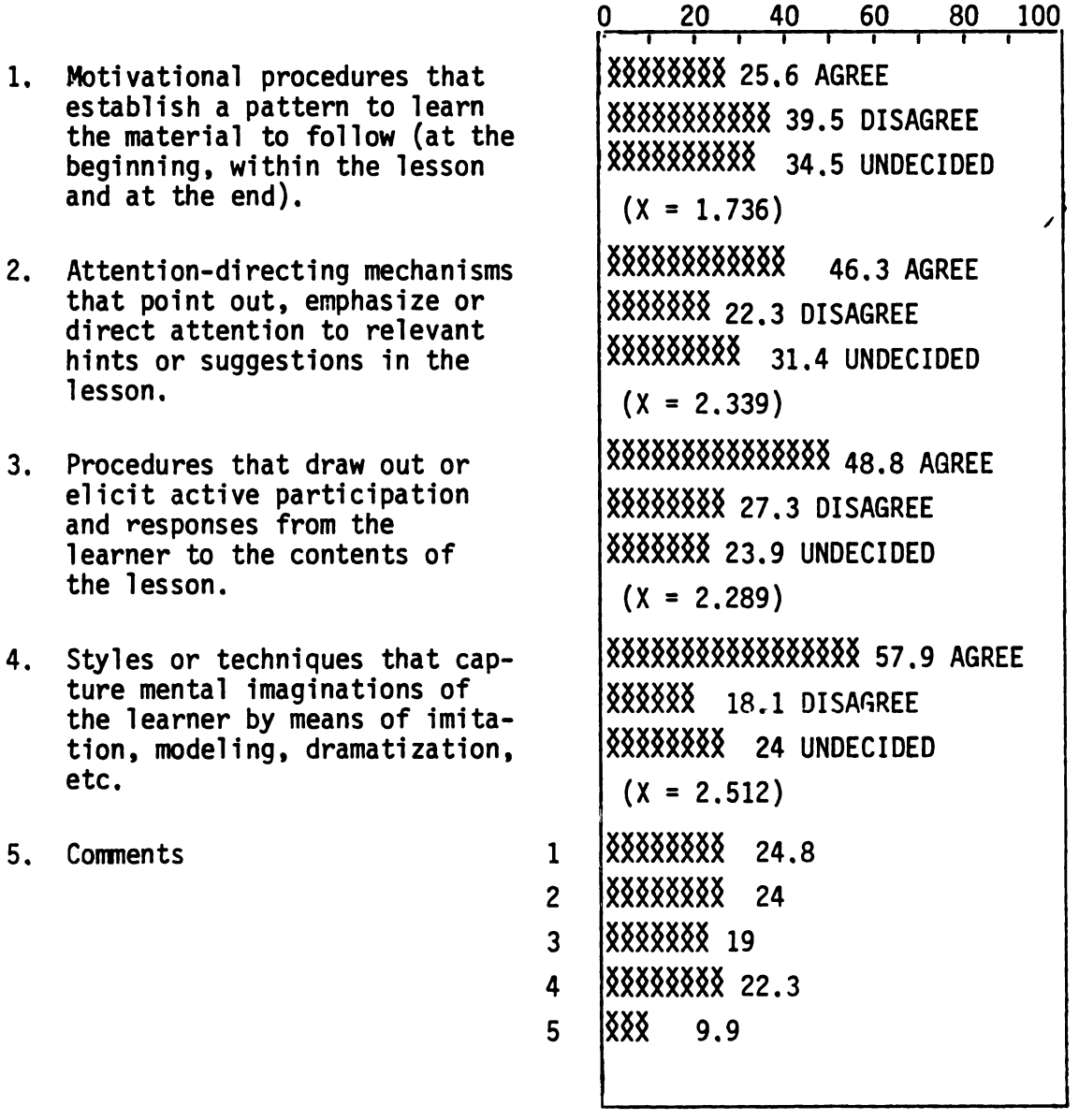
Further analysis was conducted on the statements about design techniques built in various audiovisual media used in schools including radio programs whose findings are summarized in figure 1-2.

Concerning the statement whether available audiovisual media and techniques have motivational procedures that establish a pattern to learn the material to follow at the beginning, within the lesson and at the end, 39.5 percent of the responses were negative, 34.5 percent uncertain and only 25.6 percent of the responses were positive. 25.6 percent of positive response seem to indicate that probably some instructional media and techniques have these designs and others do not have them. 34.5 percent of uncertainty is sufficient enough to imply that some teachers are not aware or have no knowledge about these design techniques.

Regarding attention-directing mechanisms for the lesson, 46.3 percent felt that the techniques are included in the design of media, 31.4 percent were uncertain which implies either that probably they do not use audiovisual media in their schools including such design techniques or maybe they have no knowledge about meaning of the term design techniques.

Figure 1-2. Teacher attitudes towards radiobroadcast programs and other audiovisual media.

Mean and percentage agreement with statements about design techniques built in various audiovisual media found commonly in schools. (N = 121)



Procedures that draw out active participation and responses from the learner to the contents of the lesson had 48.8 percent of positive response, 27.3 percent of negative response and 23.9 percent of uncertain response.

The statement concerning design techniques that capture learner mental participation by means of imitation, modeling and dramatization had 57.9 percent positive responses, only 18.1 percent negative responses and 24 percent of uncertain responses. 45 percent of uncertain responses seems to imply absence of audiovisual media comprising design techniques on the part of the teachers.

Statement 1 had a low mean of 1.7, indicative of variation of the perception of the design techniques which seems to imply either absence of media material with such design techniques or lack of knowledge about the design techniques on the part of some teachers. Statement 2 to statement 4 had almost a uniform mean with little variation in the perceptions of the statements. The percentages of positive responses towards the design techniques on the average were not high. This seems to imply that not many audiovisual media materials and techniques available and used in secondary schools have the stated design techniques built in them.

Research Question 1 (c). Will the proposed study provide data to determine how the teachers perceive the effectiveness of audiovisual media and techniques in teaching and learning activities?

Results--Research Question 1 (c). The mean and percentage statistical results for each audiovisual media item are summarized in Table (2-2) and will be used in the discussion of Research Question 1 (c).

Table 2-2. Teacher perceptions of the effectiveness in the learning and teaching process of the types of audiovisual media and techniques.

Mean and percentage agreement with statements about the effectiveness of audiovisual media used in schools.
(N = 121)

No.	AUDIOVISUAL MEDIA AND TECHNIQUES	MEAN	RESPONSES IN PERCENTAGES		
			agree	disagree	undecided
1.	Real things, models and resource people	2.5	58	30	12
2.	Flat pictures, maps and blackboards	2.4	57	29	14
3.	Slides, filmstrips and transparencies	2.0	45	44	11
4.	16 mm sound motion pictures	2.9	76	8	16
5.	8 mm single concept films	2.5	61	17	22
6.	Radio broadcast programs	2.1	45	37	18
7.	Tape recordings and records	2.5	63	20	17
8.	Textbooks, workbooks and handouts	3.2	81	10	9
9.	Fieldtrips	3.2	87	6	7
10.	Educational games and simulations	3.1	81	7	12
11.	Dramatization, demonstrations and folk media	3.0	73	9	18
12.	Television programs	1.5	40	51	9
13.	Computer programs	1.7	19	23	58
14.	Individualized learning	2.7	68	17	15
15.	Telephones	1.3	16	58	26
16.	Multimedia combining two and more of above	1.7	35	42	23

Discussion--Research Question 1 (c). Percentages and the mean were used to analyze data from the questionnaires regarding perception of the effectiveness of audiovisual media and techniques used in secondary schools. The following outcomes were revealed, and they are in the order of those perceived as highly effective on the basis of percentage responses to those having low percentage responses Fieldtrips had the highest percentage of 87, followed by textbooks, workbooks and teacher handouts, educational games; drama and folk media, motion pictures, individualized learning, tape recordings, real things, models, resource people; flat pictures, maps, and blackboards.

The audiovisual media and techniques which had a high percentage of negative response regarding value of effectiveness were telephones with 57.9 percent followed by television programs, multimedia, slides, filmstrips and transparencies; radio programs, etc. Computer programs had a high percentage of 47 uncertain responses, followed by multimedia, drama, and folk media.

Telephones, television programs, multimedia, computer programs, slides, filmstrips and transparencies had a low mean of responses indicating variability over the perception of the effectiveness of these audiovisual media in teaching and learning activities. A probable explanation might be teachers who responded might not have had experience in teaching with these media items and therefore it becomes difficult to make judgments. Textbooks, fieldtrips, educational games had a high mean of 3.00 and above, the rest of the audiovisual media had an average mean of 2.00 and above, indicating uniform perception of the value of the effectiveness of audiovisual media.

When teachers were asked to comment on the responses they made, 24.8 percent were in favor of the comment that increase in audiovisual media use should be encouraged in schools; 24 percent supported the comment that radio broadcast programs should consider school time-tables and schedules when transmitting the radio lessons; 22.3 percent supported the comment that they do not use radio programs in their schools and 9.9 percent supported the comment that motivational, learner participation, etc. design techniques should be introduced in the audiovisual media they use in their schools. For further details, refer to Figure 1-2 and Table 2-2.

Against the above analysis, it can be concluded that there are certain audiovisual media items and techniques which teachers perceive as effective, this includes fieldtrips, textbooks, workbooks, educational games, drama and folk media, motion pictures and others. There are other audiovisual media items and techniques perceived as less effective, this includes telephones, television programs, slides and transparencies, filmstrips, etc. Motivational and learner participation and etc. design techniques were perceived by some teachers as necessary to promoting effective teaching and learning and, therefore it was thought appropriate to have such design techniques used in the production of audiovisual media materials.

The analysis of the data shows that textbooks and workbooks, flat pictures, charts, maps, blackboards and etc. are among the audiovisual media available and used in most secondary schools. There are other audiovisual media available in sufficient numbers in most schools but are not used Such media include: tape recordings, educational games, drama and folk media and etc. Then of the audiovisual

media not available in most schools, television programs, motion pictures and etc. are examples. For details refer to Table 201. Radio programmes have succeeded in secondary schools to upgrade classroom teaching and learning activities. For details, refer to Figure 1-2. They are as effective as conventional classroom teaching and learning processes. Audiovisual media design techniques focusing on motivation, attention-directing mechanisms and active involvement of the learner during the course of the lesson were considered appropriate to be introduced and included in schemes of work. Fieldtrips, textbooks, workbooks, teacher handouts, educational games, drama and folk media, motion pictures and etc. were perceived effective in upgrading classroom learning. Telephones, television programs, slides and etc. were perceived as ineffective in upgrading classroom learning. For details refer to Table 2-2.

Perception of the Value of Audiovisual Media by Classroom Teachers and School Administrators

Research Question 2. Will the proposed study provide data to determine which of these courses: languages, mathematics, social studies, science studies and business studies are the teachers and school administrators motivated to perceive audiovisual media and techniques as valuable for teaching and learning activities ?

Results--Research Question 2. The research question was refined into a research hypothesis and was stated in null form (refer to page 155). The statistical technique of mean used to describe classroom teachers and school administrators perceptions of the value of audiovisual media are summarized in Table 2-3. Table 2-4

Table 2-3. Mean Perception of Audiovisual Media and Techniques: Value Score based on Teacher Status.

TEACHER STATUS	CLASSROOM TEACHER	DEPARTMENTAL CHAIRPERSON	HEAD TEACHER	TWO OR ALL OF THE THREE TEACHER STATUS	TOTAL
No. of Cases	37	26	21	31	115
Mean	2.0	2.0	2.5	3.0	2.4

Table 2-4. Means for Perception of Audiovisual Media and Techniques: Value Score based on Courses Taught.

COURSE	LANGUAGE	MATHEMATICS	SOCIAL STUDIES	SCIENCE STUDIES	BUSINESS	TOTAL
No. of Cases	12	16	25	43	14	121
Mean	2.0	2.3	2.4	2.5	2.6	2.4

gives a summary of teacher perception of the value of audiovisual media on the basis of the courses taught. Table 2-5 is a summary of mean scores on how teachers who teach specific courses perceive the value of audiovisual media. The three tables are used in the discussion of Research Question 2.

Discussion--Research Question 2. The results of mean perception between classroom teachers and school administrators were used to identify which teachers perceive the vaule of audiovisual media more positively and which teachers perceive the value of audiovisual media less positively on the average. A mean of (2.40) was considered to be the total average mean for the perceptions of the three teacher groups.

The three teacher groups combined had a mean of (3.0) followed by headteachers with a mean of (2.5) which were both above average mean response (2.4). Classroom teachers and departmental chairpersons had both a mean of (2.0) which was (.4) below mean response (2.4). The difference between high mean (3.0) and low mean (2.0) was not meaningfully large. At this stage, it is reasonable to assert that headteachers perceive the value of audiovisual media more positively than departmental chairpersons and classroom teachers. Refer to Table 2-3 for details.

Further analysis was conducted using mean perception of the value score of audiovisual media and techniques by courses taught by the teachers. The purpose of this analysis was to isolate the teachers and the courses they teach, who perceive more positively the value of audiovisual media. Additionally, this analysis is to uncover

Table 2-5. Summary of mean scores on how teachers who teach specific courses perceive the value of audiovisual media and techniques used in secondary schools.

Means	Languages N = 18	Maths N = 16	Social Studies N = 25	Science Studies N = 48	Business N = 14
1. Real things, models	1.72	2.13	2.56	2.66	3.00
2. Flat pictures	.94	1.19	2.52	2.58	3.00
3. Slides, filmstrips	1.11	1.13	2.32	2.35	2.71
4. 16 mm sound motion pictures	2.94	3.00	2.92	3.02	3.00
5. 8 mm films	2.56	2.06	2.46	2.54	2.21
6. Radio programs	1.67	2.00	2.24	2.14	2.29
7. Tape recordings	2.28	2.81	2.44	2.48	2.43
8. Textbooks and workbooks	2.78	2.75	3.36	3.14	3.50
9. Fieldtrips	2.89	3.25	3.36	3.12	3.50
10. Educational games	3.33	3.31	3.04	2.83	3.14
11. Drama and folkmedia	3.11	3.31	3.00	2.98	3.21
12. Television programs	.44	1.00	1.48	2.17	2.14
13. Computer programs	1.17	1.25	1.64	2.13	2.07
14. Individualized learning	2.33	3.50	2.64	2.21	2.71
15. Telephones	1.33	1.69	1.36	1.27	1.36
16. Multimedia	.61	1.13	1.52	1.98	2.00

specific audiovisual media and techniques teachers teaching a specific course perceive more positively as valuable for teaching and learning activities. Business studies teachers had a high mean (2.64) followed by science teachers ($\bar{x}$ = 2.5), social studies teachers ($\bar{x}$ = 2.4), mathematics teachers ($\bar{x}$ = 2.3) and language teachers with ($\bar{x}$ = 2.0). The difference between more positive perceivers, business studies teachers ($\bar{x}$ = 2.6) and less positive perceivers, language teachers ($\bar{x}$ = 2.0) was not meaningfully large. Based on these results, it can be predicted that business studies teachers perceive more positively the value of audiovisual media followed by science teachers, social studies teachers, mathematics teachers and language teachers, in that order.

With regard to specific courses; language teachers perceive more positively the value of these audiovisual media and techniques: educational games, drama and folkmedia, 16 mm sound motion pictures, fieldtrips, textbooks and workbooks, 8 mm films, individualized learning and etc. Mathematics teachers perceive more positively the value of these audiovisual media and techniques: individualized learning, darma and folkmedia, fieldtrips, 8 mm and 16 mm sound motion pictures, tape recordings, textbooks and workbooks, real things, models and etc. Social studies teachers perceive more positively the value of these audiovisual media and techniques: textbooks and workbooks, fieldtrips, educational games, drama and folkmedia, 16 mm sound motion pictures, individualized learning, real things, models, flat pictures and others. Science studies teachers perceive more positively the value of these audiovisual media and techniques: textbooks and workbooks, fieldtrips, 16 mm motion pictures, drama and

folkmedia, educational games, real things, models, flat pictures and others. Business studies teachers perceive the following media more positively: textbooks and workbooks. fieldtrips, drama and folk-media, educational games, 16 mm sound motion pictures, real things, models and flat pictures, individualized learning, slides, filmstrips and etc. For details refer to Table 2-5.

