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A STUDY OF FACTORS THAT AFFECT THE TEACHING  
OF SCIENCE IN PRIMARY SCHOOLS  
IN KIAMBU MUNICIPALITY

This research project is my original  
and has not been presented for a degree  
any other University.

BY

  
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This research project has been submitted  
in partial fulfillment of the requirements for the degree  
of Master of Education with my approval as  
supervisor.

A PROJECT SUBMITTED TO THE FACULTY OF EDUCATION  
IN KENYATTA UNIVERSITY IN PARTIAL  
FULFILMENT FOR THE DEGREE  
OF MASTER OF EDUCATION

Kariuki, Eunice  
*A study of factors  
that affect the*



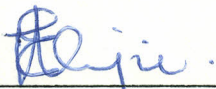
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DECLARATION

This research project is my original work and has not been presented for a degree in any other University.

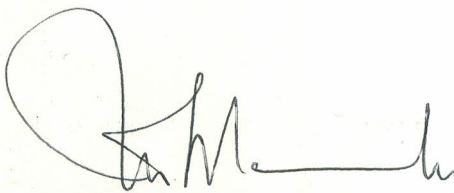
who introduced me into the world of research have wished me well throughout my time.



KARIUKI, EUNICE MAGIRI

To my husband, Kariuki, this work is also dedicated to his understanding and moral support.

This research project has been submitted for examination with my approval as University supervisor.



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DEDICATION

This work is dedicated to my dear parents who introduced me into the world of school and have wished me well throughout this difficult time.

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CHAPTER 3TABLE OF CONTENTSMETHODOLOGY

	Page
3.0 Introduction -----	
Declaration -----	i
3.1 Target Population -----	
Dedication -----	ii
3.2 Research Instrument -----	
Acknowledgement -----	iii
3.3 Administration of the Instrument -----	
Table of Contents -----	iv
3.4 Analysis and Presentation of Data -----	
List of Tables -----	vii
3.5 Scope and Limitations of the Study -----	
Abstract -----	viii
3.6 Summary -----	

CHAPTER 1

CHAPTER 1	
THE PROBLEM AND RELATED COMPONENTS -----	1
PRESENTATION, ANALYSIS AND INTERPRETATION	
1.0 Background to the Problem -----	1
1.1 Statement of the Problem -----	7
1.2 Research questions -----	8
1.3 Significance of the Study -----	9
1.4 Organization of the project -----	9
References and Footnotes -----	10

CHAPTER 2

CHAPTER 2	
REVIEW OF RELATED LITERATURE -----	11
2.0 Instructional Methods -----	11
2.1 Factors Affecting Teaching -----	12
2.2 Teacher Training Courses -----	14
2.3 Inservice of Teachers -----	17
References and Footnotes -----	19

4.6 Apparatus and materials for science teaching -----

4.7 Summary -----

<u>CHAPTER 3</u>	Page
METHODOLOGY -----	20
3.0 Introduction -----	20
3.1 Target Population -----	21
3.2 Research Instrument -----	21
3.3 Administration of the Instrument -----	23
3.4 Analysis and Presentation of data -----	23
3.5 Scope and Limitations of the Study -----	23
3.6 Summary -----	24
 <u>CHAPTER 4</u>	
PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA	25
4.0 Introduction -----	25
4.1 Teaching experience, professional and educational qualifications of teachers teaching upper primary science -----	25
4.2 Instructional methods commonly used by teachers and the factors that affect choice of the teaching methods -----	28
4.3 The kinds of problems primary science teachers face in trying to cope with the demands of a new curriculum -----	31
4.4 The rate at which science teachers are inserviced in order for them to be able to cope with the demands of a new curriculum -----	33
4.5 Opinion of teachers towards teacher training courses and their teaching experiences -----	35
4.6 Apparatus and materials for science teaching -----	38
4.7 Summary -----	41

	Page
<u>CHAPTER 5</u>	
DISCUSSION, SUMMARY AND RECOMMENDATIONS -----	43
5.0 Discussion -----	43
5.1 Summary of the findings -----	47
5.2 Recommendations from the results of the study -----	49
5.3 Recommendations for further research -----	50
References and Footnotes -----	52
BIBLIOGRAPHY -----	53
<u>APPENDICES</u>	
A - The Questionnaire -----	55
B - Time Schedule -----	65
C - Introductory letter to Headteachers from the District Education Officer -----	66

LIST OF TABLES

	Page
Table 1: Teaching Experience of Teachers --	26
Table 2: Professional qualifications of teachers -----	27
Table 3: Academic qualifications of teachers -----	28
Table 4: Instructional methods used by teachers -----	29
Table 5: Attendance of inservice courses by teachers -----	34
Table 6: Frequency of responses on teachers training aspects -----	36
Table 7: Apparatus and materials available in schools -----	39
Table 8: A comparison of apparatus and materials indicated available with what was actually seen in one of the schools -----	40

ABSTRACT

The purpose of this study was to ascertain the existence of some of the factors that affect science teaching in primary schools. The study was carried out in Kiambu District, Ndumberi zone, an area with nineteen (19) primary schools. The research was conducted in two (2) phases, a pilot study followed by the main study. The pilot study involved nine (9) teachers selected from two (2) schools. The purpose of piloting was to review the survey questionnaire and to gain experience in preparation for the main study. The sample for the main study consisted of thirty (30) teachers, selected from ten (10) schools. Ten (10) of the teachers were senior science teachers who responded to all the three (3) sections of the survey questionnaire. The rest twenty (20) teachers responded to sections I and II only. The data collected was reported and analysed using descriptive statistics, mainly averages and percentages. The findings confirmed the existence of certain factors that affect science teaching: there was an acute shortage of apparatus and other teaching materials which compelled teachers to resort to theoretical

approaches of teaching science. Further, teachers hardly improvised instructional materials and when they did, the materials were not stored for future use. Also, teachers did not get assistance from the local Teachers Advisory Sub-Centre. When a new curriculum was introduced, teachers had to cope with late supplies of vital materials like syllabi and inadequate inservicing. However, teachers had a positive opinion towards courses offered in teacher training colleges and would welcome the idea of subject specialization. Owing to the great problems that face science education in primary schools in Kiambu municipality, teachers would welcome solutions to alleviate these problems. Identification of a source of funds and inservice education would be some of the relevant steps to take.

