

A COMPARATIVE STUDY OF TEACHING WITH RADIO  
BY TRAINED AND UNTRAINED TEACHERS  
THROUGH PUPIL ACHIEVEMENT.

A THESIS SUBMITTED IN PARTIAL FULFILMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF EDUCATION OF THE  
UNIVERSITY OF NAIROBI

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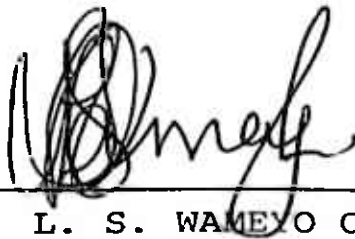
LORDVICUS SEBBYE WAMEYO | OLANGA

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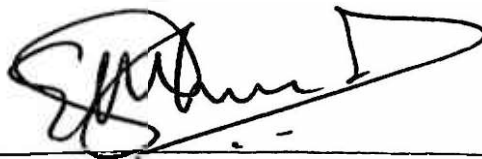
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L. S. WAMEYO OLANGA

"This thesis has been submitted for examination with my approval as university supervisor".



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DR. E. M. STANDA  
Senior Lecturer,  
Dept. of Educational Communication and  
Technology.  
Kenyatta University College.

DEDICATION

To my sisters: Rose Achieng, Terry Amimo  
and Everlyne Nicholas

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## ABSTRACT

The study attempted to compare the effectiveness of trained and untrained teachers on the utilization of instructional radio in the teaching of Health Education to Kenyan Rural Primary Schools. The effectiveness of the teachers was determined through the achievement of the pupils.

Seven teachers were randomly selected into the sample together with their 395 pupils. A pretest was administered to ascertain the starting level of the participating pupils. This was followed by eight weeks of teaching with taped materials. A posttest was finally administered on the pupils to determine the impact (if any) of teaching with the materials.

Statistical analysis revealed that whereas pupil characteristics and teacher's sex did not affect achievement, the training did, with the untrained teachers outperforming the trained teachers. Environment, subject matter and level were fixed through the design of the study.

The results seemed to indicate that the training that primary teachers receive is not helping them to integrate radio broadcast properly into their daily teaching. The researcher therefore made recommendations to the two ministries of Education. Recommendations included intensifying in-service courses, restructuring of media courses, constant utilizer evaluation, supplying of simpler radio sets, maintenance of the sets and the setting up of a separate studio for school broadcasts.

The t-test was carried out on the pretest scores and it indicated that the subjects were at the same level. The t-test was also used for hypothesis testing.

## CHAPTER ONE

### THE PROBLEM

#### 1.1 INTRODUCTION

After World War II countries took measures to improve the living standards of their peoples. The measures included the setting up of more industries to provide jobs. The developed countries agreed to invest in the less developed countries. For the peoples of the less developed countries to realise the success of this investment and subsequent development, the education of the people had to be improved first.

Prior to the war, formal education was neglected in the countries, particularly in Africa the youth were taught the traditional customs of their respective tribes. Hence there was no uniform pattern of education in the countries. However during the war, soldiers from Africa had the advantage of visiting foreign lands where they realized the importance of education. Back home after the war, these war veterans enlightened those they left behind on their war experiences and thus underscored the importance of formal education.

In Africa, this realisation led the countries to link education with freedom, and that partly led to the struggle for independences. It was

linked with freedom because the colonialists offered Africans an education that was not academic but that which could only make them work with their hands. Kenya like other African countries had a similar problem. She had been colonised by the British. The colonialists designed a racial educational system for Kenya where Africans got the lowest education while the Europeans got the best education. African education was geared towards the perpetuation of white interests and complete assimilation into the British way of life. The African was educated to foster the development of the reserves and to provide cheap labour in European enterprises. Throughout the master-servant relationship between the European and the African was kept in mind. The Asian community was second to the Europeans. For educational expenditure, the per capita cost was very low for the Africans compared to the other two races. In 1925<sup>1</sup> the per capita cost for the African, Asian and European were £1.6, £7.9 and £41.6 respectively.

At independence (1963) the system was overhauled to provide for educational equality in terms of opportunities.

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<sup>1</sup>Mutwa, R. W. Development of Education in Kenya. Nairobi: East African Literature Bureau, 1975. p. 145.

An attempt was made to africanise the formerly predominant European schools; it is sad to note that even now some of them still have the colonial outlook as they are exclusively for the children of the rich. Unlike before independence the syllabuses are now uniform and the pupils sit the same examinations. At independence the new government decided to have as many school age children as possible attending school. This demanded expansion of the then existing facilities by increasing the teaching force to cope with the extra numbers. In addition to the high enrolments due to the educational awakening, the number of school age children was increasing at an alarming rate of over 3% per annum. This itself indicated an annual increase of schools and teachers. The expansion however was to have some bad effects as James Mbotela, a social worker observed:

At present, educational progress in Kenya particularly African education has expanded beyond the widest imagination. Is there for instance, instead of education for its 'education's sake' a tendency to overaccelerate the educational programme, thereby bringing into existence an undesirable immaculate and semi-educated generation of African youth with false ideas of their own importance, useless to the people they are expected to serve.<sup>2</sup>

By 1970 the problem posed by the expansion programme had been realised and the then Chief inspector of schools (Kenya), Kanina observed that.

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<sup>2</sup> Mbotela. J., "Education, past and present." in East African Standard. (Nairobi) 3 May 1963 p. 18.

The high birth rates in our countries, the slow moving economies, and the high cost of education due to rise in salaries throughout the economy are making it impossible for us to provide education to the majority of our children. But what do we do? The quick answer has been 'let's resort to modern technology' to mass media, television, video tapes and a number of other devices.<sup>3</sup>

In 1974 there was a Presidential decree for Free Primary Education aimed at reducing illiteracy. This move affected the teachers' ratio and that of the pupils. The Ministry of Education had no option but to engage more untrained teachers (UTs) to cope with the demand. Actually the decree for free primary education had been delayed.

Prior to independence, one of the political parties, the Kenyan African National Union, (KANU), now the ruling party had promised in its manifesto to provide free education after independence. However, prior to independence the then Minister of Education in the coalition government, Honorable J. Otiende<sup>4</sup> observed that the government would move gradually towards the provision of seven years free education, which was to cost the government £6 million yearly, and that there was no intention of expanding the Teacher Training Colleges

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<sup>3</sup>Manone C. J. (Ed), Critical Issues in Teacher Education. Kampala Universities of Eastern African Conference on Teacher Education, 1970, p. 17.

<sup>4</sup>Otiende J., "Yesterday in Parliament" East African Standard, Nairobi, 11 July 1963 p. 3

(TTCs) on a regional basis. However, in the admission of students to the TTCs attention would be paid to those areas where qualified teachers were needed most.

## 1.2 DEFINITIONS OF TERMS

For the purposes of this study the following definitions of terms will be employed to clarify some technical meanings of the words and phrases used.

### Broadcast

Transmission via radio or television channels on a broad or non-directional beam, using a frequency in which receiving equipment and programmes are available to the general public.

### Broadcast to schools

Any such transmission aimed at the schools for instructional purposes.

### Instructional medium

Any component of the learning environment which provides or helps to provide stimuli to learning (Bretz p. xvii).



### Instructional radio

Radio when used as an instructional medium.

### Programme

Content of a medium, and consists generally of a message expressed in terms and techniques of the medium (Bretz p. xxi).

### Utilization

Use at the receiving end of a media system. It refers to the manner in which an instructional programme is integrated into the whole instructional system, that is, how it is coordinated with other instructional activities (Bretz. p. xxiv).

## 1.3 BACKGROUND OF THE PROBLEM

Prior to independence in Kenya, the colonial government was not keen in training teachers for schools. By 1944 plans had been proposed to start a government training institute at Kagumo. The Africans also demanded a minimum of 44 TTCs by 1960. Based on the Ominde commission of 1964 a number of TTCs were started to train primary school teachers, these

colleges included Siriba and Kagumo. During the sixties a new training scheme for form four school leavers was started at the then Central Teacher Training College now Kenya Institute of Education (KIE). This created a new breed of teachers known as S<sub>1</sub> teachers. However, due to shortage of teachers at the secondary school level most of these S<sub>1</sub> teachers ended up in the secondary schools.

The output of the colleges could not cope up with the demand. For the secondary schools the government engaged expatriate teachers. The Kenyanization of the labour force also posed a problem as Mwendwa Kyale, a Senior Education Officer observed,

although Kenya had embarked on what had become known as a 'Kenyanization policy' in its public services, the country would continue to need expatriate teachers.<sup>5</sup>

To fill the gap the Ministry of Education decided to include school leavers who had had no training in teaching but who could handle the primary school classes. This breed of teachers became known as the untrained teachers (UTs): It is sad to note that most of the UTs took to teaching when it appeared to

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<sup>5</sup> Mwendwa, K. "Need for expatriate teachers remains." East African Standard, (Nairobi), 17 July, 1967, p. 5.

be the only alternative after failing to secure places in form five or any of the post form four colleges. Thus many school leavers with poor results turned to the teaching profession not because they were qualified for teaching or interested in the career but were unable to go anywhere else. However, their contribution cannot be neglected for the Minister of Basic Education Ngeno<sup>6</sup> observed that the UTs had helped the Ministry to cope with the growing demands of increasing number of pupils.

By January 1964<sup>7</sup> there were approximately 4750 primary streams in Kenya and were estimated to increase at 150% per annum. The teaching force was as follows: P<sub>1</sub>\* - 769, P<sub>2</sub> - 2,283, P<sub>3</sub>/P<sub>4</sub> - 15,134, UT - 7637. The TTCs were then producing over 2,000 teachers annually of whom 400 were of P<sub>1</sub>/P<sub>2</sub> grade while 1,700 were of P<sub>3</sub>/P<sub>4</sub> grade. At this rate there was a hope of overcoming the shortage of trained teachers by 1969. Meanwhile the number of applicants for admission to the TTCs shot up, for in 1971<sup>8</sup> only 2,769 (16%) of the applicants got admission.

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<sup>6</sup>Ngeno, J., "Teacher Training period halved" in Daily Nation. Nairobi. March 29, 1982, p. 1

<sup>7</sup>Lewis, A.J. (Ed) Report of the Conference on the Institute of Education. Mombasa 1964, p. 6  
\*P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub> and P<sub>4</sub> are grades awarded to teachers after qualifying at the TTCs.

<sup>8</sup>Omamo, W.O. 'The role of teacher education in rural transforamtion' in Manone C.J. (Ed) 'proceedings of the 10th Universities of East African Conference on teacher education, Nairobi, p. 12.

By October 1981<sup>9</sup> the Teachers Service Commission (TSC) had employed nearly 120,000 teachers who were catering for more than 4.5 million pupils in primary and other educational institutions. One third of these teachers were untrained. The Ministry of Basic Education carried out a head count of all the teachers in the primary schools early in 1982 and found that about 40,000 of the teachers were untrained. The Government then accepted to re-introduce in-service training for the untrained teachers and to reduce the current two year training period to one year. This move was expected to increase the number of trained teachers by about 10,000 in three years.

This move implied a massive expansion of the TTCs. The Education Minister, Ngeno<sup>10</sup> disclosed that the expansion would enable each TTC to accomodate between 1,500 and 2,000 students.

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<sup>9</sup>Lijembe, J. "Teachers must be good examples," in Daily Nation (Nairobi). 27 October, 1981 p. 2

<sup>10</sup>Ngeno, J. "Colleges set to expand, in Daily Nation. (Nairobi) 2 March, 1982, p. 2

He voiced the Government's decision to improve the quality of primary school teachers. The Ministry was restructuring the training programme in such a way that methodology, professional studies and practical teaching were included. However, it is still not clear how this could be done in one year if quality is not to suffer at the hands of quantity.

With such a large number of untrained teachers the question "Are the untrained teachers comparable to trained teachers as far as teaching is concerned?" is inevitable. If they are not comparable then the pupils taught by the UTs must be at a disadvantage. Teaching involves a lot of processes; pupils initiate discussions and general maintenance of discipline and learning atmosphere in the classroom. Besides these the teachers should be acquainted with the use of audio-visual aids in teaching for as Muraya<sup>11</sup> (a senior education

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<sup>11</sup>Muraya, A. H. "Staffing and demand in Manone C. J. (Ed.) Staffing teacher education Institutes in East Africa: Universities of Eastern Africa Conference on Teacher Education, 1969, Dar es Salaam, p. 12.

Officer, Kenya - 1969) observed that whereas stress was on the quality and qualifications of teachers it was important to supply them with the tools (equipment) of their trade.

Correspondingly there was a rise in pupil numbers, for at independence there were 870,448 pupils, compared to 1,290,000 (1969) and 1,427,589 (1970)<sup>12</sup>. Together with the high enrolments, the problem of dropouts came up. In 1980<sup>13</sup>, 327,973 pupils sat the Certificate of Primary Education (C.P.E) Examination. In 1981 348,042 pupils sat the examination. Of these there were only 40,000 vacancies in 2,000 Government maintained or aided secondary schools, less than 100,000 got places in registered Harambee (self-help) and private schools leaving more than 200,000 pupils without any hope of further education. Can the failure of these pupils be attributed to the untrained teachers or to their failure to use audio visual aids effectively? Is the failure equally attributed to trained teachers as well?

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<sup>12</sup> Muraya, A. H. Op. Cit. p. 30

<sup>13</sup> Ngeno, J. "C.P.E. results out" in Daily Nation (Nairobi) 29 December, 1981, p. 1

~~Audio-visual~~ materials can be classified into three classes namely, audio, visual and audio-visual. Audio materials include radio, language laboratories, tapes, discs, telephone, tele-lecture and sound distribution systems. Visual aids include books, self-instructional materials, pictures, photographs, flashcards, flow charts, flip charts, maps, posters, exhibits, bulletin boards, magnetic boards, flannel graphs, filmstrips, slides, transparencies, silent film, chalk boards and drawing cartoons. Audio-visual aids combine both sound and vision and include television, films, video tapes, sound filmstrips, printed materials with recorded sound, study trips and demonstrations. Dale<sup>14</sup> observed that with the skillful use of radio, audio-recording, television, video recording, painting, line drawing, motion pictures, photographs, models, exhibits and posters, we can bring the world into the classroom.

What is the contribution of these audio-visual materials to the classroom? Will they make the slow learner bright and the bright learner brighter? The answer is given by Dale as:

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<sup>14</sup>Dale, E. Audio visual methods in teaching  
3rd Edition. The Dryden Press.  
 Inc. Illinois, 1969. p. 23.

Though they provide no cure-all, the evidence is clear that audio-visual materials can make rich contributions to the experiences of both fast and slow learners.<sup>15</sup>

Determining whether students actually do what they are taught is the most difficult task of all. Unfortunately for our pupils there is more teaching than learning. Further transfer therefore does not occur, but the able teacher tries to arrange experiences so that transfer takes place. Is the untrained teacher as distinct from the trained teacher able to arrange the audio-visual aids so that the pupils gain something from the lesson?

Adwan This study concerned itself with the use of one of the aids namely, the radio. But the difference is, the author used recorded lessons rather than radio itself. This was done in view of certain problems of using radio. Radio has both advantages and disadvantages. The advantages are:

- (i) It is inexpensive.
- (ii) It is upto date and immediate.
- (iii) It leaps time and space barriers.
- (iv) It makes an emotional impact.
- (v) It has authenticity and realism.
- (vi) It calls for imaginative involvement.