Research Question 3

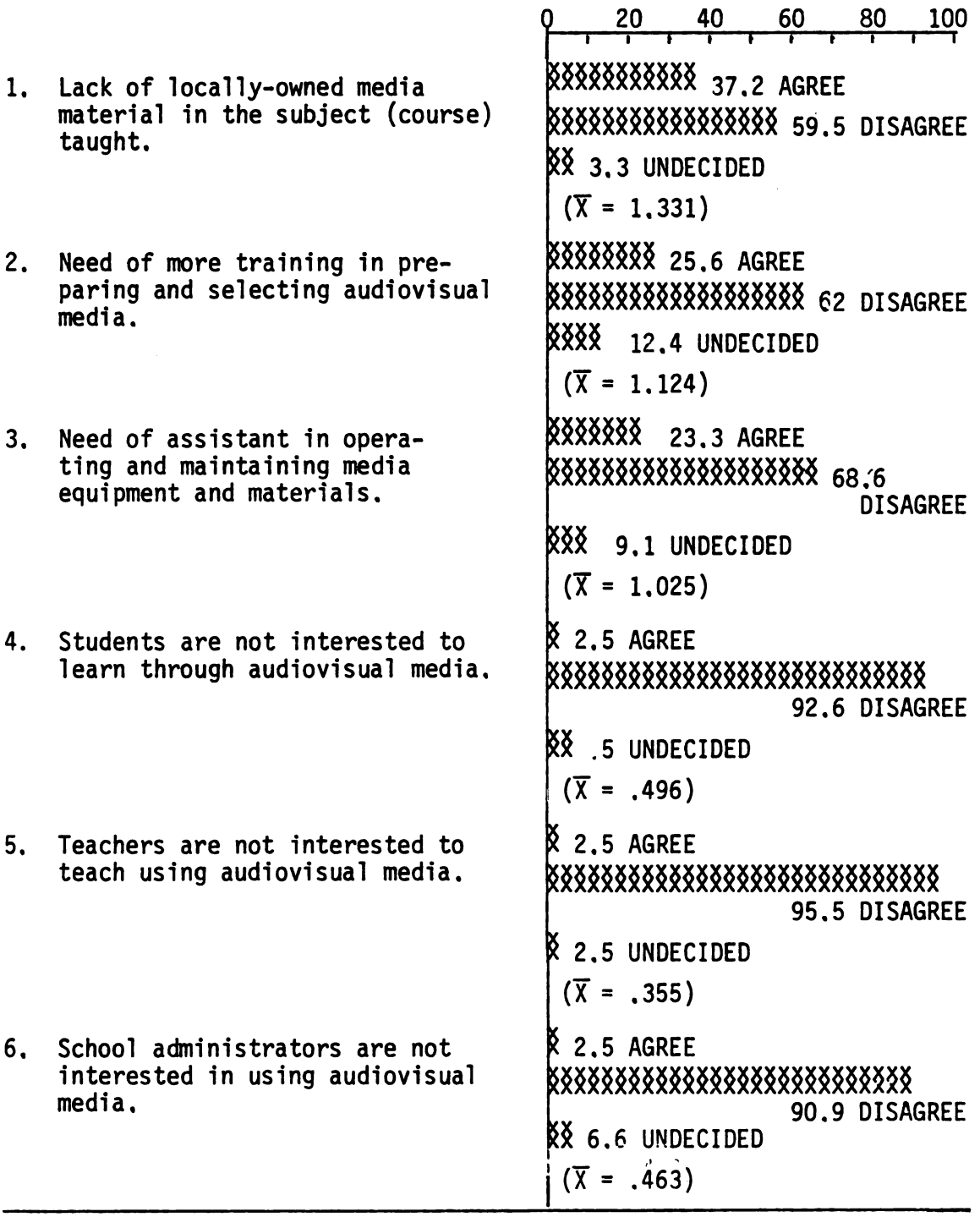
Will the proposed study provide data to identify what chief constraints are encountered by teachers when using audiovisual media and techniques, in teaching and learning activities?

Results--Research Question 3. The statistical devices of means and percentages used to describe constraints that face teachers through instructional media are provided in Figure (2-1) and also used in the discussion of Research Question 3.

Discussion--Research Question 3. Percentage analyses were performed on statements about constraints of instructional media use in schools. 59.5 percent of the teachers disagreed to the statement that lack of locally-owned media material in the subjects they teach was a constraint. 37.2 percent of the responding teachers agreed that lack of locally-owned media material was a constraint. This indicates that only a third of the schools that responded face the problem of lack of locally-owned media but the majority of schools constituting two-thirds do not have the problem. Furthermore, this result disputes one of the indications of the problem--lack of locally-owned media; cited in the analysis of the problem to be one of the several factors contributing to unproductive use of the potentialities

Figure 2-1. Teacher perceptions towards statements of reasons for not using audiovisual media.

Mean and percentage agreement with statements about constraints of audiovisual media use in schools.
(N = 121)



of media in most schools.

The statement that teachers need more training in preparing and selecting audiovisual media had 62 percent of the responding teachers agreeing negatively that is is one of the constraints contributing to unproductive use of the potentialities of instructional media. 25.6 percent agreed positively that it was a problem. This constraint is only predominant in a quarter of the schools that responded.

The statement that teachers need help in operating and maintaining media equipment is found only in less than one-quarter of the schools which responded. But a majority of the schools, amounting to 68.6 percent, agreed negatively, implying that help in maintaining and operating media equipment was not a problem in their schools.

The statement that lack of interest on the part of the students to learn through audiovisual media is a constraint that had a high percentage of negative agreement of 92.6 percent. This indicates that a lack of interest on the part of students to learn through media is not a problem in almost all schools, that responded.

Teachers are not interested to teach through audiovisual media was another statement with high negative agreement of 95.9 percent indicating that it is not a problem in most schools in the study.

School administrators are not interested in using audiovisual media, similarly, was another statement with high negative agreement of 90.9 percent implying that it is not a problem in many of the schools that responded.

On the basis of the above analysis, it can be concluded that a lack of locally-owned media, need of more training in preparing and selecting media, need of help in operating and maintaining

media equipment are constraints in some schools and not others that were studied. Lack of motivation on the part of students, teachers and school administrators is not a constraint in most schools included in the study.

Research Question 4

Will the proposed study provide data to be used to determine a program of instructional development that could be used by in-service teachers

Results--Research Question 4. The statistical techniques of means and percentages used to describe the components of an audio-visual media in-service program are summarized in Figure (2-2) and also used in the discussion of Research Question 4.

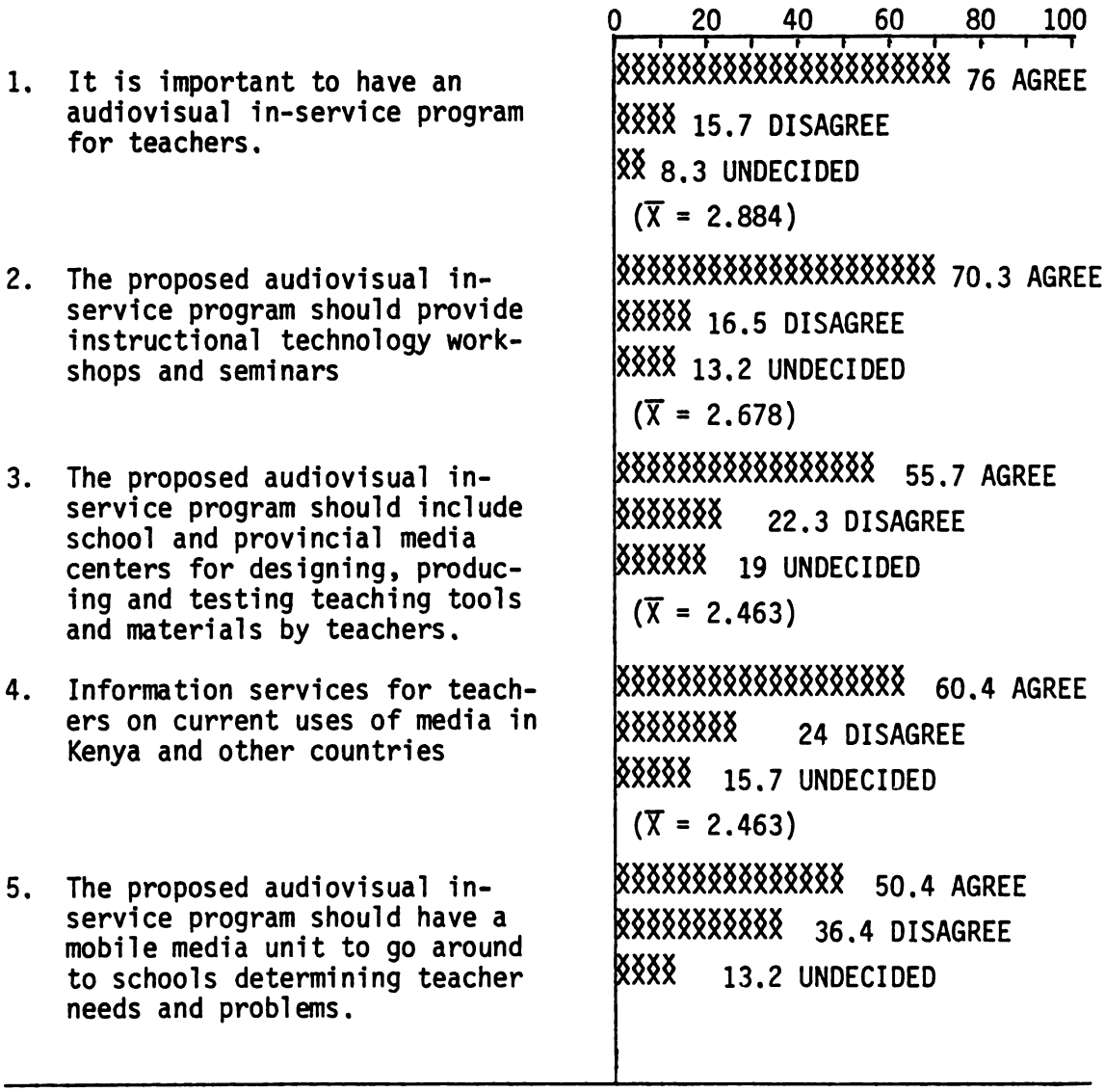
Discussion--Research Question 4. Means and percentages were performed on the statements about in-service program of instructional media. It was found that 76 percent of the teachers responded positively, 15.7 percent responded negatively and 8.3 percent were uncertain in their responses to the statement: it is important to have an audiovisual in-service program for teachers.

About 70.3 percent responses were positive, 16.5 percent negative and 13.2 percent uncertain to the statement: an audiovisual in-service program should provide teaching and educational technology workshops and seminars for teachers.

The statement that an audiovisual in-service program should include a media center in the school and in the province for designing, producing and testing teaching tools and materials by teachers had 58.7 percent positive responses, 22.3 percent negative and 19 percent

Figure 2-2. Teacher perceptions towards statements of future perceptions about audiovisual media.

Mean and percentage agreement with statements about in-service program of instructional development.
(N = 121)



uncertain responses.

An audiovisual-in-service program should disseminate information services to teachers on current uses of media in Kenya and other countries, statement had 60.4 percent positive responses, 24 percent negative and 15.7 percent uncertain responses.

The statement that an audiovisual in-service teacher program should have a mobile media unit to go around to schools determining teacher needs and problems had 50.4 percent positive response, 36.4 percent negative and 13.2 percent uncertain responses.

The agreement was high across all the statements and the differences between each mean were not large, indicating uniform perception to each of the statements of the audiovisual media in-service program. The fact that there is a high percentage of positive agreement to each of the statements indicates the necessity of an in-service program of audiovisual media for teachers. For details of the purposes of the in-service program, its components, and who should provide it, refer to page .

Research Question 5

Will the proposed study provide data to determine the status of communication links between producers and teachers?

Results--Research Question 5. The mans and percentage statistics used to describe the statements about the communication links between producers and teachers are summarized in Figure (2-3) and similarly used in the discussion of Research Question 5.

Discussion--Research Question 5. Descriptive statistics of mean and percentages were used to explore statements about communication

Figure 2-3. Teacher perceptions towards statements of communication system of secondary school educational program.

Mean and percentage agreement with statements about communication between teachers and producers.
(N = 121)

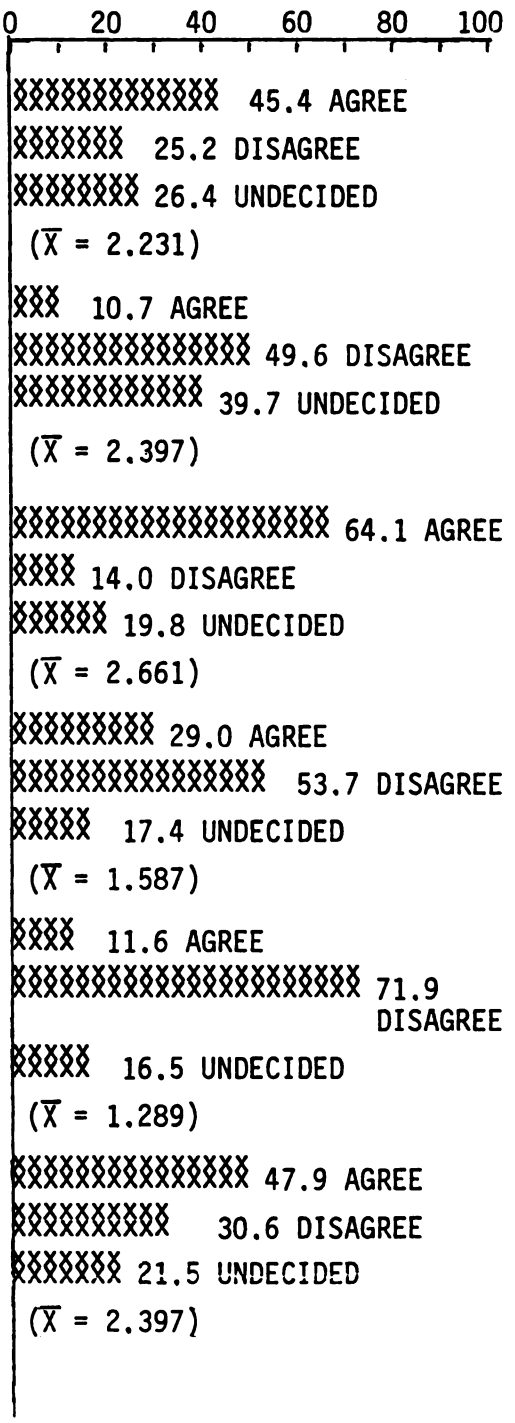
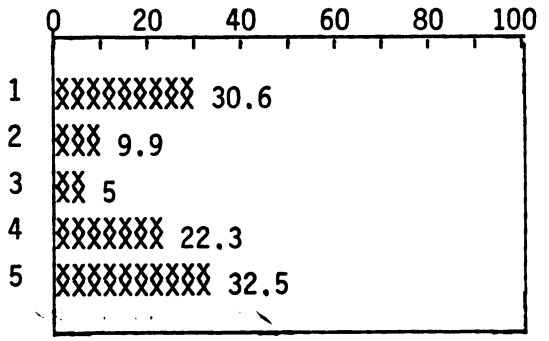


Figure 2-3 (continued)

7. Comments



links between producers and teachers. It was revealed that 45.4 percent positive agreement, 28.2 percent negative agreement and 26.4 percent uncertain agreement were responses to the statement that: exchange of information between teachers and producers is efficient. 28.2 percent negative responses and 26.4 percent uncertain responses are high enough to lead to the conclusion that information exchange might be efficient in some schools and not in others.

The statement that educational media services and feedback are available to teachers through a newsletter or circular published on a regular basis had 49.6 percent negative response, 39.7 percent uncertain response and only 10.7 percent positive response. This indicates that only 10 percent of the schools studied receive media services. A high percentage of uncertain response leads to more doubts about the availability of an information source published on a regular basis for most teachers. It can be concluded that media services and feedback information is not widely distributed to many schools, in this study.

Educational media services and feedback are available to teachers through in-service activities, seminars and workshops statement had 64.1 percent positive response, high enough to indicate that in-service activities, seminars and workshops are available to teachers in the schools covered by the study.

The statement that: teacher requests for media material are easily initiated had 53.7 percent negative responses and 29 percent positive responses. 53.7 percent negative response is high enough to indicate that over a large number of the teachers who responded their requests for media are not easily initiated.

Over the statement that teacher requests for media material are promptly confirmed and scheduled, 71.9 percent of the responses were negative, implying that many schools that responded are faced with the problem of imprompt confirmation and scheduling of media material requests.