## CHAPTER 1

THE PROBLEM AND RELATED COMPONENTS1.0 Background to the problem

In the early years of Kenya's political independence (1963-1970), the official policy was to graduate more people in science to fill vacant positions in science careers such as medicine, engineering, agriculture, teaching and research. Demand for more and better scientists at all levels was high and is still growing throughout the country in the hope that a better understanding of science and technology will be achieved. Science knowledge has increased and continued to grow both in quantity and complexity. This has necessitated a continuous updating of school science programmes, syllabi, and other related courses.

The policy of adopting a science programme that suits the needs of a country is very common and widely recognized in developing countries. Kenya is not an exception, for in the middle 1960s, the African Primary Science Programme (APSP) was launched in Entebbe, Uganda. After a few years of adopting the programme, it was replaced by the Science Education Programme for Africa (S.E.P.A.) in 1970, with its

headquarters in Accra, Ghana. The ideas from APSP and SEPA were subsequently incorporated under the auspices of the Kenya Primary Science Programme (K.P.S.P.). In 1978, a new Science Programme was prepared under the name of Primary Education Project, (P.E.P.). P.E.P. material which was piloted in 49 randomly selected schools in Kenya was formally adopted for the 8-4-4 programme in 1986. This is the programme teachers are teaching today (1988) with a few modifications. The implication of this historical perspective is that in a period of 23 years since independence, science teachers have had to teach 4 science programmes, each with its own demands on the teacher regarding methodology and content. Successful implementation of these programmes by the teacher has resulted in certain inevitable difficulties which can be identified.

Over the years, instructional methodology has changed from a theoretical to a practical approach. Soon after independence for example, it was observed that the drill<sup>1</sup> method of teaching was commonly in use. This method deliberately encouraged learners to memorise facts for the purpose of passing national examinations. The examination items mainly required

the reproduction of science facts. This enhanced rote memorisation. The science graduates of the time were devoid of both mental and manual scientific skills as well as the necessary attitudes for getting solutions to practical problems in real life situations. It was in the wake of these observations and criticisms that science programmes like the APSP and SEPA, which recommended a practical approach to teaching science, were formulated and strongly advocated for adoption. The present 8-4-4 system, similarly recommends the same practical approach to science teaching where pupils learn through direct experiences rather than being told about science. It is worthwhile to ascertain whether a disparity exists between the recommended methods of teaching and the reality in the classroom. The decision to undertake this study was prompted by an observation made during the adoption of the A.P.S.P. and S.E.P.A.,

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 Teacher Tra  
 following  
 teacher training

"Adoption of these materials was naturally slow. The teachers abhorred the laborious practical teaching where they were required to make intensive preparations for every lesson they took up with pupils. It took Kenya ten years (1967-1977) to adopt these materials".<sup>2</sup>

Also research work done by Abidha (1982) indicated that

primary science teachers still used the drill method instead of the process-based inquiry<sup>3</sup>. In the KCPE Newsletter 1987, it was noted that

"Teachers who still use the out-dated chalk and talk method of teaching place their pupils at a particular disadvantage when they sit for the Science and Agriculture paper".<sup>4</sup>

In Kenya teacher training colleges, trainees do not specialise in any teaching subject. Much as this is dictated by the high demand of teachers in schools, it may not be very desirable. "It is generally felt by both staff and students in colleges that too many subjects are covered".<sup>5</sup> Students are expected to study and sit for examinations in 13 subjects, yet they need only pass in 8 for the award of a certificate. This leads to a superficial treatment of both methodology and academic content. Teachers who are not adequately equipped with scientific knowledge may not be able to plan for a productive science lesson which will help learners acquire skills, knowledge and positive attitudes. A seminar report on Primary Science Teacher Training (Toili, W.W. KIE, 1987) had the following to say about the present situation in our teacher training colleges:

"In the recent past teaching of science has been very poorly done mainly because teachers have not been well trained. Proper training in science education is necessary because teacher competency, flexibility and ability to innovate depends largely on the level of educational training. The apparent inability of teachers to teach primary science effectively has been attributed mainly to curricula disparity. College curricula are monstrously overloaded, often with academic content, some of which is of doubtful value to the teacher in the actual classroom. Colleges and their curricular are remote from realities of the school. Information about real conditions and real problems appears incomplete; student teachers are prepared for what should rather than what is".<sup>6</sup>

These criticisms and others not in favour of the practice in the teacher training colleges prompted the researcher to investigate the science teachers opinion regarding the value of the training course offered in the colleges and its relevance in the classroom situations.

Provision of adequate facilities including text books has been a problem in many schools due to limited funds. It has become increasingly difficult to supply the ever increasing number of schools with various teaching and learning materials. The Education Commission of 1964 and many subsequent studies have

never failed to point at the poor classroom facilities and lack of teaching equipments. The Kenya National Equipment Scheme of the Ministry of Education which was charged with the responsibility of purchasing and delivering various materials is now hard pressed financially to discharge these duties. Consequently, the Ministry has introduced a cost sharing system whereby parents meet the cost of items such as textbooks and building extra classes. So far, schools receive no teaching apparatus at all. This calls for creativity in teachers so that alternative teaching resources can be sought. While adequate materials and equipments help a teacher to do a better job, a resourceful teacher in a deprived situation can, with a creative spirit, improvise and use the environment to teach effectively. In fact this is what the primary school science teacher is expected to do. Part of the work done in this study sought to find out how well schools are equipped for science teaching and the extent to which teachers improvise and use the environment for science teaching and learning.