The advantages equally apply to tape recorders but radio has much more immediacy, realism, and emotional impact. The disadvantages of radio are:

- ✓ (i) It is handicapped by being one-way.
- ✓ (ii) It is inconveniently scheduled
- ✓ (iii) It is subject to poor reception
- ✓ (iv) It cannot be preheard in advance of the broadcast.

Tape recorders have the following advantages over radio:

- (i) They are also one-way but they provide more opportunity for two-way communication. One can pause the recorder and discuss passages, answer questions, clarify certain points and can be played over and over again.
- (ii) They can eliminate the scheduling problems of radio.
- (iii) They can be preheard, evaluated and used at convenience.
- (iv) They can offer a great deal of helpful materials.

Equally important is the role played by the support materials. In the case of radio broadcasts the support materials include charts, posters, and teacher's notes. The role of the support materials before and during the broadcast for the teacher are to provide:

- (i) philosophy of aims.
- (ii) aim of each broadcast.
- (iii) description of content of each broadcast.
- (iv) statements of any concrete practical matters the teacher should arrange before hand, e.g. availability of charts, maps, pictures, etc.
- (v) statement of any desirable preparation of the class in the form of discussions, reading, experiment, etc.
- (vi) statement of what action will be required of the teacher during the broadcast.
- (vii) pictures indicating the quality of response to be expected from a class, e.g. in movement.
- (viii) A note of proper names, unfamiliar vocabulary, technical terms, etc.
- (ix) Answers to questions posed in the broadcast or in the pupils' booklet.

- (x) Additional comment which will help the teacher himself to understand more fully the subject of the broadcast.

After the broadcast the role of the support materials for the teacher is to;

- (i) indicate some possible points for discussion and other activity.
- (ii) lay down a more defined and extensive programmes of activity.
- (iii) provide a course book guiding the teacher in the whole of his work on the subject.
- (iv) provide material which may be undesirable to broadcast on the open air but can properly and usefully be introduced into the classroom if the teacher thinks fit.
- (v) provide additional background material.

Before and during the broadcast, support materials for the pupil provide;

- (i) much of the material in the absence of the teacher.
- (ii) visual material as a basis for the imagination or for comment by the broadcaster.

- (iii) textual material which will help many pupils to fix the attention upon, and to hear and understand more fully broadcasts of their native literature.


After the broadcast the role of support materials for the pupil is to provide.

- (i) Visual material as a basis of recapitulation, discussion and activity.
- (ii) Texts for further study.
- (iii) A course book as a basis for most of the later classroom work in that subject.
- (iv) Visual and textual material which can be absorbed into pupils' rough books or taken home as their private possessions.
- (v) Clearly programmed materials, which may be largely self correcting, for use particularly in subject areas where teachers are not fully qualified, or in circumstances where no teachers are available.
- (vi) Activity material in the form of cards and other forms of cut-out materials for use as educative games, kits of simple apparatus for experiments especially in Science.

- (vii) Checking of progress by means of question papers distributed periodically by the broadcasting organization.
- (viii) Further full development by means of correspondence courses.

The support materials even if ingeniously prepared will not be effective if:

- (i) It does not reach educational institutions in time.
- (ii) It reaches the institution but does not reach the relevant teacher.
- (iii) It reaches the teacher but is not read or properly studied by him.

 Support materials promote a fertile relationship between the teacher and the pupils if:

- (i) It is reliable and fortells exactly what will be in the broadcast.
- (ii) Its layout is such that he can see immediately and clearly what he wants to know.

- (iii) While giving firm guidance it still by its tone makes teacher and pupil feel free, and while giving full information still allows the broadcasts to contain an element of surprise.
- (iv) It provides for two-way exchanges of opinion and experience between broadcaster and teacher.

The development of support materials to accompany radio/T.V. broadcasts has increased the power and range of educational broadcasting and has also played an important part in the development of a sophisticated instrument which can if required use both T.V. and radio, live or recorded together with support materials or several different kinds.

In Kenya, school radio has been in use since 1963. It prevails over the other forms of mass media. In 1963 it was run privately by the Kenya Broadcasting Corporation (KBC). The then Schools Broadcasting Service (SBS) had one hour a day to broadcast British Broadcasting Corporation (BBC) imprinted programmes. The service was headed by an education officer from the Ministry of Education, but the producers were KBC employees.

The SBS was transferred to the Ministry of Education in 1965 and became the Schools Broadcasting division of the Ministry. The programme producers from the newly acquired Voice of Kenya (VOK) were transferred to the Ministry. Gradually the division's staff began to produce their own programmes. But their number was staggering. Even as late as 1975 there were only six members of the division producing local programmes and broadcasting six hours a day. Three professionally trained teachers were added to the unit and immediately seconded to Kenya Institute of Mass Communication (KIMC) for nine months training through the British Council Scholarships. The unit was particularly charged with the responsibility of producing visual materials especially for use in English, Science and Mathematics in the TTCs.

In 1976, the SBS became the Educational Media Service (EMS) and was transferred to the Kenya Institute of Education (KIE). This was the culmination of a project started two years earlier to establish EMS for the purpose of producing

or developing materials for formal and non-formal education. The World Bank then granted a loan in 1976 to enable EMS to develop facilities for audio, video, film, tapes, slides and photo materials.

The EMS was transferred to KIE to enable it to integrate its radio materials with the books produced at KIE. Upto date (1982) the radio section works on material for primary and secondary schools. The visual materials produced are still largely for college and social education. The primary aim is to motivate teachers to adopt new approaches in education.

The need to provide this type of aid to teachers had been felt even before 1963. It is hoped that through this <sup>radio</sup> ~~medium~~ ideas that are otherwise unobtainable could be provided to the teachers.

2 Today, <sup>2</sup> ~~the radio helps to fill the gaps in equipment and in teacher's own education and knowledge~~ of the world around him. <sup>4</sup> ~~The radio has established itself as a prop to teachers. In short, the visual unit is basically motivated while the radio is a prop.~~



The EMS still transmits its programmes at the VOK studios. The ground work is carried out at EMS offices, KIE; while the recording and the broadcasting are done in consultation with KIE. Every subject has a panel which is comprised of the subject's inspector from the Ministry (Chairman), curriculum developer at KIE (Secretary), teachers, tutors, inspectors and a Nairobi City Council Officer. The Health Education Programmes and the support materials must go to the panel for discussion and approval; they then proceed to the academic board which is chaired by the Director of Education. The programme is then tested in a school of the target audience. The programme is brought back and modified if necessary. The programme again goes to the panel for the final approval, after which the programme is declared worthwhile. The producer can then make a booking at VOK to produce the programme on tape. Finally the programme can go on air. The producer also has to make some printed materials or pictorial materials if they are of necessity to the programme.

In its attempt to reach the selected audience, the EMS has had two major problems. First is the poor reception from VOK in some parts of the country, this has forced schools in these areas to avoid using radio programmes.

A second problem is the poor distribution and maintenance of radio sets. The distribution of timetables and supplementary documents has also been a problem as they pass through a number of middlemen to reach the schools. Attempts are being made to overcome the problem of poor reception through the the supply of taped materials to schools in areas with poor receptions. However, distribution and maintenance still remains a problem;

The original conceptualization of radio in Kenya was as put by Raymer, that

it would be a valuable teaching aid for teachers.<sup>16</sup>

The intention was to make teaching interesting; Radio was introduced simply as an innovation in educational technology and not as a solution to a particular problem. It is appropriate to note that radio is only one of the options a teacher has at his disposal. Besides it the teacher has other media.

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<sup>16</sup> Raymer, J. "Broadcasts for Kenya classrooms" in Kenya Educational Journal Vol. 1 No. 11. May 1963, p. 12.

The effective use of radio for instruction will depend first and foremost on the user's attitude towards it. Other factors like availability of sets, accessibility to sets, environment, training of teachers, experience of teachers will also affect their choice of instructional radio. Since the teaching of Science should inculcate scientific attitude and creativity in students it is important to investigate how far school broadcasts fulfil this purpose. To do this it is important to find out actually what happens in the classroom as a result of the broadcast.

A number of organisations have considerable influence on the effectiveness of radio programmes. One of these organisations is the TTCs. The colleges are supposed to help in instructing the student teachers on how best to utilize the broadcasts. The effective utilization of the broadcasts will very much depend on the training of the teachers. On methodology Mwendwa Kyale observed that,

these colleges are required to expose their teacher trainees to the latest course materials and teaching techniques and methods.<sup>17</sup>

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<sup>17</sup>Manone C. J. (Ed.) 1969 Op. Cit. pg A3

✓ Mwendwa's observation was timely as teachers are normally very hesitant to acquire new responsibility which they may not be professionally equipped to handle. The teachers fear that ~~technology may not be teacher extenders but teacher replacers.~~

The study is therefore aimed at looking at this vital contribution of the TTCs. The study will compare the achievement of pupils taught by trained and untrained teachers using radio because as Murname puts it,

virtually every study of school effectiveness finds that some attributes of teachers are significantly related to student achievement.<sup>19</sup>

From this comparison trained teachers will then be compared to untrained teachers.

For this study, a pretest (an achievement test) in Health Education was developed and administered to 395 standard six pupils taught by seven teachers, of whom three were trained. This was followed by eight Health Education Programmes, and lastly a posttest set from the contents of the eight lessons.

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<sup>19</sup> Murname, R. J. "School effectiveness" in Teacher College Record Vol. 83 No. 1, Fall 1981, pg. 21.

All the teachers were instructed by the author to prepare the pupils before the broadcast and do follow up work after the lesson.

#### 1.4 STATEMENT OF THE PROBLEM

Schools broadcasting began in Kenya in 1963. Some 1,300<sup>20</sup> transistorised radios were distributed to selected African Primary Schools. This was made possible through a grant of £26,300 from the then colonial development corporation. The grant was to cover initial capital and recurrent costs upto 1964. Thereafter the costs were met by the Ministry of Education. Because of the heavy costs involved, it was important that this education innovation be put to use.

But Kafu<sup>21</sup> (1976) found that 33% of experienced teachers used radio broadcasts regularly, 55% used it sometimes and 12% never used it.

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<sup>20</sup> Gregg, W. D. 'First Schools broadcasting term starts on Monday' in East African Standard. Nairobi. 24 May 1963. p. 3.

<sup>21</sup> Kafu, P. A. "Analysis of the elementary school teachers' rationale concerning their use of instructional media (teaching aids) in elementary school teaching in Bungoma District and Eldoret Municipality of Western Kenya." Unpublished M.Ed. Thesis. University of Nairobi. 1976 p. 134.

He obtained a similar pattern for trained teachers. On the proportion of time devoted to different media, radio broadcasts ranked last. The possible explanation is that most of the present time teachers were taught the conventional way and therefore find it fairly hard to use modern teachnology. On this resistance to innovation Kanina observed that

Being in the inspectorate. I have been able to observe that the teacher will always go back to the methods by which he was taught I don't know how we are are going to break this.<sup>22</sup>

For those teachers it is through the training at the TTCs that they could have learnt the use of school broadcasts, its advantages and usefulness. The study therefore attempted to investigate the contribution of training to that end.

The study therefore addressed itself to comparing the achievement of pupils taught using radio by trained teachers and those taught by untrained teachers. The comparison is made using the pupils' achievement because according to the U.S. office of Education,

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<sup>22</sup> Manone C. J. (Ed.) 1970 Op. Cit. p. 11

✓ Intuitively we know that teachers do make a difference - both positive and negative, in how a student performs, in his level of achievement, in his behaviour, in the values he acquires. If teachers did not make a difference we would be satisfied with schools run and operated wholly by machines.<sup>23</sup>

In case pupils taught by trained teachers achieve more, then training is essential to teachers particularly in the use of instructional radio. Otherwise if the difference is non-significant, then training is not a factor.

#### 1.5 PURPOSE OF THE STUDY

The purpose of the study was to determine whether training is essential for a teacher to use broadcasts effectively. Since radio alone cannot be used for instruction the teacher must integrate it with other media. The teacher's presence is of importance if the media are to be of any use to the pupils.

There is a likelihood that trained teachers will prepare more before the lesson than the untrained teachers, on the other hand the trained teachers might be over confident as to prepare for the radio lesson. The trained teachers

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<sup>23</sup>U.S. Office of Education, Do teachers make a difference? U.S. Government Printing Press. Washington. 1970, p. (iii).

might also view radio lessons as a bother, or an interruption to the lesson. Sometimes a teacher might tune the radio to take his place during the lesson due to unpreparedness. But we note that the radio is not intended to replace the teacher but to help him as Gregg puts it,

In the underdeveloped world school broadcasts could do a great deal to help the teachers, although they could never replace them.<sup>24</sup>

The radio lessons are designed to supplement lessons laid down in school syllabuses such as English, History, Civics, Music and art.



1.6 QUESTIONS TO BE ANSWERED BY THE STUDY

(i) Questions pertaining to teachers.

- (a) How important is the training of the teacher in so far as the utilization of broadcasts to schools programmes are concerned?
- (b) Is radio a good aid to the trained teacher or to the untrained teacher?
- (c) Is sex a factor in the teacher utilization of radio programmes?

(ii) Questions pertaining to pupils.

- (a) Are younger pupils gaining more from radio teaching than older pupils?
- (b) Is the achievement of pupils dependent on the presence of radio at home?
- (c) Are male pupils gaining more than female pupils?
- (d) How important is the pupil's background?

## 1.7 ASSUMPTIONS OF THE STUDY

- (i) That the sample of teachers was representative of the whole universe of primary school teachers in Kenya.
- (ii) That Health Education is representative of all the Science subjects taught in Kenyan Primary Schools.
- (iii) That radios are uniformly distributed all over schools.
- (iv) That the standard of English language is uniform over all the pupils in the sample.
- (v) That all the teachers in the sample adhered to the instructions given by the researcher.
- (vi) That the effective use of the radio lesson by the teacher will be reflected in the pupils' achievement.

## 1.8 STATEMENT OF THE HYPOTHESES

There will be no difference in achievement between:

Hypothesis one.

Pupils taught by trained teachers and pupils taught by untrained teaches.

Hypothesis two.

Pupils taught by trained male teachers and pupils taught by untrained male teachers.

Hypothesis three.

Pupils taught by trained female teachers and pupils taught by untrained female teachers.

Hypothesis four.

Pupils taught by trained male teachers and pupils taught by trained female teachers.

Hypothesis five.

Pupils taught by untrained male teachers and pupils taught by untrained female teachers.

Hypothesis six.

Pupils taught by male teachers and pupils taught by female teachers.

### 1.9 IMPORTANCE OF THE STUDY

During the last few years, a considerable amount of criticism has been directed towards untrained teachers, but little of it has been based upon research. In January 1982, about 34% of primary school teachers in Yala division, Siaya district were untrained (source: Yala division Education Office). The qualifications of the teachers are given in table I.

Table 1: Qualification of teachers in Primary schools in Yala division, January 1982.

GRADE	NUMBER	%
S1	11	2.8
P1	80	20.5
P2	91	23.3
P3	67	17.1
P4	8	2.0
K.A.C.E/UT	1	0.3
K.C.E/UT	98	25.1
K.J.S.E/UT	35	8.9
TOTALS	391	100.0

It is an obvious fact that teachers are crucial and indispensable to the successful implementation of any new educational proposal. Thus there is need for a viable teacher education programme which will feed into the new education system suitable trained teachers who will lay a firm foundation, especially at the primary school level on which the new educational reforms envisaged for secondary education courses would rest.