About 47.9 percent of the responses were positive towards the statement that teacher requests for media material are efficiently and effectively carried out. 30.6 percent of the responses were negative towards the statement and 21.5 percent were uncertain responses. 30.6 percent of negative response indicates that in some schools teacher requests for media material are not effective and efficient. Further, 21.5 percent of uncertain response seems high to imply that teachers in some of those schools that responsed might have no knowledge about whether teacher requests for media are efficient, effective or not.

The mean responses over statements 1, 2, 3 and 6 were high and did not deviated unduly from each other, implying uniform perception towards the statements • The mean responses over statements 4 and 5 were low, but did not deviate markedly from each other, indicating more negative and uncertain responses towards statements about communication links.

30.6 percent of the teachers favored the comment that contacts between teachers should be encouraged; 9.9 percent commented that probably constraints imposed on the money to buy media material might be one cause of lack of frequent contacts between teachers and producers. Five percent commented that lack of regular seminars and workshops in which to discuss media issues is one cause that makes

contact between teachers and producers difficult. 32.2 percent said technical teachers communicate effectively with their producers. Asked as to why they responded so, 24 percent supported the idea that teachers need opportunities in which to suggest the media they need to use for teaching, 26.5 percent said because of their experience and observation, and 21 percent said they have good communication between their producers.

On the basis of the above analysis. it can be concluded that communication links between teachers and producers needs to be more effective and efficient. Further details of improving communication linkage between the producers and the teachers are provided on page .

Research Question 6.

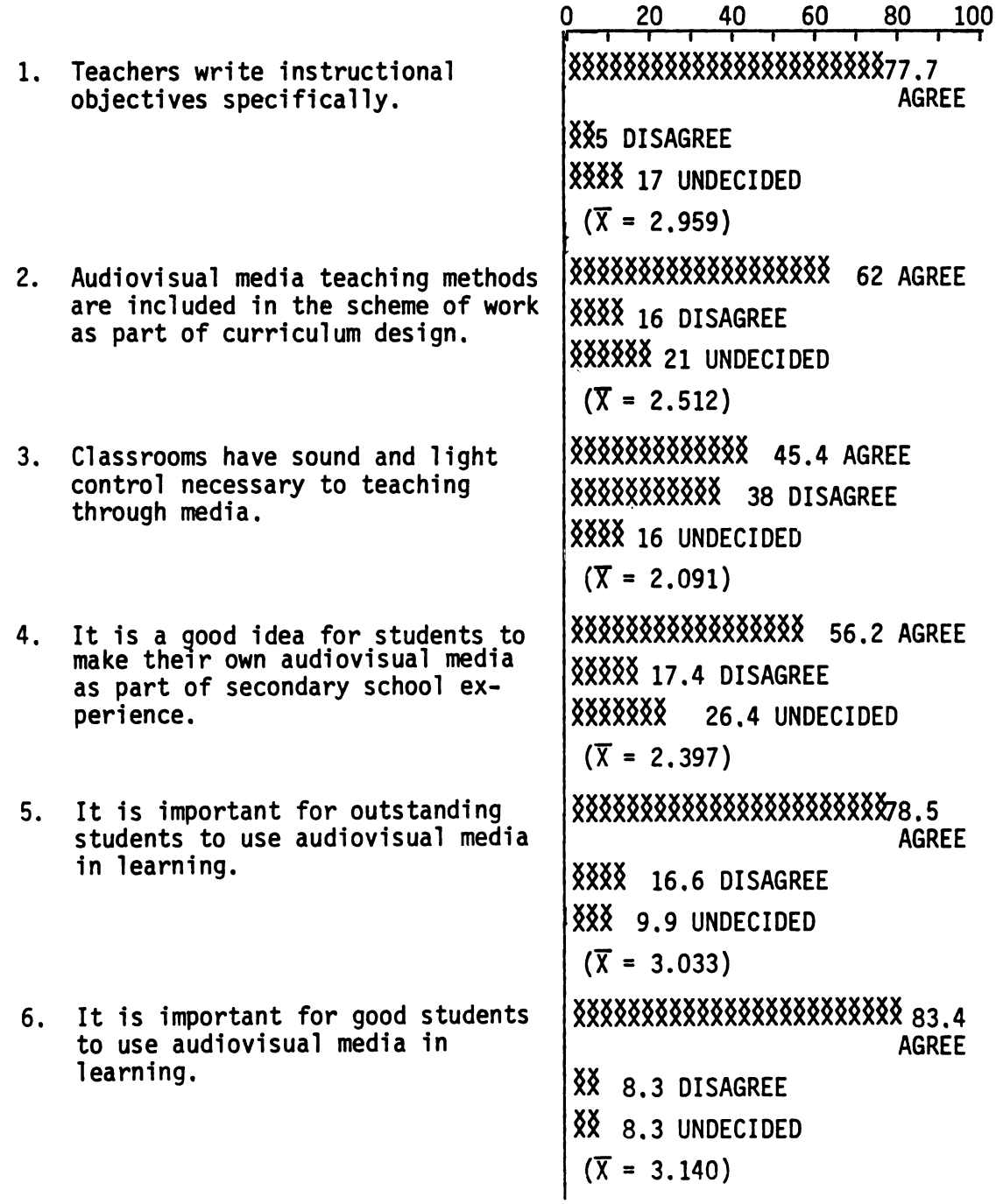
Will the proposed study provide data to determine the possibilities of teachers and students designing and producing their own audiovisual media materials that students can use to improve learning in schooling having less qualified teachers or no teachers?

Results--Research Question 6. Mean and percentage statistics were used to describe the statements about teaching systems and its environment. The man and percentage statistics used are summarized in Figure (2-4) and also used in the discussion of Research Question 6.

Discussion--Research Question 6. The statement that teachers write learning objectives specifically had 77.7 percent positive agreement and 17.4 percent uncertain agreement, indicating that only 17 percent of the teachers that responded have no knowledge about stating their instructional objectives specifically.

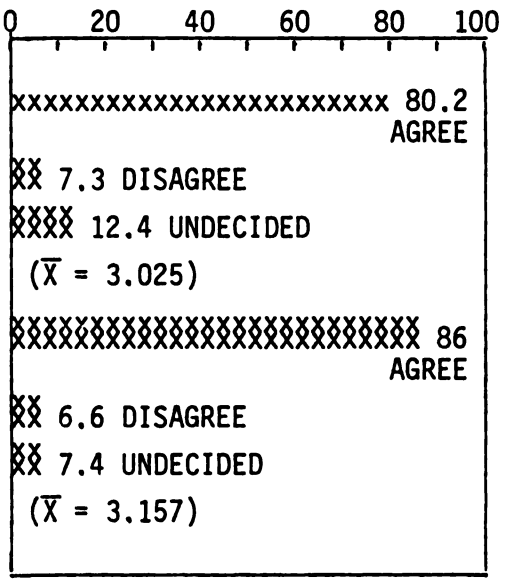
Figure 2-4. Teacher perceptions towards statements of teaching system in secondary school education.

Mean and percentage agreement with statements about teaching system and environment where it takes place.
(N = 121)



7. It is important for average students to use audiovisual media in learning.

8. It is important for poor students to use audiovisual media in learning.



Audiovisual media teaching methods being included the schemes of work as part of curriculum design had 62 percent positive agreement, 21.5 percent uncertain agreement and 16.5 percent negative agreement. Only 21.5 percent of the teachers who responded have no knowledge about the schemes, and 16.5 percent use schemes of work with audiovisual media teaching methods not included.

The statement that: classrooms have sound light control necessary to teaching using audiovisual media had 45.4 percent positive agreement, 38 percent negative agreement and 16.5 uncertain agreement. This indicates that more than a half of the schools that responded do not have sound and light facilities appropriate to teaching using instructional media.

It is a good idea for students to make their own audiovisual media as part of secondary school experience had 56.2 percent positive agreement, 26.4 percent uncertain agreement and 17.4 percent negative agreement. Since over one-half of the schools that responded favored the statement, it can be concluded that designing and producing audiovisual media by students need to be introduced in secondary school education.

Statements 5, 6, 7 and 8 had very high positive agreement. For details refer to Figure 2-4.

The mean to each statement was high and had less deviation indicating a uniform perception towards the statements about teaching system and its environment. When teachers were asked why they responded in favor of students learning from audiovisual media, 24 percent supported the statement that students learn more easily when using sight senses. About 10.7 percent who favored the statements

said, that it is the most effective way of using media and understanding clearly the subject matter. 58 percent of the teachers in favor stated that outstanding students do not need audiovisual aids, it is the average and poor student who needs the audiovisual media. On the basis of the analysis, it can be concluded that most teachers write their instructional objectives specifically, methods of teaching through media are included in the schemes of work in most schools and some schools have sound and light control facilities necessary for teaching using audiovisual media. It was considered appropriate for students to produce audiovisual media, outstanding, good, average and poor students should all use audiovisual media in learning. The statement about poor students had a high positive agreement of 86 percent, it can be asserted that they are the ones to have first priority to use media than other groups of students covered in this study.

The statement that, in recent years, what in your estimation has been the direction of audiovisual media use in your school had 22.3 percent of the teachers undecided, 15.7 percent said media use has decreased, 37.2 percent said media use has remained the same and 24.8 percent said media use has increased. When asked why they responded so, 27.3 percent of the teachers said media use has decreased owing to relaxation of teachers as a result of teaching aids not made available to them. About 37.1 percent said, availability of money has enabled teachers to design and produce media material particularly for science teaching, which has led to an increase in media use. 27.4 percent commented that they do not use media because

media equipment and time to use them is not available. On the basis of the analysis, it can be concluded that to increase media use in the schools, money, media equipment and time should be made available to all the teachers.

Research Question 7

Will the proposed study generate other areas in which future research could be conducted?

Results--Research Question 7. The data showed that research needs to be conducted in the production of audiovisual media, in the training of pre-service teachers in how to use the audiovisual media and how students can learn through such locally-designed and produced media. For details, refer to page 188.

Research Hypotheses

Hypothesis one was stated in the null form.

Research Hypothesis 1

Perception of the value of audiovisual media and techniques does not differ between teachers who work in rural secondary schools and those working in urban secondary schools.

Analysis of Research Hypothesis 1. The pooled estimate variance form of the t-test was used because it is used when samples are either large or equal. Many statisticians agree to a large extent that conclusions arrived at using this statistic are likely to be correct.[1] The results of the t-test indicate no difference in the perception of audiovisual media and techniques between teachers who work in

rural secondary schools and those working in urban secondary schools. A 2-tailed probability of .4451 for perception score = value, a 2-tailed probability of .4939 for perception score = would use, and a 2-tailed probability of .4695 for perception score = value and would use did not indicate a difference between the teachers at alpha = 0.5 level. The null hypothesis was not rejected; it was considered reasonable to conclude that there seems to be no difference in the perception of audiovisual media and techniques between teachers who work in rural and urban schools. For details, refer to Table 2-6.

Research Hypotheses 2 and 3.

Statistical Model of Analysis. Research Hypotheses 2 and 3 were investigated by oneway ANOVA test--classic experimental model with fixed effects at the alpha = .05 level. ANOVA is a test used to determine whether more than two sample means or several sample means are equal. The test is used under the assumptions that the scores were randomly sampled from a normal population with equal variances and the different samples are independent. It has been found out that certain violations of these assumptions have little effect on the results of the statistical analysis.[2]

The teachers in this study were randomly selected on the basis of the courses they teach and the administrative offices they hold in each school studied. Furthermore, all the teachers covered in the study responded to one common questionnaire statements of value and would use scores of audiovisual media and techniques. It was, therefore, considered appropriate to use a fixed effects ANOVA model to analyze hypotheses 2 and 3. Moreover, the teachers responded

Table 2-6. Summary of t-test on perception of audiovisual media and techniques between teachers who teach in rural schools and those teaching in urban schools.

	CASES	MEAN	STD DEV.	STD ERROR	POOLED AT VALUE	DF	VARIANCE 2 TAIL PROB.	ESTIMATE
VALUE								
Group 1	60	1.8750	1.0221	.1779	1.0906	108	.4451	NS
Group 2	60	2.0399	1.0970	.1911				
WOULD USE								
Group 1	60	.8807	.9519	.1658	.8913	108	.4939	NS
Group 2	50	.9754	1.0083	.1754				
VALUE AND WOULD USE								
Group 1	60	2.7557	1.9740	.3437	1.9819	108	.4695	NS
Group 2	50	3.0153	2.1053	.3665				

individually to the questionnaire statements rather than responding as a group. Thus, the assumption of independence between individual data observations can be met when using teacher as the unit of analysis, rather than resorting to school as a unit. Hence, teacher was chosen as the unit of analysis.

Research Hypothesis two was stated in the null form.

Research Hypothesis 2

Perception of the value of audiovisual media and techniques used in secondary schools does not differ between classroom teachers and school administrators.

Analysis of Research Hypothesis 2. The F ration of 8.82 (dF 3:111) for perception score = value indicated as difference; the F ratio of 6.32 (dF 3:111) for perception score = would use, indicated a difference and the F ratio of 7.37 (dF 3:111) for perception score = value and would use score indicated a difference. These differences were indicated at alpha = .05 level. Thus, the data did not support the null hypothesis that classroom teachers and school administrators did not differ in their perception of the value of audiovisual media. For details, refer to Table 2-7.

The difference in the mean perception between more positive perceivers, headteachers ($\bar{x}$ = 2.5); and less positive perceivers, classroom teachers and departmental chairpersons ($\bar{x}$ = 2.0) was not meaningfully large. This mean difference between classroom teachers and school administrators was indicated at alpha = .05 level: (F, 8.82 dF 3:000); (F, 6.32 dF 3:111); (F, 7.37 dF 3:111). The null hypothesis was rejected. The fixed effects oneway ANOVA test

Table 2-7. Summary of oneway ANOVA test on perception of audiovisual media and techniques by headteachers, departmental chairpersons and classroom teachers.

ONEWAY ANALYSIS OF VARIANCE

BY TEACHER STATUS — PERCEPTION OF AUDIOVISUAL MEDIA AND TECHNIQUES

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARES	F RATIO	F PROB.
Value					
Between Groups	29.4778	3	7.61444	8.8207	.32359
Within Groups	113.2637	111	.86325		
Total	142.7415	114			
Would Use					
SV	SS	DF	MS	F RATIO	F PROB.
Between Groups	22.8434	3	7.6144	6.3248	.32359
Within Groups	116.5545	111	1.2039		
Total	139.3979	114			
Value and Would Use					
SV	SS	DF	MS	F RATIO	F PROB.
Between Groups	52.3212	3	15.2288	7.3669	.32359
Within Groups	229.8182	111	2.0672		
Total	282.1394	114			

indicated a difference in the mean perception of audiovisual media between classroom teachers and school administrators. Such results would seem to indicate that headteachers, chairpersons and classroom teachers perceive the value of audiovisual media and techniques differently. Based on this analysis, it was reasonable to conclude that there is a difference in the perception of audiovisual media and techniques between school administrators and classroom teachers. Refer to Table 2-3 for details.

Hypothesis three was stated in the null form.

Research Hypothesis 3

Perception of audiovisual media and techniques used in secondary schools does not differ between teachers who teach language, mathematics, social studies, science studies, and business studies.

Analysis of Research Hypothesis 3. The F ratio of 3.26 (dF 4:116) for perception score = value indicated a difference in the F ratio of 4.68 (dF 4:116) for perception score = would use, indicated a difference and the F ratio of 3.97 (dF 4:116) for perception score = value and would use indicated a difference The differences were indicated at alpha = .05 level. Thus, the data did not support the null hypothesis. Hence, teachers who teach languages, mathematics, social studies, science studies and business studies did not differ their perception of the value of aduiovisual media. For details, refer to Table 2-8.

The difference in the mean perception between more positive perceivers, business teachers ($\bar{x}$ = 2.6) and less positive perceivers, language teachers ($\bar{x}$ = 2.0) was not meaningfully large. This mean

Table 2-8. Summary of oneway ANOVA test on perception of audiovisual media and techniques by teachers who teach languages, mathematics, social studies, science studies, and business studies.