### 1.1 Statement of the problem

The importance of science need not be over-emphasized in Kenya today. The success of creating citizens who are scientifically oriented is rooted in the teaching of science in primary schools. Towards this realization, educators have given a high priority to science teaching and learning, but like other aspects in Education, science teaching and learning may be facing various difficulties. Factors that affect science teaching are many and varied. The researcher attempted to investigate the conditions under which science is taught in Kiambu Municipality and the effect of some of these factors on science teaching, especially those related to:-

- a) Curriculum development.
- b) Instructional methods.
- c) System of teacher training.
- d) Inservice courses.
- e) Teaching materials.

The researcher was mainly concerned with the negative aspects of the factors investigated.

## 1.2 Research questions

The researcher sought answers to the following questions:

- a) What problems arise when teachers implement a new curriculum?
- b) How often are teachers inserviced to be able to cope with the demands of curriculum developments and to update their knowledge?
- c) What instructional methods are commonly used by teachers?
- d) What factors in the school environment greatly influence the teachers' choice of teaching methods?
- e) How well are schools equipped for science teaching and to what extent are teachers able to improvise?
- f) What assistance do the science teachers get from the Teachers Advisory Centres (T.A.C.)?
- g) What is the opinion of teachers towards the nature of the training course offered at the teacher training colleges, in areas such as:

- i) Gaining self-confidence to handle science lessons and related activities.
- ii) Mastery of content and methodology.
- iii) Relevance of knowledge gained to classroom teaching/learning situations and
- iv) Subject specialization.

### 1.3 Significance of the study

The purpose of the study was to ascertain the existence of some factors that affect the quality of science teaching. It is hoped that knowledge of these factors by:

- a) Headteachers,
- b) Curriculum developers and
- c) School inspectors

will go along way to help the primary school teacher alleviate some of the problems encountered and hence promote science teaching.

### 1.4 Organization of the project

This project is organized into five (5) chapters. Chapter I deals with the problem and the related components. The second chapter has a review of the related literature. The methodology is contained in chapter 3. The fourth chapter is an outline of data analysis. The last chapter 5 contains a discussion, summary and recommendations of this study. Finally, a bibliography and appendices are included.

CHAPTER 2  
REFERENCES AND FOOTNOTES

LITERATURE REVIEW

1. 'Drill' - An instructional method where pupils acquire knowledge passively from the teachers.
2. William Wanjala Toili: The role of primary science instructional and teacher training strategies in the promotion of scientific literacy in primary schools in Kenya: constraints and prospects. Nairobi: Kenya Institute of Education, 1987, p .2.
3. Process-based enquiry: An instructional method where pupils explore the environment actively for quest of knowledge while at the same time acquire scientific skills and desirable attitudes.
4. Kenya National Examination Council: KCPE Newsletter, Nairobi: Kenya National Examination Council, 1987, p.64.
5. Republic of Kenya, Ministry of Education: Report of the Primary Teachers Upgrading Programme Committee; Nairobi, May 1978.
6. Toili Op. Cit. pp.14-15.

## CHAPTER 2

LITERATURE REVIEW2.0 Instructional Methods

Literature on the problems of teaching and learning particularly in science has a long history in Kenya. The Kenya Education Commission (1964) observed an unsatisfactory practice among teachers in their teaching methodology. There was

2.1 Factors affecting teaching

"Common occurrence of drill methods of teaching of an authoritarian tone of voice on the part of the teacher. Neglect of activity methods of teaching and pupil participation; little attempt of grouping pupils; a negative approach to discipline and of a formalised presentation of material".<sup>1</sup>

This practice had to be abandoned in favour of a more democratic situation in class where pupils actively participate in well organized class activities. In the same Education Commission, it was observed that an unsatisfactory state of relationship existed between teachers and parents. Teachers criticised parents for neglecting the childrens' interests and parents criticised teachers for poor teaching. Such criticisms place the teacher in an uncomfortable

situation and consequently affect the teaching process. The Commission also noted that, time allocated for science which was 2 periods a week was not adequate. It was proposed that agriculture should be abandoned as a separate subject and that time hitherto devoted to science, giving a total of 4 periods a week from primary 4 upwards. This would give the teachers more time to cover the science content adequately.

### 2.1 Factors affecting Teaching

In 1974, D. Sifuna wrote an article entitled "Some factors affecting the quality of teaching in the primary schools in Kenya", where he highlighted some of the problems faced by primary school teachers. Among the problems is the prevailing teaching conditions in the schools which make it very difficult for a newly trained teacher to practice what has been learnt in the training college.

"A progressive young teacher who is the custodian of the new teaching methods may turn to traditional methods, if asked to justify the use of activity methods by the older teachers. It is not surprising that he will collapse when confronted with an apparently successful 'chalk' and 'talk' teacher".<sup>2</sup>

The fear may be reinforced by possibly having to deal with a class of over 40 'stormy' pupils who as he realises need rigid class control than that advocated by idealists in the colleges. On the other hand, a teacher with self confidence will not be easily influenced. D. Sifuna also pointed out the importance of supervision in teaching. Both internal and external supervision improves quality of teaching. Things like unpunctuality, unwarranted absenteeism, negligence in lesson preparation and marking of pupils books have to be curbed. School inspectors should 'tone' down their administrative role to that of a helper.

"Some often tend to wear on colours of a police officer that their presence in the school is often strongly resented by teachers".<sup>3</sup>

Supervisors with pre-conceived ideas that teachers are incompetent and therefore need guidance cause dissatisfaction among teachers. The trend where supervisors assume the role of a superior while the teacher is the subordinate is being discouraged by educators in favour of establishing a colleague relationship between the teacher and the supervisor. On the other hand, lack of supervision may cause problems. A study done by F.K. Kyalo, M.Ed. (1984) revealed that teachers are rarely

supervised by the A.E.Os (Assistant Education Officers).