The study is important in that it will fulfil a need in the area of research and development. Sound educational procedures proceed from a theoretical base and appreciable development activity. It is hoped that the recommendations of this study, as they relate to the identification of priority problems and alternative solutions may serve as a basis for development activities in training and inservice education of teachers in Kenya.

#### 1.10 DELIMITATIONS OF THE STUDY

- (i) The schools in the sample were in one division.
- (ii) Seven schools out of 44 were taken in the division.

- (iii) Only one subject was used.
- (iv) Only teachers with teaching experience of less than five years were in the sample.
- (v) The study was confined to a rural area.
- (vi) Only one grade of the primary school system (i.e. class six) took part in the study.

However, it is hoped that the recommendations would have applications to other subjects, grades, environments, and schools in the country.

#### 1.11 OUTLINE OF REMAINDER OF THE THESIS

The remainder of the thesis will be comprised of:

Chapter 2: Review of related literature

Chapter 3: Methodology

Chapter 4: Analysis, findings, and Evaluation

Chapter 5: Summary, conclusions and recommendations.

## CHAPTER TWO

### 2.0 REVIEW OF RELATED LITERATURE

Not much research has been done in Kenya particularly in the field of educational technology. An attempt has therefore been made to review the literature of foreign studies. Most researches done on educational media abroad have been on evaluation of programmes or courses. The evaluation took various forms like questionnaires to teachers, tests of student opinion, observation of classroom behaviour, measurement of attitude changes and measurement of student learning. This study is unique in that it is looking at the effect of the teacher's training on the pupil's learning from radio lessons.

The literature review for this study falls under three broad categories:

- (a) Review of studies on educational broadcasting.
- (b) Review of studies on teacher education.
- (c) Review of studies on teacher-pupil characteristics.

## 2.1 STUDIES ON EDUCATIONAL BROADCASTING

Studies to determine the effectiveness of educational media dates as far back as 1930s. Early studies concentrated on comparing the efficacy of media as supplements to conventional modes of instruction which did not use them. It was found that pupils did learn from educational media and that learning depended on the prevailing conditions, subject matter and the content.

Nishimoto<sup>25</sup> of Nippon Hoso Kyokai (NHK), the Japanese Broadcasting corporation categorized surveys on school broadcasts into six categories:

- (i) Conditions in which the broadcasts are used.
- (ii) Effects of Broadcasts on learning.
- ✓(iii) Students' reactions, attitudes and interests towards broadcasting programmes.

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<sup>25</sup> Nishimoto, M. The development of Educational Broadcasting in Japan. Tokyo, Sophia University Press, 1969, p. 149.



- (iv) Research for improving programme format.
- (v) Learning and series-viewing versus eclectic viewing of programmes.
- (vi) Opinion surveys on teachers' attitudes towards educational broadcasting programmes.

McQuail<sup>26</sup> of British Broadcasting Corporation (BBC) on the other hand came up with four categories into which research problems on radio broadcasts could be divided:

- (i) Current broadcast output, effectiveness and usefulness.
- (ii) Attitudes towards radio on the part of the teachers and students.
- (iii) Replacement of the live teacher.
- (iv) Audio-visual communication and its characteristics.

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<sup>26</sup>McQuail, D. Preparation and exchange of information and research in Educational T.V and Radio in Britain. London. BBC p. 227.

### 2.1.1 Effects of Broadcasts on Learning.

Numerous studies have been done to compare the effectiveness of radio over the traditional methods of teaching. One such study was done by McQuail<sup>27</sup> who found statistically significant gains in information about American History on pupils taught by radio over those taught by traditional methods. He also found no consistent differences between pupils taught through film/T.V and those taught traditionally.

*Advantages* From Japan, the NHK Radio and Television Cultural Research Institute carried out a study in 1954/5 and concluded that,

✓ the listening group came out better than the control group that was taught traditionally.<sup>28</sup>

Later researches by the institute confirmed this finding.

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<sup>27</sup>McQuail, D. Op. Cit. p. 228

<sup>28</sup>Nishimoto, Op. Cit. p. 154

In the Dominican Republic, White (1976)<sup>29</sup> observed that the radio project (the Santa Maria Radio School) provided the rural youth with an education equivalent or superior to traditional means at a cheaper cost. The project enrolled about 20,000 students between 1972 and 1975.

In Mexico, McAnany, Mayo and Kless (1975)<sup>30</sup> showed that students taught by the Telescundaria Radio Project did equally well as regular secondary school students in a system that cost less than the traditional method of teaching. A similar study that reached similar conclusions was done by Momluang (1960)<sup>31</sup> in Thailand. He also

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<sup>29</sup>McAnany, E. Success or failure of Communication technology in the third world: by what criteria shall we judge in Educational Media International. 1978. No. 4 p. 20.

<sup>30</sup>Ibid. p. 19.

<sup>31</sup>Momluang T. K. et al. "A survey of results of using school Broadcasts as a teaching method." Educational and Psychological test Bureau, College of Education. Bangkok. Quoted in The New Media: memo to educational planners. by International Institute for Educational Planning (IIEP) - UNESCO. Armsterdam. 1967 p. 19

found that the variability among the groups was considerably reduced, with radio apparently equalizing learning opportunities and bringing up less prepared pupils to a level nearer those who had more opportunities previously.

Davis (1975)<sup>32</sup> found that whereas the group taught by audio-visual aids gained significantly more than the group taught traditionally, both groups gained in knowledge. Le Franc<sup>33</sup> carried out a study comparing the use of radio and filmstrips. The combination of the media constitutes a new medium called radio-vision. He found that the inclusion of the filmstrips increased the effectiveness of the radio broadcasts.

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<sup>32</sup>Patricia Colling. (Ed). Dissertation Abstracts International: The humanities and Social Sciences. Vol. 36 No. 4. Oct. 1975 p. 1985 .A.

<sup>33</sup>Standa, E. M. "A Systems approach to instructional radio broadcasting in the Kenya School System: A model" Unpublished Ph.D. Dissertation, University of New York at Buffalo, 1978. p. 40

Kinyajui (1975)<sup>34</sup> researching in Kenya found that radio programmes were particularly useful for speechwork in the two language courses as well as for maintaining good rapport between the students and the teacher. A summary of the literature reviewed indicates that radio is superior to traditional methods.

2.1.2 Students' reactions, attitudes and interest towards Broadcasting programmes.

Most studies on instructional media have been on attitudes of either teachers or students. The effective use of radio depends on the attitudes and interest the students have on radio.

McQuail<sup>35</sup> researching in Britain found that film and T.V. have in themselves no special potency in moulding opinion or attitudes. Similar studies by Saito<sup>36</sup>,

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<sup>34</sup>Kinyanjui, P. "The Use of Radio and Correspondence Education for the Improvement of Teaching" in N. Mackenzie et al (1975) 'Open Learning' (UNESCO: Paris) in Educational Media International. 1981 No. 4 p. 4.

<sup>35</sup>McQuail, D. Op. Cit. p. 231

<sup>36</sup>Nishimoto, M. Op. Cit. p. 157

the NHK Radio and Television Cultural Research Institute (1959)<sup>37</sup> and Nishimoto<sup>38</sup> all in Japan confirmed that students' attitudes towards broadcasting programmes affected their learning. ✓  
Another study<sup>39</sup> by the institute gave a correlation of 0.413 between interest in programmes and understanding.

In Kenya, the first research by the Educational Media Service (EMS) was on a series of secondary school history programmes and their attitude changing effects. The research found that,

radio could induce specific attitude changes in secondary students, even in situations where the changes conflicted with the attitudes of the teachers.<sup>40</sup>

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<sup>37</sup>Nishimoto. Op. Cit. p. 157

<sup>38</sup>Ibid.

<sup>39</sup>Op. Cit., p. 158

<sup>40</sup>Thompson, R. J. Evaluation and Research for Educational Broadcasting in Kenya in Educational Broadcasting International. Vol. 9. No. 1 March 1976 p. 24.

It is thus important to design programmes such that the students' reactions are positive, for it is then that they can gain from the programmes. The programmes should be interesting to the students for it is only then that maximum understanding can be expected. Last but not least in importance is the attitude of the students towards the programmes. Attitudes occupy a central position in the students' accommodation of the radio programmes and the contents there in. The teacher should also assist in moulding positive attitudes in the students.

### 2.1.3 Improvement of Programme format. ✓

A study by Survey<sup>41</sup> (1927) in England found that a programme of approximately 20 minutes was most suitable in length, and that between 20-30 students could listen together. The length of a programme affects the listener's gain, a very long programme bores the listener.

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<sup>41</sup>McQuail, D. Op. Cit. p. 231.

Ewing<sup>42</sup>, researching in New Zealand found that instructional radio designers must consider other variables with regard to the forms of presentation and quality of study in the Honduras in which continuous assessment was carried out at various stages in the learning process.

✓ In Kenya, there has been a problem of reception for listeners far away from the station. A termly evaluation was carried out in 1970 using questionnaires. The results indicated that,

of the 143 reports sent in by teachers on individual programmes from all over Kenya, 32.8% recorded poor reception.

✓ The EMS also carried out another study and the findings helped to bring about changes in the overall organisation of the EMS. On the value of sound effects the EMS found that unfamiliar sounds could be confusing to the students.

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<sup>42</sup>Ewing, J. L. "The use of radio by the correspondence school of New Zealand Department of Education," in New Educational Media in Action. (Paris: UNESCO - 1967), quoted by Standa E. M. Op. Cit p. 40.



2.1.4 Teachers' attitudes towards educational broadcasting.

Knowlton and Hower<sup>45</sup> (1962) carried out a study and concluded that negative teacher attitudes towards educational media were related to utilization barriers, Finch<sup>46</sup> (1970) reported that availability of instructional resources led to increased utilization of such media but that teacher attitudes had little influence upon the availability - use relationship. Lewis<sup>47</sup> concluded that teachers perceive educational media as being readily available and that they perceive formal training in the area of audio-visual instruction as being unnecessary.

Manduley (1975)<sup>48</sup> carried out a study in Washington on radio usage. He identified and analysed factors that are related to a

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<sup>45</sup> Aquino, C.C. "Teacher attitudes to media teaching environments" in British Journal of Educational Technology. Vol. 5. No. 1 Jan. 1974 p. 73.

<sup>46</sup> Ibid.

<sup>47</sup> Ibid.

<sup>48</sup> Patricia Colling. (Ed.) Dissertations Abstracts humanities and social sciences. Vol. 36 No. 9. March 1976 p. 5652 A.

classroom teachers usage of instructional radio. He concluded that:

- (i) Teachers from small size schools received more assistance for radio usage from their administrators than teachers from larger schools.
- (ii) The more positive the school administrators' attitude towards instructional radio, the more he assisted his teachers in using the radio.
- (iii) There appeared to be a positive relation between the amount of assistance administrators provided to their teachers in employing instructional radio and frequency of teacher broadcast usage.
- (iv) The administrators least encouraged their teachers to undertake inservice training in radio usage.
- (v) There appeared to be a relationship between the teachers' attitude towards the value of an instructional radio series and the extent to which he undertakes utilization activities.

- (vi) Teachers tended to use broadcasts more frequently where radio teaching materials were more accessible.
- (vii) Teachers who received more training in radio usage had a more positive attitude towards radio materials.

Kafu (1975)<sup>49</sup> researching in Kenya observed that teachers do not consider it a worthwhile effort to use the broadcasts because the broadcasts ended up in confusing the teachers. He concluded that radio appears to be an imposition on the teachers rather than an integral medium.

## 2.2 TEACHER TRAINING

Beeby<sup>50</sup> has pointed out the relationship of the teacher's training and education to the type of schools that exist at different levels of development. He identified four

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<sup>49</sup>Kafu, P. A. Op. Cit. p. 134

<sup>50</sup>Beeby, C.E. The quality of Education in developing countries, Cambridge, Massachusetts. Harvard University Press. 1966. pp 48-86. Quoted by The New Media: memo to educational planners. Op. Cit. p. 19

types. The first type consists of teachers with little education and professionally untrained, they drill mechanically on the three Rs (i.e. Arithmetic, Reading and Writing) and encourage meaningless memorization. The second type consists of teachers with little education but have some training. For these teaching becomes more formal and systematic, the curriculum is fixed but the students still learn by rote. The third type is made up of teachers with a little more education and more training. The teacher is further beyond his pupils and has more confidence. The fourth type consists of well educated and well trained teachers who encourage inductive learning and problem solving.

Untrained teachers belong to Beeby's first type, whereas trained teachers can belong to either of the three types. Are our untrained teachers therefore drilling pupils mechanically and encouraging memorization? Are some of the trained teachers also operating at the first level?

The study addressed itself to answering these vital questions.

Mariet<sup>51</sup> identified three reasons why teachers should be trained on the usage of audio-visual media:

- (i) The often appreciable capital investment demands training which will produce teachers capable of putting media to good use.
- (ii) The educational establishment cannot ignore the fact that teachers irrespective of their subjects must incorporate its constituent elements into their teaching, even if it means redefining the teaching of that subject in relation to the new media.
- (iii) Media should be treated as a subject.

Mariet<sup>52</sup> observes that the objectives of teacher training in the use of audio-visual media should be:

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<sup>51</sup>Mariet, F. "Objectives of teacher training in the use of audio-visual media and of Educational Technology." in Educational Media International 1978, No. 3 p. 2.

<sup>52</sup>Ibid.

- (i) To handle the basic equipment.
- (ii) To design and produce educational audio-visual documents.
- (iii) To teach pupils to produce and receive audio-visual messages in a critical frame of mind.

Tim Long<sup>53</sup> on the inservice training of teachers in educational technology suggests that some constraints must be overcome before a successful pattern of teacher training emerges. The constraints are attitudes and finance. Teachers with long experience have evolved their own teaching methods which have proved successful and can see little advantage in adopting new ones, particularly if they require a great deal of extra time and work. On finance Long laments that Ministries of Education the world over tend to attach little importance to teacher training in educational technology.

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<sup>53</sup>Long, Tim. "In-Service Training of teachers in educational technology", in Educational Media International 1978. No. 3 p. 17.

In Australia, the Australian Broadcasting Commission (ABC) beams out-of-school hours to enable teachers to keep up-to-date in such subjects as Mathematics, Physics and Chemistry. The ABC also combines radio and television for teacher training. In Ceylon, the Ceylon Broadcasting Corporation devotes two hours a week to radio talks on teaching methods for trainee teachers. The Thailand Ministry of Education has several broadcasts each week for teachers including information relating to their profession as well as talks on training. The Ministry has a daily programme that helps teachers improve their teaching methods and classroom activities.

The commission<sup>54</sup> on the inservice training of teachers reported to the third E.B.U International Conference on Educational Radio and Television held in Paris in March 1967, that the contents of most subjects were rapidly changing and that the teaching methods needed constant improvement and modernization. The

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<sup>54</sup> Dupont, J.B. (Ed). Third E.B.U. International Conference on Educational Radio and T.V. Paris. March 1967. p. 403.

commission observed that new aids were being availed to teachers and that they affected the role of the teachers and the pupils. Consequently an agency that could help improve the serving teaching force had to be found, educational broadcasting appeared to play that role efficiently.

Fagbongbe<sup>55</sup> commenting on teacher education in Africa insisted that the continent needed teachers who were deeply concerned with educational needs and were aware of new educational trends. The education for these teachers would require two basic elements; the study of the subject matter which he is going to impart to the child and professional studies in education which in the long run would enable him to hand effectively his subject content to the benefit of both the child entrusted to his charge and the whole community.