ONEWAY ANALYSIS OF VARIANCE

BY COURSES TAUGHT — PERCEPTION OF AUDIOVISUAL MEDIA AND TECHNIQUES

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARES	F RATIO	F PROB.
Value					
Between Groups	17.42873	4	4.3572	3.26382	.28173
Within Groups	154.86156	116	1.3350		
Total	172.2901	120			
Would Use					
SV	SS	DF	MS	F RATIO	F PROB.
Between Groups	32.92550	4	8.2314	4.6769	.0283
Within Groups	200.9338	116	1.7600		
Total	233.8593	120			
Value and Would Use					
SV	SS	DF	MS	F RATIO	F PROB.
Between Groups	50.3542	4	12.5886	3.97036	.15502
Within Groups	355.7954	116	3.0950		
Total	406.1496	120			

difference in perception of the value of audiovisual media between teachers teaching specific courses (languages, mathematics, social studies, science studies and business studies) was indicated at alpha = .05 level: (F, 3.26 dF 4:111); (F, 4.68 dF 4:116); (F, 3.97 dF 4:116). The null hypothesis was rejected. The fixed effects oneway ANOVA test showed a difference in the mean perception of audiovisual media between teachers teaching languages, mathematics, social studies, science studies and business studies. Against these analyses it was thought reasonable to arrive at a conclusion that there is a difference in the perception of audiovisual media and techniques among teachers by the courses they teach in the schools covered by this study. Refer to Table 2-4 for details.

After the t-test, the fixed effects ANOVA test producing the above results about teacher perception of the value of instructional media items and techniques, more analyses were made on the data in order to determine if the sample distribution was drawn from a normally distributed population. It was, therefore, hypothesized that the observed sample distribution conformed to the theoretical (estimated) distribution. The Kolmogorov-Smirnov one-sample, non-parametric test was used to test if the observed sample distribution was equal to the theoretical distribution. Based on Siegel,

> The Kolmogorov-Smirnov one-sample test treats individually observations separately and thus, unlike the X^2 test for one sample, need not loose information through the combining of categories.... the X test is definitely less powerful than the Kolmogorov-Smirnov test.[3]

Hypothesis four was stated in the null form.

Research Hypothesis 4

That there is no difference in the observed and estimated distributions.

Analysis of Research Hypothesis 4. The K-S test produced a 2-tailed P. of .0000 for perception score = value; would use value and would use perception score combined which was significant at alpha = .05 level. The null hypothesis was rejected. The K-S test very significant difference in the observed and theoretical (estimated) distributions. The results of the analysis seem to indicate that the sample was not drawn from a normally distributed population. Based on this test, it was deemed reasonable to arrive to the conclusion that the sample was taken from a randomly distributed population. The results of the analysis are summarized in Table 2-9.

Summary

In this chapter, Research Question 1 (a) indicated that instructional media items and techniques such as textbooks and workbooks, flat pictures charts, maps and blackboards, etc. are available and used extensively in most schools studied. Then, there are other media items and techniques available in sufficient number in most schools but are not used effectively, examples include: tape recordings, educational games, drama and folkmedia, etc. Ultimately, there are instructional media items and techniques not easily available in schools, they include television programs, motion pictures and others. Study of Research Question 1 (b) revealed that radio programs assist students in learning more, assist teachers in improving teaching skills including organization of teacher

Table 2-9. Summary of the K-S test on observed and theoretical distribution of perception of instructional media items and techniques and scores--value, would use, and value and would use.

VALUE

Cases	Mean	STD. DEV.	EST.
121	38.157	18.661	

Theoretical Distribution -- Normal (Mean = 28.157 STD. DEV. = 18.661)

MAX (ABS DIFF)	MAX (+ DIFF)	MAX (- DIFF)	K-SZ	2-Tailed P.	
.6852	.6852	-.0000	8.16319	.0000	S

WOULD USE

Cases	Mean	STD. DEV.	EST.
121	29.431	21.874	

Theoretical Distribution -- Normal (Mean = 29.431 STD. DEV. = 21.874)

MAX (ABS DIFF)	MAX (+ DIFF)	MAX (- DIFF)	K-SZ	2-Tailed P.	
.6212	.6212	-.0000	6.8336	.0000	S

VALUE AND WOULD USE

Cases	Mean	STD. DEV.	EST.
121	67.588	40.535	

Theoretical Distribution -- Normal (Mean = 38.157 STD. DEV. = 40.535)

MAX (ABS DIF)	MAX (+ DIFF)	MAX (- DIFF)	K-SZ	2-Tailed P.	
.6532	.6532	-.0000	7.4984	.0000	S

schedules and capability of teaching more using radio programs. Media design techniques focusing on motivation, attention-directing mechanisms and active involvement of the learner during the course of the lesson were considered valuable and appropriate to be introduced and included in the schemes of work. Study of Research Question 1 (c) showed that: fieldtrips, textbooks, workbooks, teacher handouts, educational games, drama and folkmedia, motion pictures, individualized learning, tape recordings, real things, models, resource people, flat pictures, maps, blackboards and etc. were considered effective in improving teaching and learning activities. Telephone, television programs, slides, filmstrips and transparencies, radio programs, etc. were considered ineffective. (Refer to Table 2-2, Figures 2-1, 2-2.)

Study of Research Question 2 was refined into hypothesis three and was stated in null form. The data analysis showed that headteachers perceive the value of audiovisual media more positively than departmental chairpersons and classroom teachers. For details, refer to Table 2-3. Business teachers perceive more positively the value of audiovisual media followed by science teachers, social studies teachers, mathematics teachers and language teachers. For details refer to Table 2-4.

Study of Research Question 3 revealed that a lack of locally owned media, need of more training in preparing and selecting media, are only constraints in some schools and not others that were studied. Lack of motivation on the students, teachers and school administrators are not constraints in most schools covered in the study. (Refer to page 135). Study of Research Question 4 uncovered teachers' needs for an in-service instructional development program which should

include workshops, seminars, school and provincial media centers, a mobile media unit and information services on current uses of media in Kenya and other countries. Study of Research Question 5 disclosed that communication links between teachers and producers was not all that effective and therefore need to be made effective and efficient. Study of Research Question 6 showed that most teachers write their instructional objectives specifically, in some schools media teaching methods were included in schemes of work, classrooms have sound and light control for media use whereas other schools do not have such facilities. It was considered appropriate for students to design and produce audiovisual media; outstanding, good, average and poor students should all have access to using audiovisual media. But, priority should be given to poor and average students. To increase productive audiovisual media in schools, money, media equipment and time should be made available to all the teachers.

Study of Research Question 7 is summarized in Chapter V.

The null Hypothesis 1 was not rejected; there was no difference in the perception of audiovisual media and techniques between rural and urban teachers. The t-test showed a 2-tailed probability of .4451 for perception score = value, a 2-tailed probability of .4939 for perception score = would use, and a 2-tailed probability of .4695 for perception score = value and would use. The lack of a difference was indicated at alpha = .05 level (refer to Table 2-6).

The null Hypothesis 2 was rejected. There was a difference in the perception of the value of audiovisual media and techniques between classroom teachers and school administrators. The fixed effects oneway ANOVA test produced F ratio of 8.82 (dF 3:111) for perception

score = value, F ratio of 6.32 (dF 3:111) for perception score = would use, and F ratio of 7.37 (dF 3:111) for perception score = value and would use. The differences were indicated at alpha = .05 level. Headteachers perceive the value of audiovisual media ($\bar{x}$ = 2.5) more positively, followed by both departmental chairpersons and classroom teachers ($\bar{x}$ = 2.0). For details, refer to Tables 2-3 and 2-7.

The null Hypothesis 3 was rejected. There was a difference in the perception of the value of audiovisual media and techniques between teachers teaching specific courses. The fixed effects one-way ANOVA test produced F ratio of 3.26 (dF 4:116) for perception score = value, F ratio of 4.68 (dF 4:116) for perception score = would use and F ratio 3.97 (dF 4:116) for perception scoe = value and would use. The differences were indicated at alpha = .05 level. Business teachers perceive more positively the value of audiovisual media ($\bar{x}$ = 2.6) followed by science teachers ($\bar{x}$ = 2.5), social studies teachers ($\bar{x}$ = 2.4), mathematics teachers ($\bar{x}$ = 2.3) and language teachers ($\bar{x}$ = 2.0). For more details, refer to Tables 2-4 and 2-8.

Hypothesis 4 was rejected. There was a difference between observed and theoretical distributions. The K-S test produced a 2-tailed probability of .0000 for value score, would use score, value and would use score (refer to Table 2-9).

In the chapter to follow, this study is summarized. A systematic approach to audiovisual media use is outlined along with some conclusions, recommendations and personal reflections of the study investigator.

FOOTNOTES

[1]Herbert Terrace and Scott Parker (eds.). 1975. Psychological Statistics, Vol. 10 (San Rafael, California: Individual Learning Systems, Inc.), p. 60.

[2]V. Gene Glass and Stanley C. Julian. 1970. Statistical Methods in Education and Psychology (Prentice Hall, Inc., Englewood Cliffs, New Jersey), pp. 339-340.

[3]Sidney Siegel. 1956. Nonparametric Statistics for the Behavioral Sciences (New York: McGraw-Hill Book Comany), p. 51.

CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS; AND PERSONAL CONSIDERATIONS

The purpose of this study was to investigate the organization and utilization of audiovisual media and techniques in secondary school education. The study had a two-fold purpose. First, to identify audiovisual media material and techniques that are available to secondary schools. And secondly, to find out how school administrators and classroom teachers based on the courses they teach, perceive the role and value of audiovisual media and techniques used in secondary school education. The study findings were supplemented with information on how developed and developing countries use audiovisual media. Then, a systematic approach of audiovisual media was evolved. Such a systematic audiovisual media program could be recommended for adoption in schools and institutions not adequately staffed with qualified teachers in the country of Kenya.

Five measures were used to study the organization and utilization of audiovisual media in schools. The five measures were: the types of audiovisual media material and techniques available to schools; which of the audiovisual media and techniques used in schools that teachers perceive as valuable for upgrading learning and teaching?; the constraints that face teachers while teaching through audiovisual media; communication linkage between producers of audiovisual media; and the courses which the teachers teach.

One common questionnaire was sent to (250) classroom teachers and (25) headteachers of secondary schools in Kenya. The questionnaire was designed to discover classroom teacher's and school administrators' perception of the role and value of audiovisual media and techniques in schools, perception of potential audiovisual media, constraints that face teachers using audiovisual media and communication linkage between audiovisual media producers and classroom teachers. The teachers and school administrators were selected from a stratified random sample of (25) secondary schools selected from all parts of Kenya. They were selected on the basis of administrative offices they hold and courses they teach. The questionnaire was approved by the dissertation guidance committee and the Office of Research Consultation of the College of Education at Michigan State University. It was pilot tested in one school in Kenya, administered, and the data were coded and analyzed.

Design of the Study

The sample that was studied was drawn from twenty five (25) secondary schools in Kenya. This sample is five percent (5%) of the total government secondary schools and two percent (2%) of the total government, private and community supported self help (harambee), secondary schools combined.

Below the research questions and hypotheses used in the study are summarized.

Research Question 1. Will the proposed study provide data:

(a) to help determine what audiovisual media and techniques are available in secondary schools?

(b) to help determine the role played by the dominant available audiovisual media supplied by the Educational Media Service to secondary schools?

(c) to determine how the teachers and school administrators perceive the effectiveness of audiovisual media and techniques in teaching and learning activities?

This question was to find out the types of audiovisual media and techniques that are used in schools and how the teachers perceive their role in improving learning and teaching processes. Based on the data collected, there are certain audiovisual media and techniques available and used in most schools. Such media included: textbooks, workbooks and teacher handout--the most commonly used; flat pictures, charts, maps, blackboards, fieldtrips, real things, models and resource people; drama and folkmedia; educational games and simulations; slides, filmstrips and transparencies; individualized instruction, tape recordings and radio programs. Then, there are audiovisual media not available in most schools. These include: television programs and motion pictures. Of the dominant audiovisual media supplied to schools by Educational Media Service are: radio programs -- the most frequently used, followed by slides, films and television programs. This study concentrated on the effectiveness of radio programs. as the dominant audiovisual media used in schools. The data collected indicated that radio programs are perceived as effective as conventional classroom teaching and learning processes. Regarding design techniques such as motivational procedures, attention-directing mechanisms, learner participation, the data showed that very few audiovisual media and techniques have the design techniques built in them as part of their design. Fieldtrips, textbooks, workbooks and teacher handouts; educational games and simulations; drama

folkmedia; motion pictures, individualized learning, tape recordings, real things, models and resource people, flat pictures, maps, blackboards and etc., were the audiovisual media and techniques perceived as effective in teaching and learning activities. Television programs, multimedia, slides, filmstrips and transparencies, etc. were the audiovisual media perceived as less effective in teaching and learning activities. For details, refer to Tables 2-1, 2-2 and Figures 1-1 and 1-2.

Research Question 2. Will the proposed study provide data to determine which of these courses: languages, mathematics, social studies, science studies and business studies are teachers and school administrators motivated to perceive audiovisual media and techniques as valuable for teaching and learning activities?

Research Question 2 was changed to research hypothesis 3, and was stated in null form (refer to page 155). The data analysis showed that headteachers perceive the value of audiovisual media more positively than both departmental chairpersons and classroom teachers. For details, refer to Table 2-3. Business teachers perceive more positively the value of audiovisual media followed by science teachers, social studies teachers, mathematics teachers and language teachers. For details, refer to Table 2-4.

Research Question 3. Will the proposed study provide data to identify what chief constraints are encouraged by teachers when using audiovisual media and techniques in teaching and learning activities?

The data revealed that lack of locally-available media, need of

more training in preparing and selecting media, need of help in operating and maintaining media equipment were constraints in some schools and not other schools that were studied. Lack of motivation on the part of students, teachers and school administrators was not a constraint in the majority of schools studied. For details, refer to Figure 2-1.

Research Question 4. Will the proposed study provide data to be used to determine a program of Instructional Development that could be used by in-service teachers?

The data supported the proposition that it is important to have an Instructional Development in-service program for teachers. Such a in-service program should include: seminars, workshops, school and provincial audiovisual media centers. Further, the program should provide information services on current media use in Kenya and other countries and should have a mobile audiovisual media unit that can visit schools and attend to teacher needs and problems. For details, refer to Figure 2-2.

Research Question 5. Will the proposed study provide data to determine the status of communication links between producers and teachers?

Based on the data, communication links between producers of audiovisual media and teachers should be strengthened in order to be more effective and efficient. For details, refer to Figure 2-3.

Research Question 6. Will the proposed study provide data to determine the possibilities of teachers and students designing and producing their own audiovisual media materials that students can

use to improve learning in school having less qualified teachers or no teachers?

The data indicated that most teachers write their instructional objectives specifically and methods of teaching through audiovisual media are included in the schemes of work as part of curriculum design in some schools and not all schools studied. Only in some schools are classrooms equipped with sound and light control necessary for teaching using audiovisual media. The proposition that teachers and students should design and produce audiovisual media was supported by the data. To increase productive audiovisual media use in schools, money, media equipment, media material and time should be made available to all the teachers. For details, refer to Figure 2-4.

Research Question 7. Will the proposed study generate other areas in which future research could be conducted?

The data showed that more research needed to be conducted in the production of audiovisual media, in the training of pre-service teachers on how to use the audiovisual media and how students can learn through such locally designed and produced media. Such research can be in the form of survey research, experimental research and research, development and applications. For specific details refer to page 188.

The data analyzed in this study revealed that there are audiovisual media and items available in most schools: such as, textbooks, workbooks and teacher handouts; flat pictures, charts, maps and etc. Then there are audiovisual media not available in most schools. These include: television programs, motion pictures and etc. Of the audiovisual media and techniques available in schools, radio programmes

are as effective as conventional classroom teaching. Only a few of these available audiovisual media have design techniques of motivational procedures, attention-directing mechanisms, learner participation, built in them as part of their design. In addition to radio programmes, fieldtrips, textbooks, workbooks and teacher handouts; educational games and simulations; drama and folkmedia, motion pictures , are perceived by teachers as being effective in improving learning and teaching. Lack of locally-owned media, help in equipment operation and lack of motivation on the part of students and teachers were constraints only in some schools and not other schools. An Instructional Development in-service program should be established for in-service teachers and communication linkage between audiovisual media producers and teachers need strengthening in order to be more effective and efficient. Some schools have facilities for teaching using media and other schools do not have such facilities. Students should produce audiovisual media. To encourage productive audiovisual media use in schools, money, media equipment and time should be made available to all the teachers.

Research Hypothesis 1. Perception of the value of audiovisual media and techniques does not differ between teachers who work in rural secondary schools and those working in urban secondary schools.

The hypothesis was not rejected at alpha = .05 level. The results of the t-test indicated no difference in the perception of audiovisual media and techniques between teachers who work in rural secondary schools and those working in urban secondary schools. These are the results of the t-test: 2-tailed P. of .4451 for perception

score = value, 2-tailed P. of .4939 for perception score = would use, and 2-tailed P. of .4695 for perception score = value and would use. There appear to be no difference in the perception of audiovisual media and techniques between teachers who work in rural and urban schools. For details, refer to Table 2-6.