"On average, each teacher had a chance of being seen by an A.E.O. once in 3-4 years if he was lucky".<sup>4</sup>

The hope of not being supervised makes every teacher relaxed and hence the lowered standards of instruction in general and science in particular. It would be interesting to find out whether there are teachers who feel that they need to be supervised more often and regularly so as to alleviate some of the instructional problems. As pointed earlier, good supervisory practice improves the quality of teaching. It also ensures that the teacher is advised on new educational developments.

## 2.2 Teacher Training Course

The training course offered in our Primary Teacher Training College does not allow for subject specialization, mainly because of the high demand for teachers in our schools who should be able to teach any subject. The science teachers are expected to introduce often complex concepts to the young pupils using various techniques. Hence proper training especially in science is vital. In Sept. 1987, an international seminar on Primary Science Teacher Training made the following observations about the

Teacher Training Colleges.

- i) "The Teacher Science syllabus was overloaded with content.
- ii) The teacher content was not in line with the primary science syllabus.
- iii) The teaching approach in colleges divorced content from methodology.
- iv) Most tutors in colleges were being recruited straight from University. These graduates were trained to teach their subjects of specialization in secondary schools not in primary teacher colleges or primary schools.
- v) Facilities in most colleges were found to be of generally low standards.
- vi) Teaching guidelines were not adequate.
- vii) Methods of assessment needed improvement."5

In response to the above observations, the following has been done to improve the teacher training programme in Kenya.

- i) The content was drastically reduced.

Emphasis was placed on philosophy of science, teaching approach and evaluation of science.

- ii) KIE developed a guideline for tutors - Primary Teacher Education Draft Teaching Guide for Science, which is in use now in colleges. This guideline is in line with the demands of the 8-4-4 programme. Plans were underway to develop a more detailed guide.

iii) Those tutors teaching in colleges and already possess a B.Ed, degree are being selected for a Master of Education degree in Primary Education offered at Kenyatta University. In addition, a B.Ed. degree (Primary Option) programme was started in 1985 to train tutors for colleges and educators for other aspects of primary education. It is hoped that the programme will go along way in raising the standards in Teacher Training Colleges and consequently the quality of primary school teachers.

iv) The trainees undergo vigorous teaching practice sessions both practically in schools and in demonstrations under the supervision of their tutors. Finally, external assessors assess the trainees and moderate the grades awarded.

Flegg, J. (1981) pointed out that, an ill-prepared science teacher cannot teach meaningful science lessons because he may not always find science concepts meaningful and logical.

### 2.3 Inservice of teachers

Inservicing of teachers is an important aspect of alleviating the teacher's problems. Inservice courses should be for all teachers in service and geared towards improvement of skills in teaching as well as making the teachers aware of changes in the curriculum. Most teachers do appreciate such courses as Young, B.L. (1979) pointed out that "Many teachers welcome professional help and are genuinely concerned to improve the quality of their teaching inspite of the increased effort that curriculum changes inevitably demands".<sup>6</sup> The Teachers Advisory Centres which were established in 1970 were meant to co-ordinate learning activities in schools through constant inservicing of teachers in areas such as production and use of teaching materials. Each district has a major centre and sub-centres are spread, each serving 10-30 schools. It is staffed with at least one T.A.C. tutor. However, most of the TAC tutors are not well-versed in science and have to look after other subjects as well.

The KIE in conjunction with the University of Nairobi College of Adult and Distance Education (C.A.D.E.) prepare radio lessons and other materials for inservice of regular teachers on various science topics. Taped cassettes are also available from the

Kenya Institute of Education (KIE). At primary school level the teacher is expected to make maximum use of the environment by collecting material, improvising and organizing outdoor activities.

2. Sifuna, D.N. Some factors affecting the effectiveness of teaching in the primary schools.  
In: Education in Eastern Africa  
No. 2, 1974. p.216.
3. Ibid. p.218.
4. Francis K. Kyalo: A study of the factors that affect science teaching and learning in primary schools in Kitui District. Unpublished, M.Ed. Project; Kenya Institute of Education, 1984. p.55).
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2. Sifuna, D.N.: Some factors affecting the quality of teaching in the primary schools of Kenya. In: Education in Eastern Africa, Vol. 4, No. 2, 1974. p.216.
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## CHAPTER 3

METHODOLOGY3.0 Introduction

3.1 This study was a survey design conducted in Kiambu District, Kiambaa Division, Ndumberi Zone, Kenya. The purpose of the study was to investigate some of the factors that affect science teaching in primary schools. A preliminary survey was undertaken to identify the number and location of primary schools. This was done through the office of the District Education Officer. From this office permission was sought to visit the various primary schools in Ndumberi zone. A letter of introduction to the head-teachers was also given by the same office (see appendix C). Ndumberi zone covers schools within and around Kiambu Municipality which was the target area of the study. The area has a total of nineteen (19) primary schools.

This study was conducted in two (2) phases, a pilot study, followed by the main study. The purpose for the pilot study was:

- a) To detect any faults or weaknesses in the survey questionnaire.

- b) To gain basic experience in conducting the research in preparation for the larger group survey.

### 3.1 Target Population

#### (a) For Pilot Study

Two (2) primary schools were randomly selected from the target area. Nine (9) questionnaires were administered to nine (9) teachers who were randomly selected from among those who were teaching upper primary science.

#### (b) For Main Study

The sample consisted of thirty (30) teachers who were taken from ten (10) randomly selected primary schools. From each school, three (3) teachers participated in the study. Two (2) teachers were randomly selected but the third had to be the senior teacher in-charge of science. He/she was presumably most conversant with materials for science teaching that were available in the school.