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<sup>55</sup>Fagbongbe, E.O. Foundation Studies in Africa  
Teacher education  
- A description and analysis  
of current offerings,  
practices and methodology.  
Kajubi, Senteza. W (Ed)  
Reform in the professional  
education of teachers in  
Africa. Conference report  
1971, p. 74.



Perraton<sup>56</sup> suggests that the teachers must master the subjects they were going to teach in addition to practising on the teaching skills. He says part of the work must be done face to face through residential training or effective supervision of trainee teachers in the classroom. He notes that some of this work could be through distance teaching. Combining the residential training and distance teaching would enable the authorities to upgrade a large number of teachers quickly.

In Kenya, the EMS has special teacher programmes aimed at informing teachers on how to use the broadcast lessons successfully. In these programmes the listening teachers are instructed on what to do before a broadcast, during and after the broadcast. Hope has been expressed that the listening teachers could come to realize that radio can help them but it is vital that they both work first with their radio tutors before and after the broadcasts.

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<sup>56</sup>Perraton, H. "Radio Broadcasting and public education in Africa" in Educational Media International. 1981. No. 4 p. 5

Last but not least in importance is the media personnel training. Peterson<sup>57</sup> says that the primary purpose of the training should be to turn out a specialist who would be a coordinator or administrator of an audio-visual or educational media programme with general competencies in the areas to be supervised as in the case for other school administrators.

The literature reviewed suggests that a well arranged teacher education programme would produce teachers competent in using teaching aids. Are our TTCs achieving this goal? The study addressed itself to this question.

### 2.3 TEACHER - PUPIL CHARACTERISTICS

Individual pupil differences affect achievement. The differences are due to variables like age, sex, race, environment, socio-economic status, presence of parents

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<sup>57</sup> Peterson, G. T. "Graduate training of media personnel" in Educational Media Yearbook 1973 p. 83

at home, and education of the parents. Other variables considered in this study were presence of radio at pupil's home, repeating effect and class size.

### 2.3.1 Teacher characteristics

Teachers as human beings have individual differences. These differences affect their interaction with pupils. We cannot neglect these teacher differences when discussing pupil achievement because as Brophy observes,

Failure to take into account individual differences can affect the interpretation of measures of teacher behaviour as well as measures of student behaviour.<sup>58</sup>

The four most common characteristics that account for teacher differences are age, sex, teaching experience and training. The characteristic that has been researched extensively is sex of the teacher.

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<sup>58</sup>Brophy, J. E. Teacher-student relationships: Causes and Consequence. New York: Holt, Rinehart and Winston. 1974, p. 4.

Clapp (1969) found no evidence that the presence of male teachers improved achievement in boys.<sup>59</sup> Bennett (1967) found that students with female teachers achieved higher than those with male teachers and that girls out-performed boys.<sup>60</sup> Peterson (1972) found that sex of the teacher made no difference on the achievement of either boys or girls.<sup>61</sup> Asher and Gottman (1972)<sup>62</sup> confirmed Peterson's findings. Lahadone and Cohen (1972) used various measures which showed no effect of the sex of the teacher, but those that did, favoured the female teachers.<sup>63</sup>

Sweely (1970) found that teacher's sex had no effect on pupil achievement.<sup>64</sup> Kafu.

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<sup>59</sup> Brophy, J. E. Teacher-Student relationships: Causes and Consequences. New York: Holt, Rinehart and Winston. 1974, p. 221.

<sup>60</sup> Ibid.

<sup>61</sup> Ibid.

<sup>62</sup> Ibid.

<sup>63</sup> Ibid.

<sup>64</sup> Ibid.

Weinberge, Stasz and McDonald (1973) confirmed Sweely's findings.<sup>65</sup> Kafu (1976)<sup>66</sup> in Kenya showed that sex influenced the elementary teacher's opinion on the option of using radio broadcast regularly.

The above cited studies except that by Kafu indicate that there are no sex differences in the teachers. This study tried to look at the contribution of teacher's sex to pupil achievement.

Another characteristic is training. Kafu (1976)<sup>67</sup> found that professional training did not influence the elementary teacher's opinion on whether to use radio broadcasts or not. He also found that environment influenced the teacher's opinion and that experience did not influence the teacher's opinion. However environment

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<sup>65</sup> Brophy, J. E. Teacher-Student relationship: Causes and Consequences. New York: Holt, Rinehart and Winston, p. 225.

<sup>66</sup> Kafu. Op. Cit. p. 134.

<sup>67</sup> Ibid.

and experience had been controlled in the design of this study.

### 2.3.2 Pupil Characteristics

At the end of the third E.B.U Conference in Paris (1967),

a great deal of evidence was presented to the conference that the radio and television programmes a child receives outside school, and indeed his entire home and entire social environment, have much to do with the knowledge he brings to schools and with the way he is able to use school broadcasts.<sup>68</sup>

Various factors affect a child's achievement these are age, sex, environment, socio-economic status, education of the parents, presence of parents at home, presence of radio at home, and the repeating effect. The available literature focuses on sex, environment and socio-economic status.

#### 2.3.2.1 Sex of pupils

Studies on the pupils' sex indicate that there are sex differences, and that;

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<sup>68</sup>Dupont, J. B. Op. Cit. p. 495.

achievement in particular content areas suggest that these sex differences result from cultural determined sex roles rather than from biological differences between the sexes.<sup>69</sup>

This view is supported by studies<sup>70</sup> done by Milton (1958). On the direction of the differences, girls have been out-performing boys. This came out in studies carried out by Carter (1952), Hess, Shipman, Brophy and Bear (1969), Ayres (1909), Gates (1961), Maccoby (1966) and Stroud and Lindquist (1942). Johnson (1972) carried out a study in U.S.A., Canada, England and Nigeria. He found that girls out-performed boys in the first two countries whereas it was the reverse in the last two countries;<sup>72</sup> he attributed the result in the last two countries to the proportionately large number of male teachers in U.S.A. or Canada. He suggests that boys perform better with male teachers.

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<sup>70</sup>Brophy, J. E. Op. Cit. p. 201

<sup>71</sup>Ibid.

<sup>72</sup>Op. Cit. p. 202.

However, some studies showed no sex differences. Notable among those are studies<sup>73</sup> by Lambert (1968), Wisenthal (1968), Kagan (1969) and Peck (1971). On attitudes of pupils towards school, Antes, Anderson and DeVault (1965) and Jackson (1968) felt that girls had more favourable attitudes towards school.<sup>74</sup> Arnold (1968), Datta, Sechaefer and Davis (1965) found that it is the teacher themselves who view girls more favourably than boys.<sup>75</sup> On interaction<sup>76</sup> between teacher and pupils Waetjen (1962), Spaulding (1963), Meyer and Thompson (1956), Lippitt and Gold (1959) and Jackson and Lahaderne (1967) concluded that teachers tend to criticize boys more unnecessarily.

Teacher's sex differences tend to be less frequent and less intense than pupil differences. This is so because the teacher's

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<sup>73</sup> Brophy, J. E. Op. Cit. p. 202

<sup>74</sup> Op. Cit., p. 14

<sup>75</sup> Op. Cit. p. 13

<sup>76</sup> Ibid.



role tend to submerge individual differences, so that teachers are much more similar to one another when in the classroom than when outside.

#### 2.3.2.2 Socio-economic status (SES)

Becker (1952) found that teachers took SES into account when evaluating pupils and when planning teaching strategies.<sup>77</sup> Earlier Davis and Dollard (1940) found that higher status children got the teacher's praise and rewards<sup>78</sup>. Hoehn (1954) observed qualitative differences but no quantitative differences for female teachers in teacher-pupil contact by social classes.<sup>79</sup> Smith (1965) studying teachers' reactions to male students observed that teachers interacted more positively with male students for whom they predicted high occupational attainment.<sup>80</sup> On

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<sup>77</sup> Brophy, J. E. Op. Cit., 6

<sup>78</sup> Ibid.

<sup>79</sup> Op. Cit., p. 7

<sup>80</sup> Op. Cit., p. 6

the importance of SES for predicting success in pupils, Goodwin and Sanders (1969) ranked SES first, followed by intelligence quotient, standardized tests, age, sex, anecdotal notes and grade point average.<sup>81</sup> Peck (1971) found differences in achievement due to SES.

Backman (1970) found that SES was the most important of the family background measures.<sup>82</sup> The above cited studies indicate that SES affect achievement.

### 2.3.3 Environment

Achievement depends on environment. Urban pupils tend to be superior in language at the primary level than the rural pupils. A teacher will also be successful with pupils in certain environments. On the influence of environment on teacher's

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<sup>81</sup> Brophy, J. E. Op. Cit., p. 7

<sup>82</sup> Hernandez, N. G. "Variables affecting achievement of middle school Mexican - American students" in Review of Educational Research. Vol. 43. No. 1, p. 3.

effectiveness Biddle notes that,

Efficiency is relative, that a teacher may be effective with one group of children and ineffective with another, that efficiency may be modified by the physical, social and cultural environment in which the teacher operates.<sup>83</sup>

In this study, the researcher controlled for environment by selecting schools from a rural area.

#### CONCLUSION.

The studies reviewed in this chapter indicate that the bulk of the researches on radio has been on the impact of broadcasts on learning, comparisons with other methods of teaching and on attitudes of teachers and students. Very little has been done on the contribution of teacher education to the efficient utilization of radio broadcasts. This was so because the problem of untrained teachers feature only in the developing countries, whereas most of the studies reviewed were done in the developed countries.

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<sup>83</sup> Biddle, B. J. and Ellena, W.S. Contemporary research of teacher effectiveness. Holt, Rinehart and Winston P.

The study therefore played a very important role in ascertaining whether pupils taught by trained and untrained teachers gained differently from the radio broadcasts. This will go along way in suggesting to our Ministry of Education through the TTCs to intensify media courses so that maximum use is made of this option in the teaching of primary schools.

## CHAPTER 3

### METHODOLOGY

#### 3.1 ORGANISATION OF THE CHAPTER

This chapter will discuss description of the method, selection of subjects, instrumentation, data collection, and recording.

#### 3.2 DESCRIPTION OF METHODOLOGY

The study involved two tests with treatment in between. One test was administered at the start of the study to determine whether there were any initial pupil differences. The final test was to determine whether the pupils achieved differently.

Initially it was intended to use "Beginning Science" programmes. However, when the Director of Media division, KIE, Ray Thompson was approached, it was found that the Beginning Science series were no longer being aired for the year 1982, instead a new series was being developed to replace it. With the Director's advice the researcher picked on the Health Education "You and your body - Part 1" programmes. Accordingly the study had to be done using class six and not class seven as proposed.

In an attempt to overcome the problem of poor reception, the researcher decided to use taped lessons of "You and your body - Part I". This was advantageous due to the convenience of taped materials over radio broadcasts.

The research was confined to a rural area. The pretest (appendix I) was based on the prerequisite copies for the copies in "You and your body - Part I". Eight recorded lessons were then given to the pupils at the rate of one per week. A posttest based on the concepts and skills learned during the eight weeks was administered. The results were subject to statistical analysis to test the hypothesis and answer questions of the study.

### 3.3. SELECTION OF SUBJECTS

The study required two groups of pupils taught by trained and untrained teachers. The research was carried out in Yala division of Siaya district. The division has 44 primary schools, 42 of these schools are mixed and day,

the other two are day/boarding, St. Teresa's Yala for girls and Ndere for boys. The number of pupils in the division as at January 1982 was over 16,000. The number of teachers at the same time was 391 (table 1).

The approximate teacher to pupil ratio is 1:40, roughly one teacher per class. The distribution of teachers according to training and sex was as given in table 2.

Table 2: Distribution of teachers according to training and sex in Yala division, January 1982.

	MALE	FEMALE	%
TRAINED	182	75	65.7
UNTRAINED	105	29	34.3
TOTAL	287	104	100.0

The latest figures for the Republic of Kenya indicated that one third of the primary teachers were untrained. This figure was from the head count of all primary teachers

carried out during first term 1982. Yala division is therefore representative of the population of Kenya primary school teachers.

Going through the records at the divisional office, the distribution of teachers was fair with no school having more than 40% of its staff untrained. A survey of the school timetabling showed that most of the untrained teachers were handling the upper classes leaving the lower levels to the trained teachers. Most of the older trained teachers were handling the lower classes. This is fair because the younger pupils need the trained teachers most. Most of the female teachers were also handling the lower classes, this made it difficult to have enough female teachers in the sample. The few female teachers handling the upper classes were teaching non-science subjects.

A survey was done to find out details of the teachers that were capable of handling Health Education in class six. The survey had in mind factors such as training of the teachers, sex of the teachers, teaching



experience, experience in using radio broadcasts and availability of support materials. Only teachers with less than five years teaching experience and not less than one year's experience in using radio broadcasts were selected into the sample. This was accomplished using the questionnaire (Appendix III).

After a thorough scrutiny of the above factors, seven teachers were selected into the sample and were distributed as follows: Two trained males, one trained female, three untrained males and one untrained female. It was not possible to have equal number of each type because very few female teachers teach Science subjects in class six. The seven teachers taught 395 pupils, of which 167 pupils (42.3%) were taught by three trained teachers and 228 pupils (57.7%) were taught by four untrained teachers.

The distribution of pupils by sex and age was as shown in table 3.

Table 3: Distribution of pupils by sex and age.

AGE IN YEARS	9	10	11	12	13	14
BOYS	-	4	10	32	57	44
GIRLS	2	4	11	50	63	45
%	0.5	2.0	5.3	20.8	30.4	22.5

AGE IN YEARS	15	16	17	18	%
BOYS	26	16	2	1	48.6
GIRLS	21	6	1	-	51.4
%	11.9	5.6	0.8	0.3	100.0

The mean age for boys was 13.5 years and was 13.0 for girls while for all the pupils the mean age was 13.3 years.

The class size varied from school to school. The class sizes varied from 39 to 110. An assurance was got from the headmasters

of the schools with large classes that work before and after the broadcasts was to be done for each stream separately.

#### 3.4 INSTRUMENTATION

For this study a test was given at the start of the research, this test is referred to as the pretest (Appendix I). This pretest was meant to determine the entering behaviour or the academic level of the pupils. This test was important if any inference was to be made from the second test herein referred to as the post-test (Appendix II).

During the survey (carried out during the first two weeks of term one 1982), a copy of class five end-year examination on Health Science was collected from each school. These tests were used to provide a pool of items to be used in setting the pretest. The items were chosen for their suitability in terms of content and language level. 20 items were chosen to make up the pretest. The items were constructed such that the pupils were made to choose the correct response from four alternatives. Most of the questions were confined to the lower levels of Bloom's taxonomy

(i.e Knowledge, comprehension and application).

The class five end-year examination was chosen because at this particular time, namely start of term one, the class six pupils are much the same as they were at the end of class five. The timetable was then drawn such that each school was visited once a week to present the programmes. The teachers were referred to the book, "Broadcasts to schools: Annual Notes for teachers, Primary Standard six, 1978 Edition" pp. 158-161 for instructions on how to utilize the broadcasts.

As concerns the visual aids the Health Education posters were used. The researcher confirmed that the set of posters were available and usable in all the seven schools. The importance of preparing pupils before the broadcast, maintaining discipline and doing follow-up work was stressed to the teachers.

All through the preparation and briefing, the title of the research was never revealed to the teachers nor to the headmasters. This was to blind the teachers so that they could not behave artificially. However, the teachers

were encouraged to do their best and use the broadcasts to the best of their ability. The teachers were also instructed to ensure maximum attendance by the pupils.