Research Hypothesis 2. Perception of the value of audiovisual media and techniques used in secondary schools does not differ between classroom teachers and administrators.

This hypothesis was rejected at alpha = .05 level. Oneway ANOVA test showed a difference in the mean perception of audiovisual media between classroom teachers and school administrators. The mean perception difference bwetween more positive perceivers, headteachers, ($\bar{x}$ = 2.5) and less positive perceivers, classroom teachers and departmental chairperson, ($\bar{x}$ = 2.0) was not meaningfully large. In details the ANOVA test results were: (F, 8.82 dF 3:111) for perception score = value, (F, 6.32 dF 3:111) for perception score = would use; (F, 7.37 dF 3:111) for perception score = value and would use. There is a difference in the perception of audiovisual media and techniques between schools administrators and classroom teachers. For details, refer to Table 2-3 and 2-7.

Research Hypothesis 3. Perception of audiovisual media and techniques used in secondary schools does not differ between teachers who teach languages, mathematics, social studies, science studies and business studies.

The hypothesis was rejected at alpha = .05 level. Oneway ANOVA test showed a difference in the mean perception of audiovisual media between teachers on the basis of the coureses they teach. Business teachers had a high mean ($\bar{x}$ = 2.6), followed by science teachers ($\bar{x}$ = 2.5), social studies teachers ($\bar{x}$ = 2.4), mathematics teachers ($\bar{x}$ = 2.3) and language teachers ($\bar{x}$ = 2.0). The difference between more positive perceivers, business teachers ($\bar{x}$ = 2.6), and less positive perceivers, language teachers ($\bar{x}$ = 2.0), was not meaningfully large. Detailed results of ANOVA test were: (F, 3.26 dF 4:116) for perception score = value, (F, 4.68 dF 4:116) for perception score = would use and (F, 3.97 dF 4.116) for perception score = value and would use. There is a difference in the perception of audiovisual media and techniques between teachers on the basis of the coureses they teach. For details, refer to Table 2-4 through 2-8.

Research Hypothesis 4. That there is no difference in the observed and estimated distributions.

This hypothesis was rejected. The K-S test showed a difference between observed and estimated distributions. Specifically, the K-S test results were: 2-tailed P. of .000 for perception score = value, would use, value and would use. The sample was taken from a randomly distributed population. For details, refer to Table 2.9.

Data were collected through questionnaires from a stratified random sample of 25 secondary schools found all over Kenya. These data were analyzed using frequencies, descriptive statistics, t-test, Oneway ANOVA test and non-parametric test (Kolmogorov-Smirnov, K-S).

A review of the literature indicated that many studies had been carried out illustrating the use of audiovisual media in developing

and developed countries. The media can be used to expand and upgrade the national educational curriculum with an intention of making it suit the cultural and economic needs of that country. This was the case in Ivory Coast and El Salvador. Media can supplement classroom teaching if wanted by the classroom teacher. This was the case in India, Sweden, Central Africa, Maryland County of Virgina (U.S.A.), Kenya and Mexico. Furthermore, the media can extend the school through distant teaching called correspondence. This was the case with, the Chicago Television Evening College (U.S.A.), the Canadian Television program for teachers, Japan's Correspondence High School of NHK, and Kenya's Correspondence Course Unit of Nairobi University. All these studies leave very little doubt that audiovisual media if available and used properly could accelerate national educational curriculum reforms, supplement classroom teaching and extend the walls of the school making learning accessible to many people.

Summary of Results

1) The audiovisual media and techniques used in the schools studied included: textbooks, workbooks and teacher handouts--the most common--followed by: flat pictures, charts, maps, blackboards, fieldtrips, real things, models and resource people, drama and folk-media; educational games and simulations, slides, filmstrips, and transparencies; individualized instruction, tape recordings, and radio programs; 16 mm sound motion pictures and television programs. These audiovisual media and techniques were only available and used in some schools, and not all, the schools studied. Of these audio-visual media used in schools, only 45 percent of the media have

motivational procedures, attention-directing mechanisms and learner participation design techniques built in them as part of their design.

Fieldtrips, radio programs, textbooks and workbooks, educational games and simulations; drama and folkmedia; motion pictures, individualized learning, tape recordings, real things, models and resource people, flat pictures, mpas, and blackboards were the audiovisual media and techniques perceived as effective in upgrading teaching and learning activities. Television programs, multimedia, slides, filmstrips and transparencies were perceived as less effective in teaching and learning activities. For details, refer to Tables 2-1, 2-2 and Figures 1-1 and 1-2.

2) School administratros are more motivated to perceive audiovisual media as valuable in upgrading teaching and learning activities than classroom teachers. Teachers who teach business studies are more motivated to perceive audiovisual media as valuable in upgrading learning and teaching. They are followed by teachers who teach science, social studies, mathematics and languages in that order. Business teachers perceive: fieldtrips, textbooks and workboods, educational games, sound motion pictures, real things, models and etc. as valuable. Science teachers perceive: textbooks, workbooks and fieldtrips, sound motion pictures, drama and folkmedia, educational games and etc. as valuable. Social studies teachers perceive: textbooks, workbooks and fieldtrips, educational games and sound motion pictures, real things, models and etc. as valuable. Mathematics teachers perceive: individualized learning, drama and folkmedia, educational games and fieldtrips, sound motion pictures, tape

recordings and etc., as valuable. Language teachers perceive: educational games, drama and folkmedia, sound motion pictures and fieldtrips, textbooks, workbooks and individualized learning, tape recordings and etc. as valuable. For details, refer to table 2-4 and 2-8.

3) Lack of locally-owned media, need of more training in media material preparation and equipment operation and maintenance were constraints in only 29 percent of the schools studied. Lack of motivation on the part of students, teachers and school administrators was not a constraint in most schools studied. (Refer to Figure 2-1).

4) Seventy six percent of the teachers surveyed showed a need for an in-service program tailored around Instructional Development. This in-service program should provide seminars, workshops, information services on current media use in Kenya and other countries. Further, the program should include a school and a provincial media center; the latter served by a mobile audiovisual media unit that could attend to teacher needs and problems (refer to Figure 2-2).

5) Sixty five percent of the teachers surveyed indicated that communication linkage between producers of audiovisual media and teachers should be strengthened in order to become more effective and efficient (refer to Figure 2-3).

6) Most teachers surveyed write instructional objectives specifically and methods of teaching using audiovisual media are included in the schemes of work as part of curriculum design in some schools and not all schools studied. About 45 percent of the schools covered in the study have classrooms equipped with sound and light control

necessary for teaching using audiovisual media. Most teachers studied supported the idea of teachers and students designing and producing audiovisual media. In order to increase productive audiovisual media use in schools, money, media equipment, media material and time should be made available to all the teachers (refer to Figure 2-4).

7) Research needs to be conducted in the production of audio-visual media, in the training of pre-service teachers on how to use the media and how students can learn through locally designed and produced media.

8) There was no difference in the perception of the value of audiovisual media and techniques between teachers who work in rural secondary schools and those working in urban secondary schools (refer to Table 2-6).

9) There was a difference in the perception of the value of audiovisual media and techniques between school administrators and classroom teachers (refer to Tables 2-3 and 2-7).

10) There was a difference in the perception of the value of audiovisual media and techniques among teachers who teach languages, mathematics, social studies, science (natural, technical, industrial agriculture, engineering, and etc.) studies and business (commerce, typing, accounts, short hand, and etc.) studies (refer to Tables 2-4 and 2-8).

11) There was a difference in the observed and estimated sample distributions (refer to Table 2-9).

Conclusions, Recommendations and Personal Considerations

This study was generated because the investigator while teaching in one secondary school in Kenya witnessed and experienced cases in

which unproductive use of audiosvisual media was incurred. Very frequently, teachers and school administrators could make decisions without real analysis of the needs to be met to audiovisual media. Users of audiovisual media who are victims of such circumstances more in for media because they have seen one school using media or because the media is there and they have the money to but it. The results of such ill-founded decisions have often been wastefull--expensive media equipment left to gather dust while students share textbooks and cry out in some cases for even paper and pencils.

The investigator had in mind a belief that audiovisual media properly supported and wisely used could help meet some of the country's pressing educational needs. One such pressing need is upgrading instruction in community based self help schools called harambee. Opinions and suggestions as to what should be done to improve instruction ususally contradict each other. But there is a pressing demand for action that could enhance the learning of the individual student, the effectiveness of schools and colleges, and ultimately, the quality of the nation's life. The Kenya National Committee on Educational Objectives and Policies,[1] chaired by Peter Gachathi, based on present experience and informed projections believed technology can bring about far more productive use of the teachers' and students' time and thus made recommendations in favor of expanding the production and utilization of audiovisual media.

There are other reasons for harnessing technology fully to the work of secondary schools. The literature review showed that audio-visual media can perform a variety of instructional tasks, at savings in the form of time, money, human and other non-human resources. With

the help of audiovisual media, the necessary changes in a national educational curriculum that could enable the curriculum to suit the needs of a society can be made much more quickly than it could otherwise be done by conventional means of instruction. This was true in El Salvador and Ivory Coast. The media can supplement classroom teaching in situations where adequately qualified teachers are not available. This was the case in Thailand, Mexico, Kenya, Central Africa, Sweden, Hagerstown, Virginia (U.S.A.), India and Lesotho in Southern Africa. The media can improve access to schooling and make education available to more students. This was true with radio correspondence course programs in Kenya, the Japanese Correspondence High School of NHK, and Canadian Television programs. The media can also reduce rapidly rising educational system costs. Evidence to support this from the literature review include: Chicago's (U.S.A.) Television evening college, the Kenya radio correspondence course programs, Sweden and Hagerstown, Virginia (U.S.A.) television programs.

It is believed audiovisual technology can carry out its full potential in Kenya so long as educational planners and decision makers embrace it as a system and integrate a range of human and nonhuman resources into the total educational process. For this improvement to work productively in Kenya, the knowledge about how people learn must be studied and the capacity to put that knowledge to effective use must be considered seriously. To this issue, the investigator feels that the nation of Kenya should make a far greater investment in audiovisual technology. Such an investment will contribute to extending the scope and upgrading the quality of education, and that the results will benefit individual Wananchis and society at large.

The findings of this study indicated that a variety of audiovisual media are already available to secondary schools and the Educational Media Service has plans of making more audiovisual media available to most secondary schools. Lack of locally-owned media, need of more training in preparing and selecting equipment were constraints only in some schools. Lack of motivation on the part of students, teachers and school administrators was not a constraint in the majority of schools studied. But the main constraint as it was specified in the identification of the problem has been lack of systematic and serious commitment, harmony and unity of purpose among all individuals. These are the individuals who must cooperate in the organization and utilization of audiovisual media in the secondary school education. An educational system comprises many components--students, teachers, buildings, textbooks, equipment, and media material, administrators, board members, community resource people and specialists including educational psychologists, subject matter experts, media application experts, evaluation specialists and media production specialists. It is essential to involve these individuals in the production, organization, and utilization of audiovisual technology in Kenya.

In view of the foregoing discussion, the investigator recommends a systematic approach to audiovisual media use in secondary school education. The rationale to using this approach is this, it defines as clearly and precisely as possible the objectives to be sought. It then identifies ways by which these objectives might be achieved by weighing the relative advantages and disadvantages of alternative approaches so as to select the most effective, feasible,

and probably economical one. Having identified what seems the best alternative, a plan of action, including a timetable, a definition of actions to be accomplished at each stage is examined. The various resources that will be required along the way, the nature and timing of results anticipated, and practical means for regularly evaluating progress and revision in the initial plan is considered. The plan is tested and retested until a feasible final plan is produced. Below, a tentative systematic approach is presented in an outline.

A Systematic Approach to Audiovisual Media Use

A. Planning Considerations.

1. The Needs-Assessment Stage--this deals with the identification of the most urgent educational problems and collection of information relevant to, and the analysis of these problems.

2. The Solution-Selection Stage--this involves determination of suitable and available alternatives and the evaluation of these alternatives in order to select the ones most appropriate for solving the problem.

3. The Strategic Planning Stage--this includes specification of terminal and enabling objectives and educational goals. Then a plan to utilize the alternative(s) chosen, and the necessary follow-up requirements to prepare for implementing the decision plan. Educational planners should bring into the decision-making process the groups affected by audiovisual media technology and those groups whose support is essential to the success of the project.

B. Resource Allocation and Constraints. Their allocation and use are central to educational system planning. A systematic approach considers resources in terms of money, manpower, equipment/buildings and program materials.

1. Money--is examined as inputs to humans and their relationship between the outputs of the educational system and various economic and social goals of the country of Kenya.

2. Manpower--this systematic approach requires a variety of talented and enthusiastic people with many different, interlocking kinds of skills. These specialists can be grouped into three general groups, i.e. managers, producers and teachers. Training schemes, both pre-service and in-service, must be given top priority in any manpower decisions.

3. Equipment/Buildings--this approach insists that media equipment should be maintained in order to function well so that the classroom teacher or field officer can devote his energies fully to the students. To this end, trained technicians should be provided in adequate numbers.

In a developing country such as Kenya, the cost of media equipment and buildings is high. Utilization rate should be incorporated in resource planning in order for teachers and school administrators to make full and productive use of scarce resources. Further possibilities of future expansion and flexibility must influence initial choice of equipment and buildings.

4. Program materials--the approach insists on a careful consideration of the feasibility and effectiveness of locally produced

audio-visual media. This will reinforce local culture and identity of the country of Kenya. Hence, teachers' and students' services should be used in the design of audio-visual media, details are provided under curriculum and design of audio-visual media. Concentration of effort and of resources should be used to integrate harmoniously money, manpower, equipment/buildings and program materials. For example, a radio program costs the same to produce and transmit whether it is used by two students or many.

Curriculum and Teaching-Learning Materials

The Educational Media Service through the Kenya Institute of Education should take an initiative to bring farmers, businessmen and educators together to work closely and advance the potential productivity of education through audio-visual technology. To this issue, the educational media service should consult with interested organizations and establish a National Council of Education, Agriculture, Commerce, Industry and Civil Service. Such a council would focus on how audio-visual technology can best meet the needs of individual students, teachers, and administrators. A council of this kind, with representatives from key branches of education, agriculture, commerce, industry and civil service could help speed desirable advances in the design, development and education of audio-visual technology to teaching and learning.

The systematic approach suggests a curriculum that lays more concern on subjects relevant to the student's future career, on problem solving and concept formation, on structure, inquiry and learning to learn than on factual recognition and racall of knowledge. A

curriculum of this kind should have the contents of the courses (subjects) to be taught designed so as to parallel the learners' cognitive, psychomotor and affective domains of learning. Depending on whether it is an individual course (subject) or a lesson in that course, should start by defining objectives precisely and determining appropriate learning domain as cognitive, psychomotor or affective domain. Then specification of the instructional strategy within each of the learning domains chosen. A plan of a set of activities to implement the appropriate strategy. This includes arrangements for evaluating learning, student practice and presentation of materials. And then identification of the media to be used to provide interest, flexibility and reality to the learning activity. An example of such a procedure is presented in Appendix O.

Concerning designing and producing audio-visual media, teachers, students, specialists from inspectorate, examinations council, university and producers should work together harmoniously to design and produce audiovisual media. Theories about the learning process in Kenya and design techniques of motivational procedures, attention-directing mechanisms, active participation and responses from the learner and mental imaginations by imitation, and dramatization, etc. should be incorporated into the design and production of media materials.

D. Organization, Delivery and Utilization.

1. Organization--this systematic approach insists on the need for strong leadership, serious commitment, harmony and unity of purpose among all program participants from the top at national

level down to the classroom or learning center. Teamwork of a high order is required among people not normally used to it.

It is advisable to change what is possible, to adapt and adjust to what cannot change and to ignore what is irrelevant to the terminal ways or methods of getting things done in an organization. Each country or organization in a country has its own bureaucratic and intrabureaucratic organization. What is needed is to use the aforementioned organizational concepts to design and install an audiovisual media service. Kenya already has one.

2. Delivery Characteristics--if the lessons are non-broadcast media, they should be supplied to schools through the proposed Provincial media center. The Provincial media center should act as a clearing house between the school learning center and the national media center. If the lessons are broadcasted, then convenient times should be arranged for which suits the audience of the broadcast lessons. For example, the broadcast lessons can be on tape or broadcasted using fixed system frequency waves and be used in the evening during prep time. Similarly, in-service teacher programs could be transmitted over the weekends and other convenient times when teachers have time.