### 3.2 Research Instrument

The research tool used to collect data was a survey questionnaire, designed and constructed by the

researcher (see appendix A). This questionnaire had three (3) sections. Section I comprised fourteen (14) structured items which sought information about the individual respondent such as teaching experience, level of education and age of the teachers. Section II contained seven (7) statements relating to teacher training. The respondent had to indicate his/her opinion about each statement. Section III had four (4) open-ended items and an inventory of apparatus and other materials expected to be available in primary schools (Kyalo, F.K., M.Ed. 1984, appendix III). The respondent was to indicate by means of a tick (✓) those instructional materials that were available and/or improvised in the schools. From the pilot study review, it was found unnecessary for this section of the survey questionnaire to be filled by all the three (3) teachers from each school. The senior teacher incharge of science was found to be most appropriate to respond to Section III since he/she was presumably most conversant with the materials available in the school. Consequently, Section III was detached, from the survey questionnaires issued to the other teachers. In short, ten (10) senior teachers filled survey questionnaires with all the three (3) sections, while twenty (20) teachers filled survey questionnaires with sections I and II only. Also, question number 11 in section I was slightly rephrased to read as it is now in appendix A, page 57

### 3.3. Administration of the instrument

The survey questionnaires were administered by the researcher personally. Each school was visited in turn and the questionnaires issued to the respective teachers. Teachers were allowed four (4) days to respond to the questionnaires after which they were collected by the researcher. Twenty one (21) out of the thirty (30) questionnaires were recovered. Eight (8) from the senior teachers and thirteen (13) from the other teachers.

### 3.4 Analysis and presentation of data

The data obtained is reported and analysed using descriptive statistics. The range of statistics include tables and percentages. Where appropriate, qualitative information is presented to support quantitative data. The findings of this study are reported in Chapter Four (4).

### 3.5 Scope and limitations of the study

The study covered schools within and around Kiambu Municipality. The results may therefore not be generalised to other parts of the country. Due to shortage of time and funds, the study could not exhaust all the factors that affect science teaching.

Also, the results obtained are subject to the weaknesses of a questionnaire as an instrument for data collection.

#### 4.0 Introduction

### 3.6 Summary

This study was conducted in Kiambu District, Ndumberi zone, Kenya. In this Chapter, an outline of the procedure followed by the researcher is given. The study was conducted in two phases:

- a) A pilot study.
- b) The main study.

The pilot study involved nine (9) teachers selected from two (2) schools. The main study involved thirty (30) teachers selected from ten (10) schools. The results of the pilot study lead to a slight modification in the survey questionnaire. The instrument was administered by the researcher personally. The data collected was analysed using descriptive statistics and is reported in Chapter Four (4).

## CHAPTER 4

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA4.0 Introduction

This chapter deals with presentation, analysis and interpretation of the findings obtained in the study. Reference here is made to the data that have provided answers to the research questions set by the researcher as outlined in Chapter I. The data analysed here is based on information provided by twenty one (21) teachers from who questionnaires were recovered out of the thirty (30) who participated in this study.

4.1 Teaching experience, professional and educational qualifications of teachers teaching upper primary science

Teaching experience here refers to the number number of years a teacher has been on the job, since the year of appointment. Table 1, below is a summary of the findings.

P1 - Primary teacher grade I.

P2 - Primary teacher grade II.

P3 - Primary teacher grade III.

TABLE 1: TEACHING EXPERIENCE OF TEACHERS

TEACHING EXPERIENCE	NUMBER OF TEACHERS	PERCENTAGE OF TEACHERS (%)
Below 5 years	4	19
5-10 "	8	38
11-15 "	3	14
16-20 "	5	24
21-25 "	1	5

Eighty one percent (81%) of the teachers involved in this study have a long experience of over 5 years teaching in primary schools. These teachers were therefore trained in the years before 1983, a time before the present 8-4-4 system of education was formally introduced in schools.

Teachers who have satisfactorily completed a training course in teacher training colleges for primary schools are awarded the following grades.

- P1 - Primary teacher grade I.
- P2 - Primary teacher grade II.
- P3 - Primary teacher grade III

S1 - Secondary teacher grade I is a grade awarded for some secondary school teachers.

Table 2, shows the number and professional qualifications of teachers who participated in the study.

TABLE 2: PROFESSIONAL QUALIFICATIONS OF TEACHERS

TEACHERS GRADE	NUMBER OF TEACHERS	PERCENTAGE OF TEACHERS (%)
S1	1	5
P1	15	71
P2	4	19
P3	-	-
Untrained	1	5

Ninety Five percent (95%) of the teachers teaching upper primary science have been trained and at least attained primary teacher grade II. The number of untrained teachers is surprisingly but pleasantly low, although, this study dealt with only a small proportion of teachers in every school.

In this study, teachers academic attainment was sought. Table 3 illustrates the educational level of teachers who participated in this study.

TABLE 3: ACADEMIC QUALIFICATIONS OF TEACHERS

EDUCATIONAL LEVEL	NUMBER OF TEACHERS	PERCENTAGE OF
Primary Level	0	0
Kenya Junior Secondary Examination (K.J.S.E.)	1	5
Secondary Level	13	62
Advanced Secondary Level	7	33

All the teachers who participated in this study have acquired secondary education. This puts the teacher at a better position as far as the knowledge of content covered at primary schools is concerned.

#### 4.2 Instructional Methods commonly used by teachers in teaching upper primary school science and the factors affecting the choice of the teaching methods

Science programmes such as Kenya Primary Science

(K.P.S.P.) and the recently adopted 8-4-4 system recommended a practical approach to teaching science. The science teacher is expected to use instructional methods such as demonstration and experimentation. As indicated in Table 4 below, the majority of teachers prefer to use experiments and observations instead of such theoretical approaches as the lecture method.

TABLE 4: INSTRUCTIONAL METHODS USED BY TEACHERS

Instructional Method	Number of times cited by teachers out of 21 times
Experimentation	18
Observation	10
Discussion	9
Question and Answer	5
Demonstration	3
Discovery	1
Lecture	1

Going by the responses of the teachers, the above results are very encouraging as far as use of practical approaches to teaching science is concerned.

However, a quick look at the pupils' exercise note books and the scarcity of apparatus in the schools, suggest that very few experiments are likely to have been done. So, although the teachers were aware of what is expected, the actual practice could not be confirmed.