The pretest was administered to all the pupils on 22 January 1982. From 25 January to 19 March a series of eight programmes were presented to the schools. This coincided with the EMS timetable for term one. The eight programmes that come under Health Education for class six "You and your body-Part I" for term one are summarised below.

#### Lesson I - DISEASE THE ENEMY OF MAN.

The aim of this 15 - minute lesson is to show how disease in man is spread and the importance of prevention. In summary the lesson stresses three points.

- (a) Many different diseases can attack our bodies.
- (b) Disease can spread through the air; on food and drink; by insects, by touching dirty things and diseased things.
- (c) Prevention of disease is better than cure.

## Lesson 2 - MAN HIMSELF

The aim of this 14 - minute lesson is to show that all living things are made up of cells and the relationship of man to plants and other animals. The lesson introduces pupils to the group of mammals called primates. The lesson stresses two points:

- (a) Each plant and animal is made-up of millions of cells.
- (b) There are many different kinds of groups of animals. Man belongs to the group of mammals. And that man belongs to a smaller group of mammals called primates.

## Lesson 3 - THE HUMAN BODY

The aim of this 16 - minute lesson is to describe the human skeleton and show how it is moved by muscles, tendons and joints. Summary points for the lesson are:

- (a) The skeleton supports, protects and makes movement possible.
- (b) Muscles move the bones and are attached to them by tendons.
- (c) A joint is where two bones meet.

#### Lesson 4 - THE NERVOUS SYSTEM.

The aim of this 15 - minute lesson is to show the functions of the brain, spinal cord and nerves. Two points are emphasized in the lesson namely:

- (a) The brain receives and can store messages of hearing, seeing, touching, tasting and smelling. It also sends messages to all parts of the body.
- (b) The messages to and from the brain travel along the spinal cord and nerves.

#### Lesson 5 - TAKING CARE OF YOUR BODY

This 15 - minute lesson aims at showing how cleanliness and care can prevent diseases and accidents. In summary the lesson stresses that:

- (a) Always wash your hands after going to the latrine and before preparing or eating food.
- (b) Wash your body, especially your nose, eyes, mouth, and teeth as often as possible.

- (c) Keep your finger-nails short and clean, germs hide there
- (d) Keep wounds clean and covered.
- (e) With care many accidents can be prevented.

#### Lesson 6 - THE BLOOD

This 17 - minute lesson aims at describing blood and discussing its functions in the body. New words such as plasma, red blood cells, white blood cells and platelets are introduced. The lesson summarises the following points:

- (a) The blood is the transport system of the body, carrying food, oxygen and other things to all parts of the body.
- (b) The blood is made-up of four things: Plasma, red blood cells, white blood cells and platelets.

#### Lesson 7 - THE HEART

The aim of this 16 - minute lesson is to describe the heart and the blood circulation. In summary the lesson stresses four points.



- (a) The heart is made up of strong muscles and has four parts.
- (b) The heart pumps blood around the body.
- (c) Arteries are pipes taking blood from the heart. Veins are pipes taking blood back to the heart. Capillaries are very small pipes between veins and arteries.
- (d) The valves in the heart and veins stop the blood travelling backwards.

Lesson 8 - SOME INSECTS THAT CARRY DISEASE

This 17 - minute lesson aims at showing how certain disease germs can be spread by five insects (Anopheles mosquito, culex mosquito, tse-tse fly, tick, louse and house-fly) and how they can be controlled. In summary the following points are stressed:

- (a) Malaria is spread by the anopheles mosquito and Elephantiasis by the culex mosquito.
- (b) Sleeping sickness is spread by the tse-tse fly and other diseases by the ticks and lice.

- (c) Houseflies carry germs on their legs and feet.
- (d) Kill these insects and destroy their breeding places.
- (e) Insects will not come to clean bodies and clean clothes.

After the eight programmes came the post-test (Appendix II). The test was set from the content of the eight programmes. Like the pretest, the posttest consisted of 20 multiple choice items. Two questionnaires were also administered, one to the teachers (appendix III) and the other to the pupils (Appendix IV).

### 3.5 DATA COLLECTION AND RECORDING

Data for this study were collected as the study progressed. The data came from five sources namely results of the pretest, results of the posttest, responses to questionnaires to teachers and pupils and from the divisional Education Office. The results of the pretest and posttest are given in table 4.

Table 4: Results of pretest and posttest  
(pupils grouped according to sex  
and training of their teachers).

MARKS %	PRETEST				POSTTEST			
	T.M	T.F	U.M	U.F	T.M	T.F	U.M	U.F
5	1	-	2	1	-	-	1	-
10	4	-	6	-	11	1	3	-
15	9	6	17	4	15	1	7	4
20	14	7	22	8	9	4	12	6
25	15	13	24	10	20	11	24	7
30	23	8	26	6	14	7	14	8
35	16	8	30	6	13	10	34	6
40	14	7	15	5	15	6	27	3
45	5	5	13	3	6	6	23	3
50	7	1	14	-	-	4	19	3
55	1	-	5	-	3	2	8	-
60	-	1	8	-	2	3	2	3
65	-	-	3	-	1	2	5	-
70	-	-	-	-	-	-	3	-
75	-	-	-	-	-	1	2	-
80	-	2	-	-	-	-	1	-
TOTALS	109	58	185	43	109	58	185	43

T.M. = Trained Males, T.F. = Trained Females,

U.M. = Untrained Males, U.F = Untrained Females

Table 5: Results of posttest (Pupils grouped according to their sex, training and sex of teachers).

MARKS %	BOYS				GIRLS			
	T.M	T.F	U.M.	U.F	T.M	T.F	U.M	U.F
5	-	-	-	-	-	-	1	-
10	5	-	1	-	6	1	2	-
15	7	1	3	3	8	-	4	1
20	5	-	3	3	4	4	9	3
25	9	7	11	6	11	4	13	1
30	11	4	8	4	3	3	6	4
35	5	1	14	5	8	9	20	1
40	6	4	16	1	9	2	11	2
45	4	2	5	2	2	4	18	1
50	-	3	9	1	-	1	10	2
55	2	1	2	-	1	1	6	-
60	2	2	1	2	-	1	1	1
65	-	2	4	-	1	-	1	-
70	-	-	3	-	-	-	-	-
75	-	1	-	-	-	-	2	-
80	-	-	1	-	-	-	-	-
<b>TOTALS</b>	<b>56</b>	<b>28</b>	<b>81</b>	<b>27</b>	<b>53</b>	<b>30</b>	<b>104</b>	<b>16</b>

Table 6: Results of posttest (pupils grouped according to age, training and sex of teachers).

MARKS	≤ 13 YEARS				> 13 YEARS			
	T.M	T.F	U.M	U.F	T.M	T.F	U.M.	U.F
5	-	-	1	-	-	-	-	-
10	7	1	3	-	4	-	-	-
15	9	1	4	3	6	-	3	1
20	5	-	10	4	4	4	2	2
25	14	7	15	3	6	4	9	4
30	7	3	6	7	7	4	8	1
35	7	4	18	4	6	6	16	2
40	8	3	14	3	7	3	13	-
45	4	-	18	1	2	6	5	2
50	-	3	13	3	-	1	6	-
55	1	-	4	-	2	2	4	-
60	-	2	1	3	2	1	1	-
65	-	-	4	-	1	2	1	-
70	-	-	3	-	-	-	-	-
75	-	1	1	-	-	-	1	-
80	-	-	1	-	-	-	-	-
TOTALS	62	25	116	31	47	33	69	12

Table 7: Results of posttest (Pupils grouped according to presence of parents at home, training and sex of teachers..

MARKS	AT LEAST ONE PARENT				NO PARENT			
	T.M	T.F	U.M	U.F	T.M	T.F	U.M	U.F
5	-	-	1	-	-	-	-	-
10	9	1	3	-	2	-	-	-
15	13	1	7	3	2	-	-	1
20	8	4	10	6	1	-	2	-
25	19	10	20	4	1	1	4	3
30	13	7	12	7	1	-	2	1
35	11	8	31	5	2	2	3	1
40	13	5	23	2	2	1	4	1
45	5	6	19	3	1	-	4	-
50	-	3	17	3	-	1	2	-
55	3	1	7	-	-	1	1	-
60	1	2	2	2	1	1	-	1
65	-	2	5	-	1	-	-	-
70	-	-	3	-	-	-	-	-
75	-	1	2	-	-	-	-	-
80	-	-	1	-	-	-	-	-
<b>TOTALS</b>	<b>95</b>	<b>51</b>	<b>163</b>	<b>35</b>	<b>14</b>	<b>7</b>	<b>22</b>	<b>8</b>

Table 8: Results of posttest. (Pupils grouped according to education of parents, training and sex of teachers).

MARKS	EDUCATED				UNEDUCATED			
	T.M.	T.F	U.M	U.F	T.M	T.F	U.M	U.F
5	-	-	-	-	-	-	1	-
10	3	-	3	1	8	1	-	-
15	1	-	2	-	14	1	5	3
20	-	1	5	3	9	3	7	6
25	4	1	10	1	16	10	14	4
30	1	2	5	1	13	5	9	7
35	2	4	8	1	11	6	26	5
40	3	1	10	-	12	5	17	2
45	1	5	5	-	5	1	18	3
50	-	-	7	-	-	4	12	3
55	-	1	-	1	3	1	8	-
60	-	1	-	-	2	2	2	2
65	1	1	2	-	-	1	3	-
70	-	-	-	-	-	-	3	-
75	-	1	-	-	-	-	2	-
80	-	-	1	-	-	-	-	-
<b>TOTAL</b>	<b>16</b>	<b>18</b>	<b>58</b>	<b>8</b>	<b>93</b>	<b>40</b>	<b>127</b>	<b>35</b>

Table 9: Results of posttest (Pupils grouped according to employment of parents, training and sex of teachers).

MARKS %	EMPLOYED				UNEMPLOYED			
	T.M	T.F	U.M	U.F	T.M	T.F	U.M	U.F
5	-	-	-	-	-	-	1	-
10	6	-	3	-	5	1	-	-
15	8	-	3	2	7	1	4	2
20	5	3	8	2	4	1	4	4
25	10	10	18	4	10	1	6	3
30	6	2	7	3	8	5	7	5
35	8	8	20	3	5	2	14	3
40	8	4	17	2	7	2	10	1
45	4	6	15	2	2	-	8	1
50	-	3	14	1	-	1	5	2
55	2	1	6	-	1	1	2	-
60	2	3	-	3	-	-	2	-
65	-	1	3	-	1	1	2	-
70	-	-	3	-	-	-	-	-
75	-	-	1	-	-	1	1	-
80	-	-	1	-	-	-	-	-
TOTALS	59	41	119	22	50	17	66	21



Table 10: Results of posttest: (Pupils grouped according to presence of radio at home, training and sex of teachers).

MARKS	RADIO PRESENT				RADIO ABSENT			
	T.M	T.F	U.M	U.F	T.M	T.F	U.M	U.F
5	-	-	1	-	-	-	-	-
10	8	-	3	-	3	1	-	-
15	10	-	5	2	5	1	2	2
20	8	4	11	4	1	-	1	2
25	15	7	18	6	5	4	6	1
30	9	4	10	2	5	3	4	6
35	6	7	27	4	7	3	7	2
40	9	4	21	2	6	2	6	1
45	6	5	18	2	-	1	5	1
50	-	3	16	1	-	1	3	2
55	1	2	6	-	2	-	2	-
60	2	3	-	1	-	-	2	2
65	1	-	5	-	-	2	-	-
70	-	-	2	-	-	-	1	-
75	-	1	2	-	-	-	-	-
80	-	-	1	-	-	-	-	-
TOTALS	75	40	146	24	34	18	39	19

Table 11: Results of posttest (Pupils grouped according to repetition, training and sex of teachers).

MARKS	REPEATORS				NON-REPEATORS			
	T.M	T.F	U.M	U.F	T.M	T.F	U.M	U.F
5	-	-	-	-	-	-	1	-
10	2	1	-	-	9	-	3	-
15	1	-	1	-	14	1	6	4
20	3	-	1	-	6	4	11	6
25	3	2	4	-	17	9	20	7
30	4	5	6	4	10	2	8	4
35	6	2	11	-	7	8	23	6
40	4	1	8	2	11	5	19	1
45	1	5	5	-	5	1	18	3
50	-	2	5	1	-	2	14	2
55	-	-	1	-	3	2	7	-
60	-	-	1	1	2	3	1	2
65	-	1	-	-	1	1	5	-
70	-	-	-	-	-	-	3	-
75	-	-	-	-	-	1	2	-
80	-	-	-	-	-	-	1	-
TOTALS	24	19	43	8	85	39	142	35

## CHAPTER 4

### 4.0 ANALYSIS, FINDINGS AND EVALUATION

#### 4.1 DATA ANALYSIS

The data collected during the study were analysed in the order below:

1. Analysis of pretest scores
  - (a) Testing for initial pupil differences.
  - (b) Difficulty index of items
  - (c) Discrimination index of items
  - (d) Item- item correlation
  - (e) Discussion of pretest
2. Analysis of posttest scores
  - (a) Difficulty index of items
  - (b) Discrimination index of items
  - (c) Item-item correlation;
  - (d) Discussion of posttest
3. Hypothesis testing with:
  - (a) No variable controlled
  - (b) Sex of pupils controlled
  - (c) Age of pupils controlled
  - (d) Presence of parents at home controlled
  - (e) Education of parents controlled

- (f) Employment of parents controlled
- (g) Presence of radio at home controlled
- (h) Repetition factor controlled

#### 4.1.1 ANALYSIS OF PRETEST SCORES

##### a. Testing for initial pupil differences

The results of the t-test carried out on the pretest scores (Table 4) indicated that the pupils were at the same level at the start of the study ( $t = -0.816$ ). The test compared the means of the pupils who were going to be taught by trained teachers against those who were going to be taught by untrained teachers.

##### b. Difficulty index of items

The index (D) is the quotient of the number of correct responses divided by the total number of respondents.

Table 12: Difficulty index of pretest items

ITEM NO.	NUMBER OF CORRECT RESPONSES	D
1	156	0.39
2	82	0.21
3	131	0.33
4	247	0.63
5	93	0.24
6	135	0.34
7	88	0.22
8	134	0.34
9	134	0.34
10	199	0.50
11	87	0.22
12	88	0.22
13	76	0.19
14	102	0.26
15	142	0.36
16	150	0.38
17	116	0.29
18	115	0.29
19	104	0.26
20	92	0.23

Note: Total number of respondents = 395

## c. Discrimination index of items.

The discrimination index of an item shows how an item discriminates between the top 27% and the bottom 27% pupils. In this study, 107 top pupils were compared to 107 bottom pupils (see table 13).

Table 13: Discrimination indices of pretest items.

ITEM NO	CORRECT RESPONSES IN TOP GROUP	H	CORRECT RESPONSES IN BOTTOM	INDEX (H-L)/107
1	60		28	0.30
2	28		17	0.10
3	40		22	0.17
4	80		46	0.32
5	44		12	0.30
6	64		19	0.42
7	38		13	0.23
8	59		14	0.42
9	52		16	0.34
10	80		32	0.45
11	35		13	0.21
12	37		7	0.28
13	41		5	0.34
14	36		19	0.16
15	57		23	0.32
16	62		21	0.38
17	47		18	0.27
18	60		15	0.42
19	47		19	0.26
20	43		8	0.33

d. Item-item correlation.