3. Utilization--among major concerns constituting effective and productive utilization of audiovisual media are the following: learning logistics support of the media centers; reception of media materials and broadcast programs; maintenance requirements; and contact with and effective use of teachers in the classroom or learning center. To this end, in addition to the National

Educational Media Service Center, there should be a media center in each province and a learning center in each school.

The Provincial Media Center should have a staff for administrative, supervisory, technical, secretarial, production of media, and school building assignment functions. Further, it should include facilities where teachers can produce and test their teaching aids; inspection and repair of media equipment; and provisions for in-service teacher activities. There should be a two way communication linkage between the National Media Center and the Provisional Media Center. The center should include a mobile media van to attend to teacher needs and problems.

The school learning center should have a media coordinator. The center should provide services such as: assurance that all classrooms have facilities for media use; assignment of equipment and media needed by teachers; working with teachers to improve utilization and production of audiovisual materials and maintain an effective liason between the Provincial Media Center and the National Educational Media Center.

4. Guidance for the Classroom Teacher--the Provincial Media Center and the National Media Center should provide in-service teacher activities through: workshops, seminars, conferences, correspondence, evening and vacation courses, personal interviews, etc. The inspectorate, university, teacher training colleges and other specialists should conduct the in-service program and it should focus on the role of audiovisual development and technology in promoting learning and teaching.

E. Feedback, Research and Evaluation. High costs of media production and training usually leave little money and time to consider costly feedback systems. However, since feedback, research and evaluation are of paramount importance in continual improvement of an educational system, the investigator makes these suggestions:

1. Pre-testing of Audiovisual Materials--all new materials should be tested on a representative sample of the intended audience before dissemination to the entire school system. The Educational Media Service is already carrying out this activity and should be expanded and given more support.

2. Frequent Testing on Course Content--regular tests should be administered to students who learn through media. To this issue, each proposed Provincial Media Center should have a research assistant to receive or collect from schools raw scores of such tests. Such test results should be interpreted and results sent to the research assistant at the National Media Center who will then talk to producers.

3. Regular Comments from Classroom Teachers--forms like those used in the Educational Media Service annual catalogue 1977-78 are highly recommended for feedback purposes. Such forms should be completed monthly by teachers and sent to the research assistant at the proposed Provincial Media Center.

4. Frequent Observation of Classroom Lessons and Teacher Interviews--the systematic approach recommends that each Provincial Media Center should have one utilization officer or media supervisor. This officer should visit schools and collect

information on what classroom teachers think of teaching through media and also a description of what happened in the classroom.

5. Reports on Attitudes--attitude scale forms should be administered by the Provincial Media Center personnel every end of term to students and teachers separately. Such information could provide a picture as to whether the students and teachers like what they are getting.

6. Research, Development and Application--the National Media Center should work closely with the Bureau of Educational Research of Kenyatta University College and other interested organizations to conduct media research. Findings from such research should be applied in schools and colleges.

7. Dissemination of Information--a journal entitled "Audiovisual Instruction in Kenya" should be established. Such a journal should be published three times a year to start with depending on demand. It should have information, current uses, developments and research pertinent to audiovisual media in Kenya and other countries.

When information has been collected through the aforementioned feedback and evaluation techniques it should be processed and used to modify existing and proposed media programs. Based on physical and economic constraints, each province will select a suitable feedback mechanism with which it can work with. However, there is no adequate feedback and evaluation system.

The findings from this study may be generalizable beyond the population that was part of the study. Field projects and experimental

evidence cited in the literature review support the assumption that audiovisual media can be applied to carry out specific tasks both in school and out of school. This is possible as long as audiovisual media is used in the right place, in the right way and for an appropriate purpose.

Based on the findings of this study, the investigator is of the opinion that this study should be replicated on different populations, for example, teachers in schools not covered by this study. Such a replicated study should include personal interviews in addition to the questionnaire instrument. An approach of this kind might not only aid in collecting more specific information, but also revalidation of the data collection instruments.

The areas generated by this study for further research include:

(a) The audiovisual media perceived as valuable in upgrading learning by teachers teaching specific courses should be exposed to controlled experimental research. Such research findings can determine the type of medium that matches with the subject matter content of a given course.

(b) A survey research to find out the types of audiovisual media that are available to teacher training colleges and how well teacher trainees are prepared in using such media for teaching and learning activities.

(c) Research on the role played by these design techniques: motivational procedures, attention-directing mechanisms, active participation and response from the learner, etc.

(d) A survey research to determine skill prerequisites required by various occupations on school learners. These findings should be used in the curriculum and design of audiovisual media.

(e) The most suitable times for both the original and repeat transmissions of radio programs for secondary schools.

(f) The effects of cultural traits on learning from instructional media in Kenya.

In order to conduct a study similar to this and incorporate the aforementioned considerations, a research grant should be made available to the investigator.

APPENDIX A

TOWARD A SCHEME OF INSTRUCTIONAL MEDIA USE

IN SECONDARY SCHOOL EDUCATION OF THE REPUBLIC OF KENYA

A list of schools included in the Field Survey of Tools and Technologies for Learning.

A. COAST PROVINCE:

Kwale Secondary School, Box 16013	Kwale
*Coast Girls High School, Box 80194	Mombasa
Eldoro High School, Box 1	Taveta
*Mombasa Technical High School	Mombasa

B. RIFT VALLEY PROVINCE:

**Uasin Gishu Secondary School, Box 80	Eldoret
**Nakuru Day Secondary School	Nakuru
Nyanturago Harambee Secondary School, Box 69	Kericho
*Kipsigis Girls High School	
Naivasha Secondary School, Box 155	Naivasha

C. EASTERN AND NORTH EASTERN PROVINCES:

Kitui Secondary School, Box 39	Kitui
*Meru School, Box 103	Meru
*Machakos Technical School	Machakos
Maua Harambee Secondary School, P.O. Maua, via	Meru
Wajir Secondary School	Wajir

D. NYANZA PROVINCE:

**Homa Bay Secondary School, Box 22	Homa Bay
*Kisumu Technical School, Box 143	Kisumu
Kisii High School, Box 11	Kisii
Nyangori Secondary School	Kisumu
*St. Mary's School, Yala, Private Bag	Yala

E. CENTRAL PROVINCE:

*Muranga High School, Box 101	Muranga
*Tumutumu Girls' School	Karatina
Kenyatta Secondary School Mwatate	
Kiariaria Harambee School, Box 294	Kiambu
**Kijabe High School, Box 50	Kijabe

E. CENTRAL PROVINCE (cont.)

*Alliance Girls' High School, Box 109	Kikuyu
Alliance Boys' High School, Box 7	Kikuyu
*Thika Technical School, Box 91	

F. NAIROBI PROVINCE:

*Pangani Girls' School, Box 30152	Nairobi
Starehe Boys' Center, Box 30178	Nairobi
*State House Road Girls' School, Box 30252	Nairobi
Park Road Secondary School, Box 25095	Nairobi
*Kabete Technical School, Box 25095	Nairobi
Upper Hill School, Box 30424	Nairobi
*Ofafa Jericko Secondary School, Box 45530	Nairobi

G. WESTERN PROVINCE:

*Butere Girls' School, Private Bag	Butere
**Sigalagala Technical School, Private Bag	Kakamega
Kaimosi Girls' High School, Private Bag	Tiriki
*Kamusinga Friends School, Private Bag	Webuye
**Chavakau Secondary School, Box 144	Maragoli
**Lugulu Girls' High School, Private Bag	Webuye
**Kakamega High School, Box 90	Kakamega
*Chesamisi Secondary School, Private Bag	Webuye

Schools to provide emergency data in case of no response from above schools:

**Kibaywa
**Naitivi
Limuru
Jamhuri
Misikhu
Mangu High
**Sigalame
**Namulungu
**Ndivibis
Athi River
**Sipala

KEY

*schools to which questionnaires were mailed
**schools that responded

APPENDIX B

NYANZA PROVINCE

A list of secondary schools found in Nyanza Province from which the schools included in the sample were selected.

1. Amasoya sec.
2. Arya Girls
3. A.C. Nyawanga
4. Asumbi Girls
5. Birango S.D.A.
6. Bangmendo
7. Bikira Girls
8. Bunyore Girls
9. Bunyonge C.C.
10. Chulaimbo
11. Ebusiralo
12. Ebushubi
13. Ebusiratsi
14. Ekembo cc.
15. Ebwali
16. Ekwanda
17. Emusive
18. Emmaboni
19. Esibembe
20. Esibakala
21. Emalindi
22. Gakero
23. Gendia
24. Gamchoka
25. Gionsehi
26. Gujarah
27. Gud Bondo
28. Homa Bay
29. Ibacho cc.
30. Ichuhi
31. Igongo
32. Ikonge
33. Irangu
34. Kamagambo
35. Kambare
36. Kendubay
37. Kereri
38. Kiamokama
39. Kianda
40. Kisii
41. Kisumu Boys
42. Kisumu Day
43. Kisumu Girls
*44. Kisumu Tech.
45. Kisumu Union
46. Kotetiri
47. Lorateng
48. Lihanda
49. Luanda sec.
50. Ndori
51. Ngere
52. Nganda
53. Nyabite
54. Nyagowa
55. Nyakakana
*56. Nyangori sec.
57. Nyanganga
58. Nyangondo
59. Nyahururu
60. Nyaguta
61. Nyakeyo
62. Nyakeri
63. Hyambaria Harambee
64. Nyambaria Sec.
65. Nyanchwa
66. Nyanguru
67. Nyansiongo
68. Nyataro
69. Ogada
70. Otieno Oyoo Sec.
71. Ogande Girls'
72. Orando
73. President Kennedy High
74. Ramba Sec.
75. S.G.S.S.Sec.
76. St. Alfred Alara Sec.
77. St. Mary Corretly
78. St. Andrews'
*79. St. Mary's College Yala
80. Sengera Girls'
81. Tabaka Boys'
82. Tom Mboya High

APPENDIX C

April 12, 1978

Mr. Roy H. J. Thompson, Head
Educational Media Service
Kenya Institute of Education
P.O. Box 30456
Nairobi, Kenya AFRICA

Dear Sir:

I am a school teacher at Chesamisi Secondary School, Bungoma District in Western Province. Since September, 1976, I am on study leave and attending graduate studies at Michigan State University, East Lansing, U.S.A. My area of specialization is Instructional Development and Technology (the design, selection, utilization and evaluation of a wide range of communications media in teaching and learning activities).

As part of my partial fulfillment of the requirements for my studies at Michigan State University, a field research should be conducted by me and be reported in the form of a dissertation. Being a teacher in Kenya, I have optioned to conduct this study there in Kenya. This will give me more insight and experience as a Kenya teacher.

The topic of my study is 'Toward a Taxonomy of Selecting Instructional Strategies and Media Use in the Secondary School Education of the Republic of Kenya.' Specifically, this study will focus on what instructional media are already in schools or will be made available to schools. What attitudes and policies do Headmasters have towards Media. And, most important, what techniques do classroom teachers use when teaching using media. The findings from the study will be supplemented with developed and developing countries use of instructional media in education, on one hand and what the psychological theories of learning say about media on the other hand. Then, a taxonomy of selecting teaching techniques and media will be evolved. The findings of this study will be made available to you and many others interested.

To be able to carry out the study with a sense of reality, I need your permission which can be in the form of a letter specifying that you are also aware of the study. This letter will be useful when I start visiting the schools and interviewing teachers.

In designing the study, I used many of your articles, one of June 1976 in a Journal of Faculty of Education and others from Educational Broadcasting International, a Journal of the British Council.

Mr. Thompson
April 12, 1978
Page 2

This is a personal study and is not funded by anybody. I plan to collect the data between July 15th and September 19th, 1978. If you need more details of the study, please let me know and likewise if you feel there is something I can include in the study, let me know in your replies.

I very much need your assistance and I look forward to hearing from you please.

Sincerely one of your teachers,

Wekesa Mukwa

lah

cc: The Chief Inspector of Schools
Inspectorate
Ministry of Education
P.O. Box
Nairobi, Kenya AFRICA

Mr. Daniel M. Mbiti
First Secretary (Education)
Embassy of the Republic of Kenya
2249 R Street, N.W.
Washington, D.C. 20008 U.S.A.

The Provincial Inspector of Schools
Western Province

The Headmaster
Chesamisi Secondary School

May 2, 1978

Mr. Ruchiami,
The Office of the President
Republic of Kenya
P.O. Box
NAIROBI
Kenya

Dear Sir:

REF: REQUEST FOR A RESEARCH CLEARANCE

I am a school teacher at Chesamisi Secondary School, Bungoma District in Western Province. Since September 1976, I am on study leave attending studies at Michigan State University, East Lansing, U.S.A.

As part of my partial fulfillment for studies at Michigan State University, I have to conduct a field study. Being a teacher there in Kenya, I thought it worthwhile to carry out the study there at home. This will give me more insight and experience, since it is a place where I work.

My study is a field survey of the use of audio-visual aids (blackboards, pictures, maps, radios, tape recorders, textbooks, etc.) in secondary schools there at home. Specifically, I will need to know what kind of audio-visual materials that teachers use very frequently. I will have to interview 300 teachers selected from 25 schools in Kenya.

This study is a personal project and is not funded by anybody. Its purpose is to fulfill the field study courses of my program. I plan to collect the data between June 15th and July 28th, before teachers close schools for August holiday.

Please, for this study to be successful I need a research clearance from you. I just learned about research clearance requirements last week, otherwise I would have written to you earlier.

Let me thank you in advance for the assistance you are going to give me. I look forward to hearing from you please.

Yours sincerely,

Wekesa Mukwa

MICHIGAN STATE UNIVERSITY

LEARNING AND EVALUATION SERVICE · 17 MORRILL HALL EAST LANSING · MICHIGAN · 48824

May 19, 1978

To Whom It May Concern:

REF: CHRISTOPHER WEKESA MUKWA

This is to certify that Christopher Mukwa is a student in the College of Education at Michigan State University. He is currently enrolled in a Doctoral Program in Instructional Development and Technology. He came to the United States in September 1976 and did his Master's Program in Instructional Development and Technology. I was his advisor in the Master's Program.

As part of Mr. Mukwa's requirements for completing his Doctoral Degree, he has to conduct an original field study and report his findings to MSU in the form of a dissertation. Since he was a teacher in Kenya before coming to MSU, it was considered advisable that he do a field study which could utilize his prior experience and would also be of value to his own country's educational efforts. Therefore, he was advised to carry out the study in his own country. Consequently, he developed a proposal for a field survey study, titled "Toward a Taxonomy of Selecting Instructional Strategies and Media Use in Secondary School Education of the Republic of Kenya" which was approved by his Doctoral Committee of which I am the chairman.

He plans to collect the data in Kenya between June 15th and September 10th, 1978. He is then expected back in school to complete his studies. Upon completion of his studies, he intends to return to Kenya. I have enjoyed teaching such an able representative of Kenya, and believe he will be a valuable asset to his country and prove to be a very able educator when he returns.

If you have further questions, please feel free to contact me.

Sincerely,

James R. Nord

James R. Nord
Associate Professor
Chairman of Dissertation Committee

JRN/mg

APPENDIX D

Telegraphic address: "Rais"
Telephone: Nairobi 27411
When replying please quote
Ref. No. OP.13/001/80116/2
and date

OFFICE OF THE PRESIDENT
P.O. Box 30510
NAIROBI, KENYA

7th July, 19.78

Mr. Wekesa Mukwa,
Linguistics,
Michigan State University,
East Lansing, Michigan 48824,
U.S.A.

Dear Sir,

RESEARCH AUTHORIZATION

Your application for authority to conduct research on "Toward a Taxonomy of Secting Instructional Strategies and Media Use in Secondary Sch ool Educa tion of the Rep ublic of Kenya" has been approved. The relevant clearance permit should be collected by you personally from the undersigned when you arrive in Kenya. You may inform your research assistants of this approval.

Yours faithfully,

(E. K. RUCHIAMI)
for: PERMANENT SECRETARY

c.c.

Lugulu Village,
P. O. Box 675,
WEBUYE.
Kenya.

APPENDIX E

Lugulu Village
P.O. Box 675
WEBUYE
Kenya

July 1978

Dear

I need your professional help as an administrator and that of teachers on your staff to participate in a study on teachers' perceptions of the role audio-visual media play in the teaching and learning activities of secondary school education in Kenya.

Research is needed on the production and utilization of audio-visual media. The findings, it is thought, could have important implications for the way instructional media and techniques are used to enable the teacher to teach less and the student to learn more. The results of which could help to predict and/or plan more effective media programs and services that can be implemented at other levels of education, harambee schools and private institutions.