To the question of the factors that mostly affect the choice of teaching methods, seventy six percent (76%) of the teachers indicated that provision of facilities and adequate teaching apparatus greatly influence the instructional method chosen. The non-availability and scarcity of practical apparatus and materials compels the teacher to resort to theoretical approaches. Secondly, the passing of National examinations is given such a great emphasis that the method of teaching does not matter much provided pupils pass well. Forty eight percent (48%) of the teachers lamented that the teaching load of an average of forty (40) lessons a week is too much for a teacher to have adequate time to prepare lessons and improvise apparatus. By the end of the day, the teacher is very exhausted. The small percentage of teachers (23%) who complained about large classes pointed out the difficulty of giving help to individual pupils.

4.3 The kinds of problems primary science teachers face in trying to cope with the demands of a new curriculum.

Teachers cited the following as some of the problems they face when trying to cope with the demands of a new curriculum.

1. Syllabi and reference books are not readily available by the date the new curriculum is to be implemented. This puts the teacher in a situation where he is expected to work without the necessary tools.
2. The majority of teachers are not given an opportunity to attend inservice courses and orientation seminars, hence some teachers have no confidence to teach new and sometimes unfamiliar content. This is true especially to teachers with long experience in the classroom who have not had a chance to upgrade their knowledge.

In addition to the above problems, teachers cited other difficulties which hinder effective science teaching, such as:

- 1) Lack of funds makes it impossible to purchase text books and science apparatus. It's even

- more difficult to construct science rooms and storage facilities.
2. More than often, there is a group of pupils missing lessons while they participate in such co-curricular activities as games, music and drama festivals. This calls for the subject teacher to give extra time to these pupils.
  3. Thirty three percent (33%) of the teachers pointed out that science is not a favourite subject because it involves alot of work while teaching materials are not always available.

To minimise some of the difficulties, and therefore improve science teaching in Kenyan primary schools, teachers suggested the following ways:

1. Primary schools should be supplied with science kits as it used to happen in the 1960s. The science kit consisted of apparatus such as pulleys, measuring instruments and a few chemicals.
2. Text books and syllabi should be made available to schools and/or bookshops in time to avoid delays.

TABLE 5: ATTENDANCE OF INSERVICE

3. The system of subject specialization should be introduced in primary teacher colleges and primary schools. This will eliminate the problem of the primary teacher being "a jack of all trades and a master of none".

4. The role of the T.A.C. tutors should be made more effective, so that they can be able to advise teachers on new science developments better.

4.4 The rate at which science teachers are inserviced in order for them to be able to cope with the demands of a new curriculum

Inservicing of teachers is an important aspect of curriculum improvement. While it should be carried out regularly to all serving teachers, Table 5 illustrates the rate at which teachers who participated in this study have attended inservice courses.

indicated having attended an inservice

period between 1978 and 1986. All teachers

that the only source of information to

informed about science development

and the teachers' manuals. According

responses, the Teachers Advisory Sub-

TABLE 5: ATTENDANCE OF INSERVICE COURSES BY TEACHERS

Year Inservice Course was conducted	Number of teachers who indicated attendance	Nature of the course
1978	1	How to set good mock questions and prepare practical lessons.
1981	1	Improvement of science standards in national examinations Instilling awareness of soil conservation to the public through the pupils.
1986	1	How to promote science as a practical subject and help teachers organize science lessons.
Not Indicated	1	Improvement of science teaching.
Not Indicated	1	Improvisation of Agricultural apparatus.

Only five (5) out of twenty one (21) teachers indicated having attended an inservice course in the period between 1978 and 1986. All teachers indicated that the only source of information to keep themselves informed about science development is the text books and the teachers' manuals. According to the teachers' responses, the Teachers Advisory Sub-Centre at

Ndumberi offers no assistance. The Sub-Centre consists of a single room serving as the office for the T.A.C. tutor. It has no storage facilities or even the materials to store.

4.5 Opinion of teachers towards teacher training

1. Most of the science topics are  
courses and their teaching experiences.

2. Knowledge of science topics  
The data contained in this section is on science teachers' self confidence in terms of mastery of content and methodology, and whether they consider the teacher training course valuable to their teaching experiences. Table 6 contains details of the teacher responses to seven (7) statements.

3. Knowledge of science topics should be introduced in teacher training colleges.	21	74%
5. College curriculum is remotely related to realities in the classroom.	15	50%
6. Mastery of methodology is possible without a teacher training course.	5	16%
7. Mastery of content is possible without a teacher training course	16	52%

The following deductions can be made from the teachers responses to each of the statements:

- 1) Slightly over half, fifty seven per cent of the teachers felt that most

TABLE 6: FREQUENCY OF RESPONSES ON TEACHER TRAINING ASPECTS

Statement	Frequency and percentage of responses			
	Agree	%	Disagree	%
1. Most the science topics are difficult to teach.	12	57	9	43
2. Knowledge of science teaching gained in teacher training colleges is readily applicable in the classroom situation.	10	48	11	52
3. As a trained teacher, it is easy to handle science class lessons and related activities with self-confidence.	20	95	1	5
4. The idea of subject specialization should be introduced in teacher training colleges.	21	100	0	0
5. College curriculum is remotely related to realities in the classroom.	15	71	6	29
6. Mastery of methodology is possible without a teacher training course.	5	24	15	71
7. Mastery of content is possible without a teacher training course	16	76	4	19

The following deductions can be made about the teachers responses to each of the statements.

- 1) Slightly over half, fifty seven percent (57%) of the teachers felt that most of the science

topics are difficult to teach. This may have emanated from:

- a) Unfamiliar topics introduced in the syllabus;
- b) Scarcity of teaching materials and proper reference books,
- c) Low rate of inservice courses as pointed out earlier.

2. Forty eight percent (48%) of the respondents indicated that knowledge gained in colleges is readily applicable in classroom situation while 52% disagreed. This could be attributed to individual differences in teacher creativity, resourcefulness and ability to make use of the environment.