The product moment of correlation was calculated between randomly paired items. The formula used is as given by Furneaux (P. 47),

$$\text{phi} = \frac{AD - BC}{\sqrt{(A + B)(C + D)(A + C)(B + D)}}$$

Where phi = the correlation coefficient.

A = Frequency of pupils getting both items correct.

B = Frequency of pupils responding correctly to item 2 but failing in item 1.

C = Frequency of pupils failing in item 2 but corresponding correctly to item 1.

D = Frequency of pupils failing in both items.

The results are in table 14.

Table 14: Product moment correlation between pairs of pretest items.

PAIR	A	B	C	D	phi
1	40	53	117	185	.037
2	31	51	104	209	.039
3	39	93	91	172	-0.051
4	61	186	31	117	.043
5	31	57	110	197	-0.005
6	54	80	96	165	.034
7	55	145	22	173	.205
8	27	60	89	219	-0.019
9	24	64	88	219	-0.013
10	38	77	66	214	-0.098

e. Discussion on pretest items.

A good range for difficulty is between 0.20 and 0.75. Below 0.20 shows that the item is very difficult, whereas above 0.75 shows that the item is very easy. From table 12, 19 items qualify to be good items. A good discrimination index ranges between 0.20 and 0.80 and should be positive. From table 13, 17 items qualify in this respect. The low item-item correlation coefficients indicate that the pairs of items are independent, implying that getting item 1 correct did not necessarily mean getting item 2 correct.



## 4.1.2. ITEM ANALYSIS OF POSTTEST.

## a. Difficulty index (D).

The outcome of the calculations for D are tabled in table 15.

Table 15: Difficulty indices of posttest items (N = 395).

ITEM NO.	CORRECT RESPONSES	D
1	161	0.41
2	124	0.31
3	155	0.39
4	70	0.18
5	131	0.33
6	90	0.23
7	146	0.37
8	144	0.36
9	135	0.34
10	61	0.15
11	268	0.68
12	159	0.40
13	89	0.23
14	99	0.25
15	104	0.26
16	124	0.31
17	192	0.49
18	162	0.41
19	153	0.39
20	158	0.40

## b. Discrimination index.

The discrimination indices of posttest items are given in table 16.

Table 16: Discrimination indices of post-test items.

ITEM NO.	NUMBER OF CORRECT RESPONSES IN UPPER GROUP H	NUMBER OF CORRECT RESPONSES IN LOWER GROUP L	INDEX (H-L)/107
1	53	23	.28
2	68	15	.50
3	71	17	.51
4	25	10	.14
5	37	27	.09
6	41	14	.25
7	71	24	.44
8	64	25	.36
9	58	33	.23
10	21	8	.12
11	99	46	.50
12	80	16	.60
13	35	12	.21
14	44	11	.31
15	60	12	.45
16	50	20	.28
17	91	24	.63
18	81	20	.57
19	58	27	.29
20	58	24	.32

c. Item-item correlation.

Item-item correlation coefficients are given in table 17.

Table 17: Product moment correlation coefficients between paired posttest items

PAIR	A	B	C	D	phi
1	57	125	54	159	.068
2	29	125	41	200	.023
3	22	109	68	196	.101
4	64	82	79	170	.122
5	18	117	43	217	-0.042
6	117	151	42	85	.101
7	31	58	68	238	.121
8	28	76	95	196	-0.054
9	93	97	65	140	.176
10	70	82	88	155	.096

d. Discussion on posttest items.

18 items fall within the accepted range for the difficulty index. 17 items discriminate well between top and bottom pupils. Items 4 and 10 are commonly difficult and non-discriminative. On the whole the posttest had good items because more than 85% of the items had good difficulty and discriminative

indices. The results of the item-item correlation also show independency between the randomly chosen pairs of items.

#### 4.1.3 HYPOTHESIS TESTING

The statistical test employed was the t-test. The conditions for using the t-test are as given by Furneaux (p.158):

- (i) That the measurement be in an interval form. For this study achievement (pupil scores) on the two tests were interval measures.
- (ii) That the sample represents approximately a normal population distribution.
- (iii) That the variances of the two populations being compared be approximately equal.

The second condition is one of the assumptions of the study while the last was shown to be met through calculating the variances each time the t-test was used. To run the t-test it was necessary for the sample sizes to be greater than 30. In certain cases the sample

sizes were smaller than 30. In such cases the t-test formula for small samples (Furneaux p. 113) was used. In this test, the t-value is given as

$$t = \frac{M_1 - M_2}{\theta}$$

Where  $\theta$  (the standard error of the difference between the measures is given by

$$\theta = \sqrt{\frac{N_1 \theta_1^2 + N_2 \theta_2^2 (N_1 + N_2)}{(N_1 + N_2 - 2) N_1 N_2}}$$

Where  $N_1$  = number of subjects in group 1.

$N_2$  = number of subjects in group 2.

$\theta_1^2$  = Variance of group 1.

$\theta_2^2$  = Variance of group 2.

The significance level for testing the significance difference between the means was set at 5%. The two-tailed test was used. Seven factors were fixed one at a time, and each time the six hypotheses tested. Finally a summary of each hypothesis was done to

ascertain whether the particular hypothesis was accepted or rejected most of the time. For each test, the chi-square value was calculated to find out whether a particular pattern of entries in a contingency table was likely to have occurred by chance.

The chi-square also indicated whether the two independent samples have significantly different distributions across the two characteristics and may thereby be considered to have been drawn from different populations. If the obtained sample value is greater than the critical value at some significant level, then we can conclude that the frequencies differ significantly from the frequencies that would be expected by chance. On the other hand if the obtained value is less than the critical value, then the characteristics are not significantly associated. For this study the obtained value should be smaller than the critical value. The formula used to calculate the chi-square for a 2 x 2 contingency table is as given by Furneaux (p. 119),

$$\text{chi-square value} = \frac{N(AD-BC)^2}{(A+B)(A+C)(B+D)(C+D)}$$

where, A, B and C, D are levels of characteristic 1 and 2 respectively.

a. Testing with no variable controlled.

The chi-square value for the distribution of the 395 pupils according to teachers' sex and training is 12.76, significant at 1%. The frequencies therefore differ significantly from those that would be expected by chance. The results of the hypothesis testing is in table 18.

Table 18: Results of hypothesis testing for 395 pupils.

GROUPS	MEAN	s.d.	t	REMARKS
Trained (T)	31.47	13.54	-3.791	significant (s)
Untrained (UT)	36.71	13.64		
Trained Males (TM)	28.53	12.55	-5.857	S
Untrained Males (UM)	37.73	13.74		
Trained Females (TF)	36.98	13.70	1.784	Non-significant (NS)
Untrained Females (UF)	32.33	12.41		
TM	28.53	12.55	-3.906	S
TF	36.98	13.70		
UM	37.73	13.74	2.519*	S
UF	32.33	12.41		
Males (M)	34.32	14.02	0.437	NS
Females (F)	35.00	13.30		

\*NS at 1%

b. Sex of pupils controlled

The sample was made up of 192 boys (48.6%) and 203 girls (51.4%). The frequencies associated with sex and training of the teachers are given in table 5. A 2 x 2 table of training of teachers by sex of pupils yields a chi-square



value of 0.225, which is non-significant. The results of the hypothesis testing are given in table 19.

Table 19: Results of hypothesis testing for 192 boys and 203 girls.

BOYS				
Groups	Mean	s.d.	t	Remarks
T	32.86	14.59	-2.021**	S
UT	37.08	14.09		
TM	29.20	12.75	-4.197	S
UM	38.95	14.22		
TF	40.18	15.48	2.258**	S
UF	31.48	12.31		
TM	29.20	12.75	-3.417	S
TF	40.18	15.48		
UM	38.95	14.22	2.418*	S
UF	31.48	12.31		
M	34.96	14.42	-0.408	NS
F	35.91	14.56		

## GIRLS

Groups	Mean	s.d.	t	Remarks
T	30.06	12.31	-3.480	S
UT	36.38	13.27		
TM	27.83	12.42	-4.162	S
UM	36.78	13.35		
TF	34.00	11.25	0.066	NS
UF	33.75	12.84		
TM	27.83	12.42	-2.311**	S
TF	34.00	11.25		
UM	36.78	13.35	0.873	NS
UF	33.75	12.84		
M	33.76	13.68	-0.076	NS
F	33.91	11.68		

\* NS at 1%

\*\*NS at 2%

Further testing was carried out to determine the effect of pupil's sex on achievement, see table 20.

Table 20: Results of t-tests to determine the effect of sex on achievement.

TEACHER CHARACTERISTICS	GROUPS	t	REMARKS
T.M	Boys	0.567	NS
	Girls		
U.M	Boys	1.058	NS
	Girls		
T.F	Boys	1.728	NS
	Girls		
U.F	Boys	-0.561	NS
	Girls		

Table 20 shows that sex was not a factor in the posttest achievement. However, boys tended to achieve more than the girls.

c. Age of pupils controlled.

From table 3, the mean age was 13.3 years. Two age levels were chosen, namely younger pupils (aged 13 or less), and old pupils (aged 14 and above). There were 234 (59.2%) younger pupils and 161 (40.8%) old pupils. The frequencies associated with these age groups are given in table 6. The distribution is non-significant (1%) with a value of 6.12. The results of the t-tests are in table 21.

Table 21: Results of hypothesis testing for 234 younger pupils and 161 old pupils.

GROUPS	YOUNGER			REMARKS
	MEAN	s.d.	t	
T	29.43	12.93	-4.166	S
UT	37.07	14.60		
TM	26.85	11.13	-0.566	NS
UM	37.97	14.88		
TF	35.80	14.98	0.547	NS
UF	33.71	13.23		
TM	26.85	11.13	-2.700	S
TF	35.80	14.98		
UM	37.97	14.88	1.552	NS
UF	33.71	13.23		
M	34.10	14.65	-0.250	NS
F	34.62	13.94		

234. 30. 20.  
 may 1972 to 1974

Table 21 cont.

GROUPS	OLD			
	MEAN	s.d.	t	REMARKS
T	33.69	13.91	-1.247	NS
UT	36.22	11.75		
TM	30.74	14.03	-2.648	S
UM	37.32	11.68		
TF	37.87	12.81	2.200**	S
UF	28.75	9.56		
TM	30.74	14.03	-2.357**	S
TF	37.87	12.81		
UM	37.32	11.68	2.765	S
UF	28.75	9.56		
M	34.79	13.03	-0.294	NS
F	35.44	12.61		

\*\* NS at 2%

Table 22: Results of t-test to determine effect of pupils' age on achievement.

TEACHER CHARACTERISTICS	GROUP	t	REMARKS
T.M	Old	1.564	NS
	Young		
UM	Old	-0.332	NS
	Young		
TF	Old	0.559	NS
	Young		
UF	Old	-1.157	NS
	Young		

Table 22 shows that age is not a significant factor in achievement.

d. Presence of parents at home controlled.

From the responses to the pupils' questionnaire (Appendix IV), the pupils were divided into two groups. 344 pupils (87.1%) were found to be staying with at least one parent at home while 51 had neither parent at home. The distribution was non-significant (chi-square value of 0.03). The results of the testing are given in tables 23 and 24.

Table 23: Results of hypothesis testing for 344 pupils staying with at least one of the parents and 51 pupils staying with neither parent.

GROUP	STAYING WITH AT LEAST A PARENT			
	MEAN	s.d.	t	REMARKS
T	30.89	13.02	-4.130	S
UT	36.94	13.98		
TM	28.05	11.72	-6.027	S
UM	37.91	14.16		
TF	36.17	13.77	1.320	NS
UF	32.43	12.33		
TM	28.05	11.72	-3.575	S
TF	36.17	13.77		
UM	37.91	14.16	2.324**	S
UF	32.43	12.33		
N	34.28	14.12	-0.219	NS
T	34.65	13.26		

Table 23 Cont.

STAYING WITH NEITHER PARENT				
GROUP	MEAN	s.d.	t	REMARKS
T	35.48	16.50	0.078	NS
UT	35.17	11.18		
TM	31.79	17.39	-0.963	NS
UM	36.36	10.26		
TF	42.86	12.54	1.508	NS
UF	31.86	13.61		
TM	31.79	17.39	-1.427	NS
TF	42.86	12.54		
UM	36.36	10.26	0.936	NS
UF	31.86	13.61		
M	34.58	13.44	-0.569	NS
F	37.00	13.86		

\*\*NS at 2%

Further testing to determine whether the presence of parents at home contributed was not done because the number of pupils with neither parent at home was very small.

e. Parents' education controlled.

For this study parents educated upto class seven were classified as uneducated, while those educated beyond class seven as educated. 100 pupils (25.3%) had educated parents. The frequencies were distributed non-significantly with a chi-square of 3.76. The distributions are given in table 8.

Table 24: Results of hypothesis testing for  
100 pupils with uneducated parents.

Parents uneducated

GROUP	MEAN	s.d	t	REMARKS
T	36.47	15.69	0.605	NS
UT	34.55	13.83		
TM	29.69	14.88	-1.260	NS
UM	34.91	13.94		
TF	42.50	14.17	1.814	NS
UF	31.88	13.61		
TM	29.69	14.88	-2.563	S
TF	42.50	14.17		
UM	34.91	13.94	0.590	NS
UF	31.88	13.61		
M	33.78	14.21	-1.647	NS
F	39.23	14.61		

Table 24 cont.

Parents uneducated

GROUP	MEAN	s.d.	t	REMARKS
T	30.19	12.68	-4.846	S
UT	37.59	13.50		
TM	28.23	12.19	-6.132	S
UM	39.02	13.51		
TF	34.50	12.90	0.710	NS
UF	32.43	12.33		
TM	28.23	12.19	-2.615*	S
TF	34.50	12.90		
UM	39.02	13.51	2.740*	S
UF	32.43	12.33		
M	34.50	13.98	0.558	NS
F	33.53	12.59		

\*NS at 1%



Table 25: Results of t-tests to determine the effect of parents' education on achievement.

TEACHER CHARAC- TERISTICS	GROUP OF PUPILS	t	REMARKS
	Parents educated	-0.328	NS
TM	" uneducated		
UM	" educated	1.875	NS
	" uneducated		
	" educated	-2.081**	S
TF	" uneducated		
	" educated	0.110	NS
UF	" uneducated		

\*\* NS at 2%

f. Parents' employment controlled.

241 pupils (61%) came from families with at least one parent employed while 154 pupils (39%) had both parents unemployed. Employment here includes self-employment. The frequencies associated with parents' employment are displayed in table 9 and are distributed with a chi-square 0.16.

Table 26: Results of hypothesis testing  
with employment of parents  
controlled.

AT LEAST ONE PARENT EMPLOYED				
GROUP	MEAN	s.d.	t	REMARKS
T	32.50	13.30	-2.883	S
UT	37.62	14.00		
TM	29.15	13.04	-4.229	S
UM	38.15	14.00		
TF	37.32	12.30	0.735	NS
UF	34.77	13.93		
TM	29.15	13.04	-3.185	S
TF	37.32	12.30		
UM	38.15	14.00	1.033	NS
UF	34.77	13.93		
M	35.17	14.30	-0.648	NS
F	36.43	12.67		
PARENTS UNEMPLOYED				
GROUP	MEAN	s.d.	t	REMARKS
T	29.93	13.83	-2.423*	S
UT	35.23	12.98		
TM	27.80	12.04	-3.878	S
UM	36.97	13.33		
TF	36.18	17.00	1.396	NS
UF	29.76	10.30		
TM	27.80	12.04	-2.181**	S
TF	36.18	17.00		
UM	36.97	13.33	2.246**	S
UF	29.76	10.30		
M	33.02	13.53	0.150	NS
F	32.63	13.89		

\*NS at 1%

\*\*NS at 2%

Table 27: Results of t-tests to determine the effect of parents' employment on pupils' achievement.