The study is being done as part of graduate studies program by Mr. Wekesa Mukwa at Michigan State University in United States of America.

The Permanent Secretary in the Office of the President in consultation with the Ministry of Education, Nairobi, Kenya, are approving and authorizing this study to be carried out.

Very soon, July 8th, you will receive eleven questionnaires, one for yourself, five for each of these department chairpersons: (1) Languages, (2) Mathematics, (3) Social Studies, (4) Science Studies and/or Industrial, Technical and Vocational Studies and (5) Business Studies. The remaining five questionnaires will be given to teachers whose names come first on the alphabetical list of teachers in your school. Each questionnaire takes twenty three minutes to complete. Every individual response will be considered strictly confidential.

The summary results of this study will be sent to your school sometime in April, 1979, in appreciation for your assistance. Your school's responses are important to this study because of its outstanding reputation for student achievement in public and national examinations.

If because of some reason you feel your school cannot participate in the study, please let me know immediately through the above address.

I thank you in advance for the help you will be giving me.

Sincerely yours,

Mr. Wekesa Mukwa
A Secondary School Teacher

Lugulu Village
P.O. Box 675
Webuye
July 1978

Dear Headteacher:

Your school has been selected because of its outstanding student achievements in Public and National examinations to participate in a study on teachers' perceptions of the role audio-visual media play in the teaching and learning activities of secondary school education in Kenya. This was indicated to you recently in a letter.

Enclosed find eleven questionnaires, one for you ; five for each of these department chairpersons: (1) Languages, (2) Mathematics, (3) Social Studies, (4) Science Studies and/or Industrial, Technical or Vocational Studies, and (5) Business Studies. The remaining five questionnaires are to be distributed to teachers whose names come first on the alphabetical list of teachers in your school. Please pass them to the teachers as directed. Every individual response will be considered strictly confidential. The questionnaires are field tested and each takes twenty three minutes to complete.

Please, I would be most grateful for your cooperation in completing the headteacher's questionnaire and collecting the completed teachers' questionnaires and returning them to me in the attached envelope as soon as is convenient. The latest date being July 25th, 1978.

The summary results of this study will be sent to your school in April 1979. If circumstances allow, I will visit your school early in September to thank you for your assistance.

Meanwhile, I thank you for your help and look forward to your reply.

Sincerely,

Wekesa Mukwa

Enc.

Lugulu Village
P.O. Box 675
WEBUYE
Kenya
July 8th, 1978

Dear Colleague:

I need your professional help, as a teacher, to participate in a study on teachers' perceptions of the role audio-visual media play in the teaching and learning activities of secondary school education in Kenya.

Research is needed on the production and utilization of audio-visual media. The findings, it is thought, could have important implications for the way instructional media and techniques are used to enable the teacher to teach less and the student to learn more. The results of which could help to predict and/or plan more effective programs and services that can be implemented at other levels of education, harambee schools and private institutions.

The study is being done as part of graduate studies program by Wekesa Mukwa at Michigan State University, United States of America, under the direction of Dr. James R. Nord, Associate Professor of Education and consultant on college instruction.

The Permanent Secretary in the Office of the President in consultation with the Ministry of Education, Nairobi, Kenya, have approved and authorized this study to be carried out.

Your cooperation is deeply appreciated. Please fill out this questionnaire (today, if possible) and return it by July 20th, 1978. Your individual responses will be considered strictly confidential. As a classroom teacher, I know well the time demands that confront you, and, therefore, I have devised questionnaires that will require approximately twenty-three minutes to complete.

The summary results of this study will be sent to your school sometime in April 1979 in appreciation for your assistance and with the hope that the report might be of value to you. Your schools' responses are important to this study because of its outstanding reputation for student achievement in public and national examinations.

I thank you for your help and look forward to your reply.

Sincerely,

Wekesa Mukwa
A Secondary School Teacher

APPENDIX F

635 Abbot Road, Appt. #304
East Lansing, Michigan 48823
United States
October 1978 2

Dear Headteacher and staff members:

On July 9, 1978, eleven questionnaires, one for you, five for each of these department chairpersons: (1) Languages, (2) Mathematics, (3) Social Studies, (4) Science Studies and/or Industrial, Technical or Vocational Studies, and (5) Business Studies were sent to your school. These questionnaires were for a study involving secondary school teachers' perception of the role educational media plays in the secondary school education of the Republic of Kenya.

You and other teachers on your staff were selected as one of these important people. But, as of this date, I have not received your questionnaires. What with an extremely busy schedule and mounting responsibilities, the questionnaires were probably misplaced or maybe the post office got it to you too late for you and other staff members to answer before the stated deadline in the cover letter.

However, it is very important that your responses and that of other members on your staff be part of this study. For that reason, I am asking you and other staff members to fill out the questionnaires that have been mailed to you the second time or the old ones if you have them and return them as soon as possible to the research correspondent mentioned below who will then mail them to me to the United States.

Your cooperation is deeply appreciated.

Sincerely,

Wekesa Mukwa
Michigan State University
United States of America

Research correspondent,
For: "Tools and Technologies for Learning"
Lugulu Village,
P.O. Box 675 WEBUYE, KENYA

APPENDIX G

FORM USED TO RECORD RESPONSES
FROM PARTICIPATING SCHOOLS

Table I

Serial Number	Name of School	Original Sample	Record List of First Mailing	Record List of Second Mailing	% Used in Analysis	Total % Received

Table II: Questionnaires Received According to Courses Taught by Teacher

Serial Number	Name of School	Courses Taught By Teachers				
		Languages	Maths	Social Studies	Science Studies	Business Studies
1 2						
Total						
% of each course						

Table III: Questionnaires Received According to Teacher Status

Serial Number	Name of School	Status of Teachers		
		Headteacher	Department Chairperson	Classroom Teacher
Total				
% of each group				

APPENDIX H

Mr. Wekesa Mukwa
Instructional Development
and Technology
College of Education
Michigan State University
East Lansing, MI 48824 U.S.A.
April 20th, 1978

Dear Colleague:

I need your professional help as a teacher to participate in a research. The study is about teacher perceptions of the role and value audio-visual media play in upgrading learning and teaching activities in secondary school education of the Republic of Kenya.

During this stage of the research, I am field testing the questionnaire (a booklet of forms to be used to collect research data). My intention is to determine whether you as one of these important people, the teachers, understand the statements of the questionnaire. Further I need to know how long the questionnaire takes you to complete. Also if you have any comment, feel free to indicate in a form provided below:

Please complete this form as you go through statements of the questionnaire:

(a) Teacher status: Headteacher___ Depart. Chairperson___ Classroom teacher____

(b) How many minutes did the questionnaire take you to complete?_____

(c) Did you have difficulties in understanding certain statements?

____Yes ____No. If Yes, what particular statements_____

_____

(d) What statements of the questionnaire did you find:

(1) Boring

(2) Interesting

(e) Comments_____

_____

Thank you very much.

Yours sincerely,

Wekesa Mukwa, Secondary School Teacher

APPENDIX I

Wekesa Mukwa
Linguistics
Michigan State University
East Lansing, Michigan 48824

June 7th, 1978

The Headmistress
Lugulu Girls High School
P.O. Private Bag
WEBUYE
Kenya, East Africa

Dear Headmistress:

I would like you to give me assistance. Right now, I am working on a survey research as part of partial fulfillment for my studies at the above mentioned school. I am expected to prepare 400 questionnaires that will be mailed to schools all over Kenya. Duplicating these questionnaires in United States and carrying them to Kenya is very expensive.

I wondered whether you could allow me use of one of your duplicating (cyclostating) machines to prepare these questionnaires. I am willing to meet all the total costs of using the machine. The stencils are already there in Kenya at Lugulu Village with one of my research assistants. Your school is the only convenient place I can duplicate these questionnaires.

If you feel it is fine, indicate it to Sarah Gideon and she will indicate it to one of my research assistant Japheth Maturu and they can start duplicating them.

It will be until end of next month when I will be able to come to Kenya, but meanwhile may I convey my sincere greetings to you and members of your staff. I am thanking you in advance for the assistance you are about to give me. Your school is among those included in the study I am soon conducting.

Looking forward to seeing you when I come home.

Yours faithfully,

Wekesa Mukwa

APPENDIX J

Mr. Wekesa Mukwa
Instructional Development
and Technology
College of Education
Michigan State University
East Lansing, Michigan 48824
U.S.A.
July 10th, 1978

To Whom It May Concern:

REF: BI: JANET K. MUKWA

This is to certify that Bi: Janet K. Mukwa has been contacted by the undersigned to collect data on a field survey of teacher perceptions of the role and value of audio-visual media in upgrading teaching and learning activities in secondary school education in Kenya.

Owing to unexpected financial constraints, Mr. Wekesa Mukwa, the one conducting the research has not been able to come to Kenya personally.

The research was approved and authorized to be carried out by the Office of the President, Nairobi, Kenya.

Every individual response will be considered strictly confidential and the summary results will be posted to your school in April 1979 with a hope that teachers benefit from them.

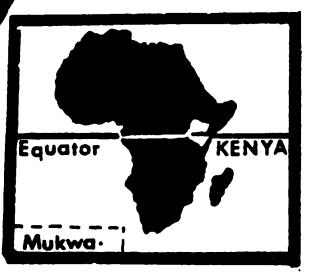
Sincerely yours,

Wekesa Mukwa

APPENDIX K

1979

Questionnaire
for
A FIELD SURVEY
of
TOOLS and TECHNOLOGIES
for
LEARNING
in
THE REPUBLIC OF KENYA
Secondary School Education



Dear Headteacher:

AUDIO-VISUAL EQUIPMENTS AND FACILITIES IN YOUR SCHOOL

How many of each of the following audiovisual equipments and facilities are currently included in your inventory? (If exact figures are not available, please give your best estimate.)

	Types of Audiovisual Equipments and Facilities:	Number of items currently included in your inventory	Please check (X) here is this is an estimate
1.	Radio receivers		
2.	Record (gramophone) players		
3.	16 mm. film projectors		
4.	8 mm. film projectors		
5.	Television receivers		
6.	Audio tape recorders		
7.	Video tape recorders		
8.	2 x 2 slide projectors		
9.	Opaque projectors		
10.	Overhead transparency projectors		
11.	Filmstrip-slide projectors		
12.	Sound filmstrip projectors		
13.	Closed-circuit television		
14.	Globes		
15.	Educational games manuals		
16.	Dark room equipment		
17.	Cameras (16 mm, 8 mm, 35 mm or video)		
	Facilities		
18.	Audio-visual library		
19.	Dramatic theatres		
20.	Individualized learning facilities		
21.	Learning resource centres		
22.	Science laboratories/workshops		

MICHIGAN STATE UNIVERSITY
COLLEGE OF EDUCATION

SECTION I - USE OF AVAILABLE AUDIOVISUAL MEDIA

A. Radio Broadcasting Programs

You are going to find a series of statements. There are five possible answers for each statement that go from Strongly Agree to Strongly Disagree. You are expected to choose the answer that most closely approximates your opinion and make a check (X) on the corresponding line.

0 Parents these days are concerned about the quality of the education their children receive:

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

Please answer the following statements that are about radio broadcasts to schools.

1. Students learn more with radio broadcasting and accompanying material than without them.

SA	A	U	D	SD

(1)

2. Classroom teachers improve their skills of teaching by listening to the radio teacher and reading his accompanying printed materials.

SA	A	U	D	SD

(2)

3. Students learn how to study better on their own when they receive their classes through radio broadcasting.

SA	A	U	D	SD

(3)

4. Classroom teachers learn to organize their schedules better with radio broadcasting and accompanying printed material.

SA	A	U	D	SD

(4)

5. It is possible to teach more through radio broadcasting during the year because radio broadcasts can cover more material.

SA _____ A _____ U _____ D _____ SD _____ (5)

6. Radio broadcasts to schools help parents become more interested in the education of their children.

SA _____ A _____ U _____ D _____ SD _____ (6)

B. Radio Broadcasts and Other Audiovisual Media

Please, now answer the following statements on radio broadcasting and other audiovisual media found in your school.

Radio broadcasts, accompanying printed material, slides, tapes, still and motion pictures, etc. used in my school have the following design techniques built in them:

7. Motivational procedures that establish a pattern to learn the material to follow (at the beginning, within the lesson and at the end).

SA _____ A _____ U _____ D _____ SD _____ (7)

8. Attention-directing mechanisms that point out, emphasize or direct attention to relevant hints or suggestions in the lesson.

SA _____ A _____ U _____ D _____ SD _____ (8)

9. Procedures that draw out or elicit active participation and responses from the learner to the contents of the lesson.

SA _____ A _____ U _____ D _____ SD _____ (9)

10. Styles or techniques that capture mental imaginations of the learner by means of imitation, modeling, dramatization, etc.

SA _____ A _____ U _____ D _____ SD _____ (10)

Comments_____

_____ (11)

Why did you respond the way you did above?_____

_____ (12)

SECTION II - USE OF OTHER AUDIOVISUAL MEDIA AND TECHNIQUES IN YOUR SCHOOL

I would like to know your personal opinion about how effective in the teaching process you consider your use to be of the types of audio-visual media and techniques given below.

11. Real things, models and resource people are valuable teaching aids.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	(13)

12. Flat pictures, charts, maps and blackboards are very valuable teaching aids.

SA	A	U	D	SD	(14)

13. Slides, filmstrips and transparencies are very valuable teaching aids.

SA	A	U	D	SD	(15)

14. 16 mm. sound motion pictures are very valuable teaching aids.

SA	A	U	D	SD	(16)

15. 8 mm. single concept films are very valuable teaching aids.

SA	A	U	D	SD	(17)

16. Radio broadcasts are very valuable teaching aids.

SA	A	U	D	SD	(18)

17. Tape/disc recordings, record player or gramophone records are valuable teaching aids.

SA	A	U	D	SD	(19)

18. Textbooks, workbooks and teacher's handouts are very valuable teaching aids.

SA	A	U	D	SD	(20)

19. Field trips are very valuable opportunities for learning.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	(21)

20. Educational games and simulations are very valuable teaching techniques.

SA	A	U	D	SD	(22)

21. Dramatization, demonstrations and folk media are very valuable teaching techniques.

SA	A	U	D	SD	(23)

22. Television programs are very valuable teaching tools.

SA	A	U	D	SD	(24)

23. Computer assisted learning and computer assisted television programs are very valuable teaching tools.

SA	A	U	D	SD	(25)

24. Individualized learning is a valuable teaching technique.

SA	A	U	D	SD	(26)

25. Telephones are valuable learning tools.

SA	A	U	D	SD	(27)

26. Multimedia (accompanization of two and more of above) audiovisual aids and techniques are valuable teaching and learning tools.

SA	A	U	D	SD	(28)

27. If real things, models and resource people were in my school, I would use them.

SA	A	U	D	SD	(29)

28. If flat pictures, charts, maps and blackboards were in my school, I would use them.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	(30)

29. If slides, filmstrips and transparencies were in my school, I would use them.

SA	A	U	D	SD	(31)

30. If 16 mm. sound motion pictures were in my school, I would use them.

SA	A	U	D	SD	(32)

31. If 8 mm. single concept films were in my school, I would use them.

SA	A	U	D	SD	(33)

32. If radio broadcasts were in my school, I would use them.

SA	A	U	D	SD	(34)

33. If tape/disc recordings, record player or gramophone records were in my school, I would use them.

SA	A	U	D	SD	(35)

34. If textbooks, workbooks and teacher's handouts were in my school, I would use them.

SA	A	U	D	SD	(36)

35. If field trip opportunities were in my school, I would use them.

SA	A	U	D	SD	(37)

36. If educational games and simulations were in my school, I would use them.

SA	A	U	D	SD	(38)

37. If dramatization, demonstrations and folk media were in my school, I would use them.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	(39)

38. If television programs were in my school, I would use them.

SA	A	U	D	SD	(40)

39. If computer assisted learning and computer assisted television programs were in my school, I would use them.

SA	A	U	D	SD	(41)

40. If individualized learning techniques were in my school, I would use them.

SA	A	U	D	SD	(42)

41. If telephones were in my school, I would use them.

SA	A	U	D	SD	(43)

42. If multimedia (accompanization of two and more of above) audio-visual aids and techniques were in my school, I would use them.

SA	A	U	D	SD	(44)

Comments: _____

_____

_____ (45)

43. Which of the following audiovisual media and techniques do you use in your school? Please check (S) the boxes that apply to you.