3. In spite of the above differences in opinion, almost all the teachers (95%) felt that self-confidence is gained in training courses regardless of other difficulties experienced in schools.

4. All the teachers (100%) are of the opinion that subject specialization should be introduced in schools and colleges. This would enable the teacher to learn fewer subjects in depth and possibly minimise the difficulties experienced when teaching those subjects.

5. Seventy one (71%) of the teachers felt that disparity exists between the primary teachers college curriculum and that offered for the school children.

6. To master methodology, teacher training course is necessary as felt by seventy one percent (71%) of the teachers. According to these teachers most of the text-books do not have details on how to teach and therefore, a training course becomes the only solution to this vital aspect of teaching. Recently, the Faculty of Education (Kenyatta University) is undertaking to produce books that meet this challenge.

7. Unlike methodology, content can be mastered without a training course, as indicated by seventy six percent (76%) of the teachers.

#### 4.6 Apparatus and materials for science teaching

An attempt was made to investigate how well schools were equipped and the extent to which teachers were able to improvise for science teaching. An inventory consisting of fifty (50) different types of apparatus and materials expected to be available in schools was used. A summary of the findings is contained in Table 7 below.

TABLE 7: APPARATUS AND MATERIALS AVAILABLE IN SCHOOLS

School	Number of items available out of 50	%	Number of items improvised out of 50.	%
Kasarani	25	50	9	18
Riara	28	56	15	30
Kangoya	6	12	5	18
Karunga	18	36	23	46
Kiu-River	18	36	15	30
Chief Wandie	15	30	6	12

To confirm the results above, the researcher requested teachers in two (2) of the schools to allow her to actually see the apparatus and materials present. Table 8 contains the details of materials indicated by the teacher as present or improvised, and that which was actually observed by the investigator in one of the schools.

TABLE 8: A COMPARISON OF APPARATUS AND MATERIALS INDICATED AS BEING AVAILABLE WITH WHAT WAS ACTUALLY SEEN IN ONE OF THE SCHOOLS

NB: This observation was made at Kasarani Primary School.

Name of apparatus or material	Teachers Responses		Researcher's Observation
	Available	Improvvised	
Animal cages		✓	Not observed
Torch	✓		Not observed
Torch batteries	✓		Not observed
Bulbs	✓		Not observed
Wires	✓		Observed
Wind Vane		✓	Not observed
Raingauge		✓	Not observed
Anenometer		✓	Not observed
Weighing balance		✓	Not observed
Pendulums		✓	Not observed
Hammer	✓		Observed
Pulleys,	✓		Observed
Razor Blades, Baloons	✓		Not observed
Candles	✓		Observed
Mirrors	✓		Observed
Hand lenses	-		Not observed
Fuel & Jiko	✓		Not observed
Tape, polythene bags	✓		Observed
Bottles	✓		Observed
Chemicals Acid Alkali		✓	Observed
1st Aid Kit	✓		Not observed
Jembe and Panga	✓		Observed

From the above Table 8, the discrepancy between teachers' responses and actual observations can be noticed. Too few teaching materials were observed compared to what the teacher had indicated as being available in the school. One of the teachers had mentioned that there was nothing to be seen because materials collected by pupils or improvised by the teacher were discarded after use. Such items were indicated as available when in fact they did not exist in the school, hence a possible explanation for the above discrepancy. Also, due to lack of specific storage facilities, materials were kept in different places including teachers' houses. It would be interesting to do a stock taking exercise for each school to ascertain the actual numbers of the science teaching apparatus and other materials that are actually available.

#### 4.7 Summary

The data presented and analysed in this chapter dealt with the following aspects of this study:

- a) The quality of teachers teaching science.
- b) Instructional methods commonly used by teachers.
- c) Problems related to science teaching.

- d) Teachers opinion towards training course and its relevance to classroom situation.
- e) The rate at which teachers are inserviced.
- f) Provision, storage and improvisation of science apparatus and materials.

All the teachers who participated in the programme, except one were trained teachers. The programme was run by four graduates. This academic background placed them at a better position to deal with the content. However, the report of the Upgrading Programme Committee of 1973 had the following to say about college academic background:

"...It is the constant comment of college tutors that student academic background on entry to college is weak in all subjects. This is borne out by student performance in the teachers' certificate examination and the examiners report for all subjects. This is particularly evident in the case of mathematics where, in spite of the new entry requirement, approximately fifty per cent (50%) of the students entered with a grade nine (9) in the subject..."

Although science is not singled out in the report, it is clear that high academic achievement is not required to teach primary school content, teachers

## CHAPTER 5

DISCUSSION, SUMMARY AND RECOMMENDATIONS5.0 Discussion

All the teachers who participated in this study except one were trained teachers, majority of whom are form four graduates. This academic attainment places them at a better position to deal with primary science content. However, the report of the Primary Teacher Upgrading Programme Committee of 1978 (Lijembe Report) had the following to say about college students' academic background:

"...It is the constant contention of college tutors that students academic background on entering college is weak in all subjects. This is borne out by students' performance in the teachers certificate examination and the chief examiners report for all subjects. This is particularly evident in the case of mathematics where in spite of the new entry requirement approximately fifty percent (50%) of the students enter colleges with a grade nine (9) in the subject..."<sup>1</sup>

Although science is not singled out in this observation and that high academic achievement is not necessary to teach primary school content, teachers who did not

themselves enjoy school science lessons may often have recollections of their own inadequacies in the subject and this may prevent them from developing science lessons successfully. It is therefore not surprising that all the teachers supported the idea of subject specialization.

Regarding the opinion of teachers towards the value and relevance of training courses offered in colleges, the majority of teachers consider these courses very useful especially in the area of teaching methodology and building self-confidence as teachers. It is therefore important for college curriculum to be geared towards this end by reducing the amount of academic content. As indicated by about half of the teachers, direct application of knowledge gained in colleges to classroom situation is not always possible. This could be attributed to the shortage of teaching materials in some schools. Also the teacher is expected to be highly creative and resourceful.