TEACHER CHARACTERISTICS	GROUP OF PUPILS	t	REMARKS
TM	Parents employed	0.562	NS
	" unemployed		
UM	" employed	0.567	NS
	" unemployed		
TF	" employed	0.280	NS
	" unemployed		
UF	" employed	1.304	NS
	" unemployed		

- g. Presence of radio at home controlled. 285 pupils (72.2%) had radios at their homes. The frequencies associated with the presence/absence of radio are given in table 10. The pupils are non-significantly distributed with a chi-square of 1.56.

Table 28: Results of hypothesis testing with presence of radio at pupils' home controlled.

RADIO PRESENT

GROUP	MEAN	s.d.	t	REMARKS
T	31.61	13.84	-3.042	S
UT	36.71	13.92		
TM	28.20	12.96	-4.993	S
UM	37.67	14.08		
TF	38.00	13.29	2.161**	S
UF	30.83	11.48		
TM	28.20	12.96	-3.798	S
TF	38.00	13.29		
UM	37.67	14.08	2.245**	S
UF	30.83	11.48		
M	34.46	14.40	-0.451	NS
F	35.31	13.03		

\*NS at 1%

\*\*NS at 2%

RADIO ABSENT

GROUP	MEANT	s.d.	t	REMARKS
T	31.15	12.97	-2.255**	S
UT	36.72	12.89		
TM	29.26	11.75	-3.051	S
UM	37.95	12.55		
TF	34.72	14.70	0.107	NS
UF	34.21	13.57		
TM	29.26	11.75	-1.429	NS
TF	34.72	14.70		
UM	37.95	12.55	1.018	NS
UF	34.21	13.57		
M	33.90	13.70	-0.201	NS
F	34.46	13.71		

\*NS at 1%

\*\*NS at 2%

Table 29: Results of t-tests to determine the effect of presence of radio at home on achievement.

TEACHER CHARACTER- ERISTICS	GROUP OF PUPILS	t	REMARKS
TM	Present	-0.424	NS
	Absent		
UM	Present	0.121	NS
	Absent		
TF	Present	0.826	NS
	Absent		
UM	Present	-0.863	NS
	Absent		

h. Repetition factor controlled.

301 pupils (76.2%) were fresh from class five. The frequencies associated with repetition and training of teachers are given in table 11. They were distributed non-significantly with chi-square 0.61.

Table 30: Results of hypothesis testing  
with repetition factor controlled

NON-REPEATORS

GROUP	MEAN	s.d.	t	REMARKS
T	30.97	14.18	-3.256	S
UT	36.44	14.60		
TM	28.29	13.29	-5.003	S
UM	37.82	14.82		
TF	36.79	14.49	1.903	NS
UF	30.86	12.34	-3.113	
TM	38.29	13.29	-3.113	
TF	36.79	14.49		
UM	37.82	14.92	2.866	S
UF	30.86	12.34		
M	34.25	14.97	0.141	NS
F	33.99	13.75		

REPEATORS

GROUP	MEAN	s.d	t	REMARKS
T	32.91	11.51	-2.139	S
UT	37.65	9.66		
TM	29.38	9.70	-3.268	S
UM	37.44	9.47		
TF	37.37	12.29	-0.263	NS
UF	38.75	11.26		
TM	29.38	9.70	-2.327**	S
TF	37.37	12.29		
UM	37.44	9.47	-0.341	NS
UF	38.75	11.26		
M	34.55	10.25	1.244	NS
F	37.78	11.79		

\*\*NS at 2%

Table 31: Results of t-tests to determine the effect of repetition on pupils' achievement.

TEACHER CHARACTERISTICS	GROUP OF PUPILS	t	REMARKS
TM	Non-repeaters (NR)	-0.368	NS
	Repeaters (R)		
UM	NR	0.197	NS
	R		
TF	NR	0.146	NS
	R		
UF	NR	-1.620	NS.

Table 32: Summary of hypothesis testing.

FIXED CHARACTERISTICS	GROUP	H1	H2	H3	H4	H5	H6
None		X	X	✓	X	Xa	✓
Sex of pupils	Boys	Xb	X	Xb	X	Xa	✓
	Girls	X	X	✓	Xb	✓	✓
Age of pupils	Old	✓	X	Xb	Xb	X	✓
	Young	X	✓	X	✓	✓	✓
Parents' presence	Yes	X	X	✓	X	Xb	✓
	No*	✓	✓	✓	✓	✓	✓
Parents' education	Educated	✓	✓	✓	X	✓	✓
	uneducated	X	X	✓	Xa	Xa	✓
Parents' employment	Employed	X	X	✓	X	✓	✓
	Unemployed	Xa	X	✓	Xb	Xb	✓
Radio at home	Yes	X	X	Xb	X	Xb	✓
	No	Xb	X	✓	✓	✓	✓
Pupil repeated	Yes	X	X	✓	X	X	✓
	No	Xb	X	✓	Xb	✓	✓
Overall result		X	X	✓	X	✓	✓

Difference in

favour of

- Xa Hypothesis accepted at 1% level
- Xb Hypothesis accepted at 2% level.
- X Hypothesis rejected.
- ✓ Hypothesis accepted
- \* Conditions for t-test not met.
- UT Untrained teachers
- UTM= Untrained male teachers
- TF= Trained female teachers
- F= Female teachers

#### 4.1.4 Correlation Coefficients between achievement and Intervening Variables.

In addition to the t-test results reported in 4.1.3, further testing was done to determine the correlation between the independent variables and the dependent variables (Pretest and posttest). This was done by computer using SPSS (Statistical Package for the Social Sciences) programme. The independent variables were coded as follows:

- Sex of Pupil (SP) Girl = 1, boy = 0
- Age of pupil (AP)  $\geq 14$  years = 1,  $< 14$  years = 0
- Repetition (RC) Yes = 1, No = 0
- Staying with father (SF) Yes = 1, No = 0
- Staying with mother (SM) Yes = 1, No = 0
- Education of father (EF) Number of years spent in school.



Education of mother (EM) Number of years spent  
in school.

Employment of father (JF) Yes = 1, No = 0

Employment of mother (JM) Yes = 1, No = 0

Sex of teacher (ST) Female = 1, Male = 0

Radio at home (RH) Yes = 1, No = 0

Class size (SC)  $\leq 50=0$ ,  $51-80=1$ ,  $>80=2$ .

The dependent variables were coded as

Pretest (PRS) Raw marks in percentage.

posttest (PTS) Raw marks in percentage.

The information from pupil responses to appendix IV were punched onto cards coded as above and run using SPSS programme (Appendix V). The computer print out gave the correlation coefficients tabled in table 33. Using the formular  $Z = r\sqrt{N}$  (Furneaux P.110), the significance of the correlation were computed. The results of the computation are also in table 33. setting a significance level of 5% requires  $Z=1.96$ .

Table 33: Correlation coefficients (r) between independent variables and dependent variables.

VARIABLE	<u>PRETEST (PRS)</u>		<u>POSTTEST (PRS)</u>	
	TRAINED	UNTRAINED	TRAINED	UNTRAINED
PTS	0.19 (s)	0.27 (s)	1.00 (s)	1.00 (s)
SP	0.07	0.11	-0.10	-0.03
AP	0.10	0.00	0.16 (s)	-0.05
RC	-0.03	-0.04	0.06	0.04
SF	-0.06	0.05	0.00	0.04
SM	-0.07	-0.05	-0.08	0.09
EF	0.17 (s)	0.05	0.04	-0.06
EM	0.16 (s)	0.14 (s)	0.12	0.01
JF	-0.02	0.09	0.09	0.12
JM	0.04	0.17 (s)	0.05	0.07
ST	0.08	-0.14 (s)	0.30 (s)	-0.16 (s)
RH	-0.03	0.04	-0.01	0.00
SC	0.08	-0.26 (s)	0.05	-0.18

S = Significant correlations, implying that PRS/PTS are related significantly to the variables.

## 4.2 FINDINGS

The summary of the hypothesis testing (table 32) indicates that most of the hypotheses were either constantly accepted or rejected when each of the intervening factors were controlled.

### 4.2.1 Hypothesis one (Trained versus Untrained teachers).

Table 32 shows that the hypothesis was rejected most of the time in favour of untrained teachers. The pupil achievements were non-significantly different for older pupils and for pupils with educated parents.

### 4.2.2 Hypothesis two (Trained male versus untrained male teachers).

The hypothesis was rejected in favour of untrained teachers. The only exceptions were for younger pupils and pupils with educated parents.

### 4.2.3 Hypothesis three (Trained female versus untrained female teachers)

The hypothesis was accepted. The only exceptions were for boys, older pupils and pupils with radios at home. The small differences were in favour of trained female teachers.

4.2.4 Hypothesis four (trained male versus trained female teachers).

The hypothesis was rejected in favour of female teachers. The hypothesis was accepted for pupils with no radios at home.

4.2.5 Hypothesis five (Untrained male teachers versus Untrained females)

The hypothesis was accepted, with small differences favouring untrained male teachers. It was rejected for older pupils and repeaters.

4.2.6 Hypothesis six (Male teachers versus female teachers).

There was no significant difference between pupils taught by male teachers and those taught by female teachers. The small differences favoured female teachers.

4.2.7 Intervening Variables.

From tables 20, 22, 25, 27, 29 and 31 and 33 we conclude that sex, age, parents' education, parents' employment, presence of radio at home, and repetition of class six are not significant factors in pupil achievement from radio broadcast lessons. The non-significant differences were in favour of boys, pupils with employed parents and pupils with no

radios at home.

Trained teachers unlike untrained tended to be more effective with older pupils, and pupils with uneducated parents. Trained male teachers and untrained female teachers unlike untrained males and trained females tended to be more effective with repeaters. Among the variables analysed, only two, namely sex of teacher and class size affect pupil achievement significantly. However, the class size is only significant for untrained teachers.

#### 4.2.8

Regression Equations between dependent variables and independent variables.

The computer print out gave better values of all the independent variables when they were regressed with respect to the dependent variables. The print out gave values for the trained and untrained teachers separately, for each of the dependent variables.

(i) For trained teachers

$$\begin{aligned} \text{Pretest score (raw)} = & 28.00 + 0.49EF + 2.80AP + 0.30EM \\ & - 2.36JF - 2.06SM + 1.60SC - 1.88RC \\ & - 1.44SF - 1.15RH + 0.94SP + 0.84ST \\ & + 0.42JM. \end{aligned}$$

$$\begin{aligned} \text{Posttest Score (raw)} = & 31.34 + 9.05\text{ST} + 3.72\text{AP} - 4.35\text{SC} \\ & - 3.26\text{SP} + 0.24\text{EM} - 2.13\text{SM} + 1.10\text{JF} \\ & + 1.11\text{RC} - 0.92\text{RH} + 0.10\text{EF} + 0.84\text{JM} \\ & - 0.46\text{SF}. \end{aligned}$$

(ii) For untrained teachers.

$$\begin{aligned} \text{Pretest score (raw)} = & 37.58 - 5.51\text{SC} - 10.96\text{ST} + 2.58\text{AP} \\ & + 0.47\text{EM} - 0.22\text{EF} + 1.14\text{RC} + 1.10\text{SF} \\ & - 1.02\text{JM} - 0.99\text{SM} + 0.71\text{SP} - 0.78\text{RH} \end{aligned}$$

$$\begin{aligned} \text{Posttest score (raw)} = & 50.35 - 5.09\text{SC} - 12.40\text{ST} - 0.61\text{EF} \\ & + 5.06\text{RC} - 3.43\text{SP} + 3.63\text{JF} - 3.98\text{SM} \\ & - 1.31\text{AP} - 1.30\text{RH} - 1.86\text{JM} + 1.12\text{SF} \\ & + 0.15\text{EM}. \end{aligned}$$

#### 4.3 INTERPRETATION

Results of hypothesis one and two indicate that pupils taught by untrained teachers achieve more from radio lessons. Results of hypothesis three indicate that training is not much of a factor for female teachers. Results of hypothesis four indicate that trained females out-perform trained males, while results of hypothesis five favour untrained males.

The sex of the teachers appears to affect pupil achievement from radio broadcasts lessons. Training appears to make the female teacher more effective than the male teacher. Training appears not to improve the effectiveness of teachers particularly males in the use of radio broadcasts to schools.

#### 4.4 EVALUATION

The result on the sex of teachers disagrees with the literature reviewed in chapter two, that teacher's sex has no effect on pupil achievement. The findings that pupil sex is not a factor is not in line with the literature reviewed. However, the observed difference is in favour of boys. This is contrary to what Brophy (P. 202) would expect. Girls, according to Brophy should out-perform boys in a subject like Health Education, because of the cultural tendency for girls to observe health habits more than boys.

The results displayed in table 27 indicate that pupils with employed parents are at a non-significant advantage. For education of parents the findings are not consistent; they non-significantly favour pupils with educated parents and

trained male teachers, and significantly favour pupils with uneducated parents and taught by trained female teachers.

#### 4.5 Discussion

Judging from the results of the data analysis it is logical to say that pupil characteristics seem not to affect achievement. Home background and socio-economic status of the pupils' family seems not to affect achievement either. This means that the observed differences in the posttest achievement can be attributed to the teacher characteristics, in this study the training and sex of the teachers. Variables such as environment, grade of pupils, subject matter had been fixed through the design of the study.

Because of the nature of the research, no generalisations can be made over all the school subjects, or levels. Nor can the results be used to make predictive statements on the achievement of pupils taught by the other media namely TV, film, etc.

The results showed that female teachers once trained improved and appeared to be more effective in their use of radio broadcasts. Male teachers



on the contrary became less effective after training. Considering the trained, female teachers came out more effective non-significantly than males. For the untrained, the male teachers appeared more effective than the females. Basing our arguments on these results, it is inevitable to advocate more admission for female teachers in the TTCs.

The results of hypotheses one and two show that untrained teachers came out more effective, implying that training induces negative response or resistance to instructional media in the teachers.

## CHAPTER FIVE

### 5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 SUMMARY OF THE STUDY.

The study aimed at comparing achievement of pupils taught by trained teachers and untrained teachers using radio. To do this two tests were administered to standard six pupils in seven primary schools. In between the tests, the pupils were taught using radio broadcast materials.

The results of the two tests were analysed for differences. The first test (Appendix I) gave non-significant t-value. This implied that the pupils were starting off at approximately the same level. The second test showed marked differences. In most of the cases the differences favoured untrained teachers (see Table 32).

This result contradicts the normal belief that trained teachers are more effective than untrained teachers. As expected the teachers' sex was not a factor. The testing process also revealed that the intervening factors affected achievement non-significantly. This

left the researcher with only one variable on which to attribute the differences in achievement, and this was training.

## 5.2. CONCLUSIONS

### 5.2.1 DIRECT OUTCOME OF THE RESEARCH

From the results of the study the following conclusions can be drawn:

- (i) Untrained teachers tend to be more effective with radio broadcasts. This may be so because trained teachers tend to be resistant to innovations in educational technology. They insist on using other media, making radio look like an imposition on them. The trained teachers are also confident in themselves and consider the broadcast material as inadequate.
- (ii) For female teachers there are very slight differences in favour of the trained teachers. Training improves the female teachers very slightly. This shows that female teachers are not very resistant to innovations like male teachers; this is further confirmed by the results of hypothesis four.
- (iii) Sex of the teachers seems not to affect pupils' achievement from radio lessons. The only exception is the case of trained

teachers where females out-perform males.