		Yes	No	Not Available
(46)	1. Real things, models and resource people			
(47)	2. Flat pictures, charts, maps and blackboards			
(48)	3. Slides, filmstrips and transparencies			
(49)	4. 16 mm. sound motion pictures			
(50)	5. Radio broadcasts			
(51)	6. Tape/disc recordings, record player or gramophone records			
(52)	7. 8 mm. single concept films			
(53)	8. Textbooks, workbooks and teachers' handouts			
(54)	9. Field trips			
(55)	10. Educational games and simulations			
(56)	11. Dramatization, demonstrations and folk media			
(57)	12. Television programs			
(58)	13. Computer assisted learning and computer assisted television programs			
(59)	14. Individualized learning			
(60)	15. Telephones			
(61)	16. Multimedia (accompanization of two or more of above)			
(62)	17. Others (specify) _____			

SECTION III - REASONS FOR NOT USING AUDIOVISUAL MEDIA

44. Sometimes you cannot take advantage of audiovisual media. What is your opinion about these reasons you might give.

1. Lack of locally owned media material in the subject(s) I teach.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	
_____	_____	_____	_____	_____	(63)

2. I need more training in preparing and selecting audiovisual media.

SA	A	U	D	SD	
_____	_____	_____	_____	_____	(64)

3. I need help in operating and maintaining media equipments.

SA	A	U	D	SD
_____	_____	_____	_____	_____

4. Students are not interested to learn through audiovisual media.

SA	A	U	D	SD	
_____	_____	_____	_____	_____	(66)

5. I am not interested in using audiovisual media for teaching.

SA	A	U	D	SD	
_____	_____	_____	_____	_____	(67)

6. School administrations are not interested in using audiovisual media for learning and teaching purposes.

SA	A	U	D	SD	
_____	_____	_____	_____	_____	(68)

Comments_____

_____ (69)

Why did you respond the way you did above?_____

_____

_____ (70)

SECTION IV - YOUR FUTURE PERCEPTION ABOUT AUDIOVISUAL MEDIA

45. It is important to have an audiovisual media section as part of an in-serving program for us teachers.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	(71)

46. A such audiovisual media section should provide:

1. Day to day teaching technology workshops, seminars for we teachers and school administrators.

SA	A	U	D	SD	(72)

2. An audiovisual media center in the school and in the province where we teachers can design, produce and test our teaching tools and materials.

SA	A	U	D	SD	(73)

3. Information services for us on current uses of media in Kenya and other countries to support educational goals and objectives.

SA	A	U	D	SD	(74)

4. A mobile audiovisual media unit go round schools determining our needs, problems etc.

SA	A	U	D	SD	(75)

Comment_____

_____ (76)

Why did you respond the way you did above?_____

_____

_____ (77)

SECTION V - EXCHANGE OF INFORMATION BETWEEN TEACHERS AND PRODUCERS

47. Exchange of information between we teachers and producers is efficient.

SA	A	U	D	SD	(78)

48. Educational media services and feedback are available to we teachers through:

1. A newsletter, a circular and other information sources that are published on a regular basis.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	(79)

2. In-service activities, seminars and workshops.

SA	A	U	D	SD	(80)

49. Our requests for media material are:

1. Easily initiated.

SA	A	U	D	SD	(81)

2. Promptly confirmed and scheduled.

SA	A	U	D	SD	(82)

3. Efficiently and effectively carried out.

SA	A	U	D	SD	(83)

Comments_____

_____

_____ (84)

Why did you respond the way you did above?_____

_____

_____ (85)

SECTION VI - THE TEACHING SYSTEMS AND ENVIRONMENT WHERE THEY TAKE PLACE

50. I write my teaching objectives (aims) in terms of a description of who is my student, the subject matter that he is to learn, the conditions under which the learning will be examined and the level of acceptable learning.

SA	A	U	D	SD	(86)

51. Methods of teaching using audiovisual media are included in my schemes of work as part of curriculum design that guides me.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	(87)

52. Classrooms in my school have sound and light controls plus other necessary facilities that allows me to teach using audiovisual media.

SA	A	U	D	SD	(88)

53. It is a good idea for students to make their own slides, films, photographs, audiotapes, etc. as part of their secondary school experience.

SA	A	U	D	SD	(89)

54. How important do you feel is the use of audiovisual media in teaching methods for the following groups of students?

	SA	A	U	D	SD	
1. Outstanding students:						(90)
2. Good students:						(91)
3. Average students:						(92)
4. Poor students:						(93)

Why did you respond the way you did?_____ (94)

_____

_____

_____

55. In recent years, what in your estimation has been the direction of audiovisual media use in your school?

Increased	Remained Just the Same	Decreased	Undecided	(95)

Comment_____

Why do you say so?_____ (96)

_____

56. How many of the following journals in education and research do you read?

1. Kenya Educational Review	___Occasionally	___Regularly	___Never (97)
2. Kenya Educational Journal	___Occasionally	___Regularly	___Never (98)
3. Kenya Teacher (Mwalimu)	___Occasionally	___Regularly	___Never (99)
4. Education in Eastern Africa	___Occasionally	___Regularly	___Never (100)
5. A Journal of Eastern Africa (Research and Development)	___Occasionally	___Regularly	___Never (101)
6. Other (specify please)	___Occasionally	___Regularly	___Never (102)

SECTION VII - BACKGROUND INFORMATION

Please check (X) as it applies to your school.

____maintained	(103)	____girls	(107)	____two year secondary	(110)
____assisted	(104)	____boys	(108)	____four year secondary	(111)
____unaided (private)	(105)	____mixed	(109)	____six year secondary	(112)
____unaided (harambee)	(106)				

____Academic	(113)	____Day	(118)	____Teacher	(123)
____Technical	(114)	____Boarding	(119)	____Department chairperson	(124)
____Vocational	(115)	____Day/Boarding	(120)		
____Technical/vocation	(116)	____Urban	(121)	____Head teacher	(125)
____All of above	(117)	____Rural	(122)		

Age_____(126)

Sex ____male ____female (127)

Teaching experience _____years (128)

____Christian (129)

____Muslim (130)

____Other (131)

Please rank order the subjects you teach.
Assign 1, 2, etc.

_____Languages	(132)	_____Industrial Education	(137)
_____Mathematics	(133)	_____Technical Education	(138)
_____Social Studies	(134)	_____Vocational Agriculture	(139)
_____Natural Science	(135)	_____Business Education	(140)
_____Music, Art, Drama, etc.	(136)	_____Engineering/Electronics	(141)

Thank you very much for your cooperation in completing this form. Please pass it to the person who gave it to you who will enclose it in the envelope and drop it in the post office. Again, ASANTE SANA.

Wekesa Mukwa
Lugulu Market
Box 675
Webuye, Kenya
AFRICA

WEKESA MUKWA
Instructional Development and Technolocy
Department of Secondary Education and Curriculum
College of Education
Michigan State University
East Lansing, Michigan 48824
UNITED STATES

APPENDIX L

A SEARCH FOR INFORMATION

Research Section: Educational Media Service.

Please, I would very much appreciate if you could supply me with the information listed below:

(1) Purposes and findings of unpublished survey research, Experimental research, Research and Evaluation that have been conducted on the status of Instructional Media in Secondary school education in Kenya. (Those findings that were published, I might have come across them).

(2) Findings and recommendations of field tests of various types of instructional media material and equipment. For example: film testing, the average cost of producing a film locally in Kenya and how the audience learned from the film; video tape programs etc.

(3) An approximate list of the types of instructional media material and equipment the Educational Media Service has already supplied and will be supplying to secondary school teachers through the Kenya Schools Equipment Scheme.

(4) The future plans Educational Media Service has regarding Secondary school education in Kenya.

(5) Approximate annual cost of school radio broadcasts between 1970-1977. (Please if it is possible) as follows:

	Cost per each year 1970 ——— 1977
A. Production costs	
1. Recording costs	
2. Scrip writing	
3. Curriculum design	
4. Artist for design and preparation of student workbooks	
5. Preparation of teachers' guides	
6. Management	
7. Formative evaluation (i.e. field testing)	
8. Support and facilities.	
B. Transmission	
1. Facility	
2. Equipment	
3. Operations	

C. Reception costs

1. Radio set (if possible give types of models please).
2. Batteries (hourly cost of power)
3. Teacher's guides (number of pages please).
4. Teacher training (number of hours per year at _____cost per hour).
5. Maintenance cost of radio receivers.
6. Total cost per student hour of radio broadcasts.
7. Total cost per student hour without radio broadcast.
8. Number of students.
9. Total cost of supervision (1 day of supervision time).

These statistics will be used to analyze: cost benefits and cost-effectiveness of school radio broadcasts in Kenya in my field study and may be used to predict the costs of other media programs to be introduced.

(I apologize for asking too much)

(6) 1. Methods for sending instructional media material, equipment, information and services to secondary school teachers and those of receiving feedback from them.

2. The kinds of instructional media inservice training programs for secondary school teachers that are currently existing.

3. What constraints face teachers who use instructional media for teaching and learning activities.

(7) If a teacher wanted a 16 mm sound motion film on the preparation of fertilizers in Kenya to use in her agriculture lesson, she writes a letter to the Educational Media Service requesting for the production of this film. Please, describe for me the procedures and stages her request goes through up to the time she purchases the completed film from the Kenya Schools Equipment Scheme.

Thank you very much for the information. I very much appreciate it.

Mr. Wekesa Mukwa
WEBUYE, KENYA

APPENDIX M

Apt. #304
635 Abbott Road
East Lansing, Mi. 48823
U.S.A.

September 13, 1978

Dear Headteacher:

I write to thank you and members of your staff for your participation in the survey research on Tools and Technologies for Learning in Secondary School Education in Kenya.

I very much appreciated the way you and your staff members cooperated and responded to the questionnaire statements and the comments that were made.

As it was stated earlier on, the summary results will be mailed to your school in April 1979.

Once again, thank you very much for your cooperation and that of members of your staff and others who participated to make this research a success.

Yours sincerely,

Mr. Wekesa Mukwa

Instructional Development
and Technology
Secondary School Curriculum and
Instruction
College of Education
Michigan State University
East Lansing, Michigan 48824
United States of America

cc: Mr. Roy H.J. Thompson
Kenya Institute of Education
P.O.Box 30231
Nairobi

Chief Inspector of Schools
Ministry of Education
Nairobi, Kenya

APPENDIX N

635 Abbott Road
Apt. #304
East Lansing,
Michigan 48823
U.S.A.
November 1st, 1978

The Head,
Educational Media Service,
Kenya Institute of Education
P.O. Box 30231,
NAIROBI
Kenya, East Africa

Dear Sir:

Enclosed find two letters sent to participating schools in the survey research: "Towards a Scheme of Educational Media Use in the Secondary School Education of the Republic of Kenya." A field Survey of Tools and Technologies for Learning.

One letter was sent to teachers who responded to the first issue of the questionnaires mailed to their school and the other letter was sent to teachers who did not respond to the first questionnaires sent to them and were sent second copies of questionnaires.

It was considered appropriate to let the teachers who responded to the questionnaires know that The Educational Media Service and The Ministry of Education are aware about this research. Informing the teachers that their employer - Ministry of Education, is aware of their cooperative contributions in research activities, encourages them positively to participate in future research projects. Therefore it was indicated on the letter sent to the teachers that a copy had been sent to the Educational Media Service and the Inspectorate in the Ministry of Education.

Forty percent of the data has been collected with which to work.

Sincerely yours,

Mr. Wekesa Mukwa

CC: Chief Inspector of Schools
Ministry of Education
P.O. Box 30040
NAIROBI
Kenya, East Africa

APPENDIX O

DEVELOPING A LESSON

This is an outline specifiying general procedures followed in preparing a lesson.

STEP I Writing teaching/learning objectives in terms of a description of who the learner is, the subject matter that s/he is to learn, the conditions under which the learning will be examined and the level of acceptable learning.

STEP II Determining the learning domain as:
Cognitive, i.e. What the learner should know, understand or comprehend, for example, solve a math problem, spell a word, etc.
Affective, i.e. how a learner should feel about something, for example, listen attentively, enjoy the lesson and appreciated it.
Psychomotor, i.e. how a learner controls or moves his body, for example, type 30 words per minute, paint a picture and etc.

STEP III Specifying the teaching/learning strategy within each domain;

Cognitive	Psychomotor	Affective
a. Naming	a. self-paced	a. interest or motivation
b. Event Naming	b. mixed paced	
c. Classification	c. externally paced	b. Attitude or value
d. Rule using		

STEP IV For each strategy a plan of activities for evaluating learning, learner practice and presentation of materials is made.

STEP V Identification and selection of the media that will be used to provide, interest, flexibility and reality to teaching/learning in the lesson is carried out.[1]

SAMPLE OF LESSON PLAN
SCIENCE STUDIES

1. Writing an objective:

Learner:	Form five physics students
Subject matter:	Will use Ohm's law to determine either the voltage, current or resistance in D.C. circuit
Learning conditions:	When given the values of the other two quantities
Level of acceptable learning:	Both the answer and the sequence used in solving the problem must be correct

2. Learning domain is: Cognitive

3. The appropriate learning strategy is: rule using

4. Writing learning strategy prescription:

Comments:

Before practice, test the learner's knowledge of different circuit components. Find out if s/he knows how these elements affect resistance, current, voltage.

After the learner calculates a given circuit, show him a problem correctly solved. Show each step. Point out common errors or omissions which frequently cause a learner to make errors.

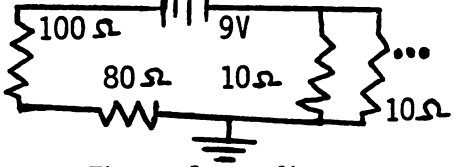
Presentation

State Ohm's Law (E = IR). Show a circuit diagram. Indicate that the student will be able to calculate either resistance, voltage, or current when given two of the other values for a given circuit. Explain the circuit illustrated. Show step by step solution and operations required for each step.

Tell the story of Ohm's struggle for recognition. Testify of the power of this simple law in all electronics. Cite examples of very comples circuits where the law still holds.

Practice

1. Assess component concepts; voltage, amps, resistance
2. Display circuit diagrams



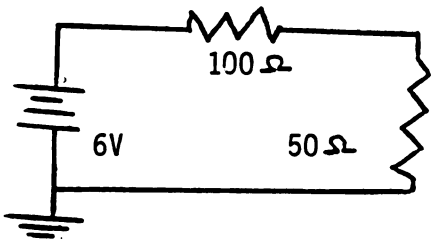
Response: The volts, Ohms, or amps involved

Directions: Determine the current (Voltage or resistance) of the following circuit. After each problem we will show you the correct procedure.

Present a variety of different circuits. Include all of the different circuit elements which the student has studied.

Evaluation

Display: A circuit diagram



Directions: Determine the current draw of the following circuit (or voltage or resistance).
Response: A number indicating amps, volts or resistance in ohms.
Level of acceptable learning: 1) formula correctly written for problem involved; 2) correct answer.

5 (a) What media could you use?

	OBJECTS	STILL PICTURES	MOTION PICTURES	AUDIO	WRITTEN WORDS/SYMBOLS
Presentation	Electrical equipment	Diagram of electrical circuit	_____	Discussion by teacher	Labels on circuit diagrams, written discussion
Practice	Electrical equipment	Diagram of electrical circuit	_____	_____	Problems
Evaluation	Electrical equipment	Diagram of electrical circuit	_____	_____	Problems

5 (b) Prescribe the Media you will use

Presentation:	Comments
Provide a variable power source, a number of light bulbs to provide variable resistance and the appropriate electrical meters. Have students record the voltage, ohms and amps as each one of the three elements is varied, and using the formula, demonstrate how the same values can be determined mathematically.	If effectively carried out, such a demonstration can be motivational and will help the student to more fully understand and remember Ohm's law.
Practice:	
Pretest with a written quiz to see if students understand resistance, current, and voltage. Make remedial instruction for those who do not. Make the electrical apparatus used in the presentation available to learners for validating answers to practice problems. Provide a number of different circuit diagrams with two out of the three elements given. Make solutions and answers accessible to students to they can check both their application of Ohm's law formula and the answer.	Confirming their results the electrical apparatus provides a means of positive verification of an abstract value.[2]
Evaluation:	
Provide student with several circuit diagrams that were not used during the practice or demonstration sessions.	

MWISHO.

FOOTNOTES

[1]Extracted from; Prototype Specifications Manual: A Guide for Instructional Development (National Special Media Institute), p. 55.

[2]Extracted from; Selecting Instructional Strategies and Media: A Place to Begin (National Special Media Institutes), pp. 51, 142 and 143.

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