- (iv) Boys tend to achieve more than girls though non-significantly. Sex of pupils is not a factor.
- (v) Trained teachers tend to be more effective non-significantly with older pupils, whereas untrained teachers are at home with younger pupils. Age of pupils is not a factor..
- (vi) Trained teachers tend to be more effective with pupils whose parents are educated. . However the parents' education is a non-significant factor in pupil achievement.
- (vii) Employment of parents is a non-significant factor in pupil achievement.
- viii) Presence of radio at pupil's home is not a factor in pupil achievement from radio lessons.
- (ix) Repetition of standard six by pupils is not a factor in achievement.

Having seen that sex of a teacher, sex of pupil, age of a pupil, education and employment of parents, presence of radio at home and repetition are not factors, and having fixed the age and experience of the

teacher, the environment, academic level of the pupils and the subject matter, we are bound to conclude that any differences in the pupils' achievement can only be attributed to the training of the teacher.

#### 5.2.2. FINDINGS WORTH KNOWING

From the above argument and table 32 we come to the conclusion that untrained teachers are more effective with radio broadcasts than trained teachers. This conclusion points out very clearly that either the teachers are never trained properly on how to integrate media (especially radio) into their teaching or that the trained teachers are so resistant to educational innovations that they find it hard to utilize fully radio broadcasts. Coupled with resistance to innovations maybe the negative attitudes the teachers hold about media that appear to be more of replacers than extenders.

#### RECOMMENDATIONS

Ensuing from the findings, the following recommendations are inevitable,

- (i) The Ministry of Basic Education should through KIE restructure the media courses offered at the TTCs to incline more towards helping the trainee teachers to integrate radio broadcasts into their day

to day lessons upon graduation.

- (ii) The TTCs should encourage the trainee teachers to be creative and innovative so that they can upon graduation continue making improvisations, setting up science laboratories containing locally collected materials and even making tape recordings of well planned lessons.
- (iii) The Ministry of Basic Education should encourage teachers to attend in-service as well as refresher courses. To this end, the researcher suggests intensified and compulsory courses for all primary school teachers at least once in two years for each teacher. The courses could last a week and could be taken at the Teachers Advisory Centres (TACs). It would not be expensive as the teachers would be commuting from their homes. The instructors would be education officers, university education lecturers and other persons qualified to offer advice of this nature to teachers.
- (iv) The EMS should set up a programme of termly evaluation whereby questionnaires would be

sent out to teachers to get their responses as to the suitability of the material broadcast that term. The responding teachers would also be given an opportunity to make criticisms and suggestions. The EMS would then use these responses to improve.

- (v) The Government should find a way of acquiring cheap domestic receivers (radios) that would be distributed to schools.
- (vi) The two Ministries of Education should encourage schools to purchase simple tape recorders. They could assist the schools in purchasing cheap recorders particularly in areas with poor VOK reception. The EMS could then continue with the tape copying services and serve these schools satisfactorily.
- (vii) The Government should set up a service unit within the Kenya School Equipment Scheme charged with servicing school radio sets to ensure that as many of the radio sets are in working order.
- (viii) The Ministry of Information and Broadcasting should open up a studio at KIE purposely for educational broadcasting. The

frequency on which this studio would broadcast would correspond to the fixed frequency of the cheap domestic receivers recommended in (v) above. This would ensure that they are not misused by headmasters and teachers. It would also make more air time available for educational programmes.

For further research the researcher recommends:

- (i) Further research should be done in an urban setting. Alternatively a larger study could be done involving both urban and rural schools to examine the effect of environment on pupil achievement from radio broadcasts.
- (ii) A larger study should be done involving a large number of teachers, different grades and different subjects. More generalized conclusions would then be drawn from the study.
- (iii) A study should be done to compare the radio broadcasts and tape recording.



APPENDIX I  
RESEARCH PRETEST,  
HEALTH EDUCATION CLASS SIX,

Friday 22 February 1982. Time: One hour

Tick (✓) the correct response to each question.

1. An animal which eats meat only is called -----
  - A. A herbivore
  - B. A Carnivore
  - C. An omnivore
  - D. A pest.
  
2. A cow has ----- teeth and they are of -----  
(same, different) type.
  - A. 12, same
  - B. 12, different
  - C. 24, same
  - D. 24, different
  
3. Protective foods are called -----
  - A. Mineral salts
  - B. Proteins
  - C. Carbohydrates
  - D. Vitamins

4. Mrs. Onyango's child was suffering from Kwashiokor. When she took the child to hospital the doctor discovered that she had failed to provide the child with certain kinds of foods. These foods are most likely to be -----
- Maize, potatoes, sugar and bread
  - Lemons, green vegetables, carrots and oranges.
  - Meat, eggs, beans, and milk
  - Iron, iodine, common salt and sulphur
5. Which of the following statements are TRUE about insects:
- Some insects are agents of pollination
  - They have six pairs of legs,
  - Some insects spread diseases.
- (i) and (iii)
  - (iv) and (ii)
  - (iii) and (iv)
  - (ii) and (iii)
6. All mammals feed their young ones on milk. Here are some animals:- monkey, tortoise, bat, crocodile and pig, which ones are NOT mammals?

- A. Bat and tortoise
  - B. Pig and crocodile
  - C. Monkey and bat
  - D. Crocodile and tortoise.
7. Which of the following gives the correct order of the life cycle of a locust?
- A. Larva-Egg-Adult-Pupa
  - B. Egg - Adult - Pupa
  - C. Egg - larva - Pupa - Adult.
8. Insects use small holes in the abdomen for breathing. These holes are called -----
- A. Spiracles
  - B. Thorax
  - C. Segments
  - D. Antennae
9. Which of the following is NOT a method for preventing diarrhoea?
- A. Washing our hands after visiting a latrine.
  - B. Sleeping under a mosquito net
  - C. Keeping flies away from our foods.
  - D. Eating properly cooked foods.

10. An insect's body is divided into 3 parts, namely -----
- A. Head, chest and legs.
  - B. Head, Thorax and abdomen.
  - C. Heads, wings and abdomen
  - D. Head, abdomen and legs.
11. Bacteria is a -----
- A. Small insect
  - B. Microscopic solid
  - C. Microscopic inorganism
  - D. Microscopic organism
12. Bacteria causes -----
- A. Malaria
  - B. Leprosy
  - C. Polio
  - D. Sleeping sickness
13. Scabies is a disease caused by -----
- A. Man
  - B. Spiders
  - C. Mosquito
  - D. Small mite

14. Pellagra is caused by feeding only  
on -----
- A. Meat
  - B. Minerals
  - C. Carbohydrates
  - D. Proteins
15. For healthy and strong teeth we need  
to -----
- A. Eat alot of carbodhydrates
  - B. Drink a lot of milk
  - C. Have a lot of rest
  - D. Eat a lot of meat
16. Sailors in olden days suffered from a  
diease called Scurvy because-----
- A. They were at sea for long periods
  - B. They didn't get enough to eat
  - C. Their diet lacked vitamins
  - D. They drunk too much
17. Certain diseases like smallpox, tubercu-  
losis can be prevented by -----
- A. Vaccination
  - B. Blood transfusion
  - C. Fungicides
  - D. Tablets.

18. Frogs belong to a group of animals called -----
- A. Mammals
  - B. Reptiles
  - C. Birds
  - D. Amphibians
19. Animals with jointed legs are called
- A. Molluscs
  - B. Anthropods
  - C. Reptiles
  - D. Vertebrates
20. Man, monkey and chimpanzee are ----- while dogs are not.
- A. Primates
  - B. Mammals
  - C. Animals
  - D. Reptiles

APPENDIX II  
RESEARCH POSTTEST  
HEALTH EDUCATION

CLASS SIX

Time: One hour

Provide answers to the following questions by writing letters (i.e. A, B, C or D) only.

1. Which of the following statements are TRUE?

(i) The sense of taste tells us how sweet ugali is.

(ii) The sense of smell tells us how sweet ugali is.

(iii) The 5 senses are seeing, hearing, touching, smelling and tasting.

(iv) The spinal cord controls all movements.

A. (ii) and (iv)

B. (i) and (iii)

C. (i) and (iv)

D. (ii) and (iii)

2. The human body is made up of tiny units called -----

A. Nuclei

B. Plasma

C. Muscles

D. Cells

3. Muscles are joined to the bones by
- A. Ligaments
  - B. Cartilage
  - C. Tendons
  - D. Joints
4. In order to bend the arm
- A. The biceps relax and the triceps contract.
  - B. Both biceps and triceps contract
  - C. Both biceps and triceps relax
  - D. The biceps contract and the triceps relax.
5. Which of the following statements are NOT TRUE?
- A. The anopheles mosquito spreads malaria
  - B. The culex mosquito spreads filaria
  - C. Typanosomiasis is spread by tse-tse fly.
  - D. Dysentery and tracoma are spread by the housefly.
6. The mosquito is more dangerous than the lion because .
- A. It is smaller than the lion.
  - B. It is an insect and the lion is a mammal



- C. It carries malarial germs and the lion doesn't.
  - D. It bites more people than does the lion.
7. Which of the following is NOT TRUE about the functions of the skeleton
- A. Protects the body
  - B. Supports the body
  - C. Receives messages from all parts of the body.
  - D. Makes movement possible.
8. Which of the following statements is NOT TRUE
- A. Disease is spread by all insects.
  - B. Disease is spread through food
  - C. Disease is spread by some insects.
  - D. Disease is spread through the air
9. Cleanliness is our best protection against
- A. Cuts and bruises
  - B. Diseases of all kinds
  - C. Malnutrition
  - D. Headache

10. Which of the following pairs is NOT a good comparison of the human body and a village
- A. Germs - Wild animals
  - B. Ears - Gates
  - C. Hair - Watchman
  - D. Skin - Fence.
11. The blood is made up of
- A. Plasma, red blood cells, white blood cells and platelets.
  - B. Red blood cells and white blood cells
  - C. Red coloured plasma and plasma
  - D. Plasma, red blood cells and white platelets.
12. Which of the following is NOT a method of keeping our bodies clean
- A. Brushing our teeth often
  - B. Keeping our fingernails short and clean
  - C. Covering a wound with a bandage for a week before washing it.
  - D. Killing all insects in the house so that they don't give us diseases
13. Which of the following statements is TRUE
- A. All veins carry impure blood

- B. All veins carry pure blood.
  - C. Only one vein carries impure blood
  - D. Only one vein carries pure blood
14. All activities in a cell are controlled by
- A. Cell wall
  - B. Vacuole
  - C. Nucleus
  - D. Platelets
15. The work of the white blood cells is to
- A. Make a person look fair.
  - B. Fight off invading germs.
  - C. Carry oxygen
  - D. Digest proteins
16. Blood would not be able to carry oxygen if did not contain
- A. White cells
  - B. Plasma
  - C. Fibrin
  - D. Haemoglobin

17. Nerves are part of the body which
- A. Carry messages to and from the brain
  - B. Make us nervous
  - C. Cause nervous breakdown
  - D. Carry blood to the brain
18. Our skin protects us against disease because it
- A. Kills germs
  - B. Attacks germs
  - C. Produces a poison which kills germs
  - D. Prevents germs from entering the body.
19. Which of the following methods is NOT useful in controlling insects that carry disease
- A. Burning their breeding places
  - B. Spraying insecticides
  - C. Taking medicine after the insects has bitten us
  - D. Covering our food.
- 20 . Which of the following properties apply to primates only.
- A. They have hair on their bodies

- B. They have fingers and thumbs to pick up things.
- C. They feed their young on milk
- D. Their young ones are born alive.

APPENDIX III

QUESTIONNAIRE TO TEACHERS

Please provide the information requested below correctly. The researcher assures you that your responses will be treated as confidential. Tick (✓) where necessary.

Part A

1. Name of school -----

2. Sex of respondent -----

Male

Female

3. State your age range

under 25 years

26-30 "

31-35 "

36-40 "

over 40 "

4. What is your qualification

Trained teacher

Untrained teacher

5. How long have you been teaching Science using radio

Never

Under 1 year

- 1-4 years
- over 4 years

PART B

(For trained teachers ONLY)

6. During your school days did your teachers use radio to instruct you

- Yes
- No

7. During your training at the TTC did you come across radio as one of the media of instruction?

- Yes
- No

8. If your teachers (in schools) used radio to instruct you, what was your reaction to it?

- Interesting
- Undecided
- Boring

9. If your college tutors used radio broadcasts to instruct you, what was your reaction to it?

- Interesting
- Undecided
- Boring

10. What can you say about the training you got on the use of radio broadcasts in teaching. Be brief?

-----  
-----  
-----  
-----  
-----

PART C

(To be answered by ALL teachers)

11. Do you listen carefully to each radio programme?

- Always
- Sometimes
- Never

12. If you could choose, would you like more school radio programmes?

- Yes
- No.



13. How often do you use radio in teaching?
- I use all the programmes relevant to my pupils.
  - I use some of the programmes relevant to my pupils
  - Never
14. How long do you spend on preparation about each programme before the broadcast begins?
- Over 2 hours
  - 1-2 hours
  - Under 1 hour
15. How long do you spend on additional work with the pupils after each radio lesson?
- Over 2 hours
  - 1 - 2 hours
  - Under 1 hour
16. If you could choose, would you do more work about the programmes with your pupils before the broadcast?
- Yes
  - No

17. If you could choose, would you do more work about the programmes with your pupils after the broadcast?

Yes

No

18. Do you enjoy the radio work with your pupils?

Yes

Sometimes

No

19. Would you say more about the work you do with your pupils before and after each broadcast?

-----  
-----  
-----  
-----  
-----

20. Can you comment on the suitability of the Health Education programmes on "You and your body - Part 1"?

-----  
-----  
-----  
-----

APPENDIX IV

QUESTIONNAIRE TO PUPILS

1. Pupil's name'-----School -----
2. Do you stay with your father? -----
3. If no, then who do you stay with? -----
4. Where is your father staying? -----
5. What highest class did your father reach? -----
6. Is your father employed? -----
7. He is employed as a -----
8. Do you stay with your mother? -----
9. If no, then who do you stay with? -----
10. Where is your mother staying?----->-----
11. What highest class did your mother reach? -----
12. Is your mother employed? -----
13. She is employed as a -----
14. Did you repeat class six? -----
15. Do you have a radio at home? -----

## APPENDIX V

SPSS PROGRAMME

```

RUN NAME          SPSS REGRESSION ANALYSIS
SUBFILE LIST      TRAINED UNTRAINED
VARIABLE LIST     SP, AP, RC, ST, SM, EF, EM, JF, JM,
                  ST, RH, SC, TT, PRS, PTS.

INPUT MEDIUM      CARD
N of cases        167  228
INPUT FORMAT       FIXED(3X,5F1.0,2F2.0,6F1.0,2F2.0)
PROCESS SUBFILE    EACH
REGRESSION         VARIABLES = PRS, PTS, SP, AP, RC,
                    = SF, SM, EF, M, JF, JM,
                    = ST, RH, SC, TT.
REGRESSION= PRS WITH SP, AP, RC, SF,
              SM, EF, EM, JF, JM, ST, RH,
              SC, TT.
REGRESSION= PTS WITH SP, AP, RC, SF,
              SM, EF, EM, JF, JM, ST,
              RH, SC, TT.

STATISTICS        ALL
READ INPUT DATA.
FINISH.

```

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