According to the results obtained in this study, schools are experiencing acute shortage of teaching apparatus and materials. Time is long gone when they

used to receive science kits. Now, the teacher is expected to solve this problem at the school level by improvising many instructional materials. Unfortunately, according to the findings, improvisation is largely neglected in schools. Apart from the materials teachers say they improvise and discard after use, there is very little to be seen in schools. Similar observations were made by Kyalo, F.K. (1984)<sup>2</sup> in a study carried out in Kitui District. Teachers regard improvisation as making science too involving while there are other subjects and duties to take care of. Infact one teacher pointed out the need to be assisted with ideas on how to improvise before being expected to do it successfully.

One thing the teacher should be aware of is that, a lot of material can be collected as he works through the course. These materials could be carefully stored to be used in succeeding years. Whenever possible, common everyday objects like containers which are familiar with the pupils should be collected so that any available money can be used for the purchase of pieces of apparatus for which there is no adequate substitutes such as hand lenses and thermometers. As mentioned earlier, teachers cited the problem of apparatus and materials as one of the factors that

influence their choice of teaching methods. Teachers resort to theoretical approaches contrary to the recommended practical approaches largely due to lack of adequate instructional resources. This practice beats the purpose of the science objective which emphasises acquisition of practical skills. Also, when a teacher lectures more often, the content is covered faster but of course less is achieved in terms of pupils understanding.

5.1 Another factor that may affect science teaching is the rate at which teachers are inserviced. In-servicing of teachers is an important aspect of curriculum development because teachers are made aware of the changes. But according to the results of this study it is not adequately done. None of the teachers have attended inservice courses regularly. The majority have never attended any course in their teaching career. One headmaster who has served for twenty five (25) years expressed the fears teachers develop when asked to teach a newly introduced curriculum. Such fears would be eradicated if teachers are properly inserviced. However, organising regular inservice courses would be an expensive exercise. To alleviate this problem of cost, and to decentralise National Organisation of Inservice Courses, Teachers

Advisory Centres were established in 1970s. These centres were charged with the responsibility of co-ordinating learning activities in schools through constant inservicing of teachers in areas such as production and use of teaching materials and also, to assist teachers in the adoption of new teaching approaches. According to the teachers responses in this study it is doubtful whether some T.A.C. tutors discharge these services effectively.

#### 5.1 Summary of the Findings

The following is a summary of the findings of the study:

1. Ninety five percent (95%) of the teachers teaching science were trained. Eighty one percent (81%) had a teaching experience ranging from five to twenty five (5-25) years.
2. The rate at which science teachers were inserviced in order for them to be able to cope with the demands of a new curriculum was rather low. Only five (5) out of twenty one (21) teachers indicated having attended an inservice course in the period between 1978 and 1986.

3. Services offered at the Teachers Advisory Centres (T.A.C.) were unpopular among teachers. None of the teachers indicated having received any assistance from the T.A.C. tutor at Ndumberi sub-centre.

4. From the results of this study, there is evidence that teachers face a range of difficulties. On the introduction of a new curriculum, teachers have to cope with late supplies of essential materials like syllabi and reference books. The majority of the teachers were not inserviced to familiarise themselves with new curricular developments. Within the school environment, schools are barely equipped for science teaching and teachers hardly improvise. The acute shortage of funds militate against purchase of apparatus and materials. This leaves the teacher almost empty handed to handle a practical oriented subject. Storage facilities are limited, making it difficult to store improvised materials.

5. Teachers' choice of instructional methods was greatly influenced by shortage of apparatus and materials. The majority of teachers indicated commonly using practical approaches, but a quick examination of the pupils note books and the scarcity

of materials could not support them. It is possible teachers often resorted to theoretical approaches.

6. Teachers valued highly the courses offered in teacher training colleges especially because they provided self-confidence and the methodology of teaching. However, teachers held different opinions regarding the application of knowledge gained vis-a-vis classroom situations. All teachers indicated preference for the idea of subject specialization.

very useful.

## 5.2 Recommendations from the Results of the study

From the results of the study, the following recommendations are presented:

Student teachers should be able to

1. Inservice courses should be conducted more frequently to keep teachers informed about educational developments. The courses should not only be frequent and regular but should reach a greater number of teachers.

## 5.3 Recommendations for Further Research

2. The role of T.A.Cs should be made more effective. The T.A.C. tutor should make the facilities and services available at the centre more popular

among teachers. Also, he/she should ensure that the purposes for which these centres were established are achieved.

3. To cope with the problem of lack of apparatus and materials, a source of funds should be identified. This will consequently lead to the solution of many other difficulties. The teacher should be encouraged and motivated to embark on improvisation and storage of materials. Storage facilities should be provided. A large cupboard kept specifically for science materials would be very useful.
4. As much as possible, college curricula should not be remote from the realities in the schools. Student teachers should be able to apply the knowledge gained at college to classroom situations. The idea of subject specialization which teachers prefer is something worthy considering for the future.

### 5.3 Recommendations for Further Research

1. Since this study was limited to a single educational zone within Kiambu District, similar research could be conducted on a wider scale.

2. This study, mainly dealt with factors affecting teaching of science; further research could be conducted to investigate factors that affect learning of science among pupils.

3. In this study, a questionnaire was used to collect data. More comprehensive data could be obtained if the results of the questionnaire are supplemented with interviews and observation of teachers in action (i.e. teaching).

3. Henry Ayot, Advisory Centres in Africa, Africa Project Case Study, University School of Education

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 B. K.J.S.E.  
 C. K.O.E./E.A.C.E./G.C.E.  
 D. K.A.C.E./B.A.A.C.E./H.S.C.  
 E. B.Ed./B.Sc.  
 F. Other specify \_\_\_\_\_

APPENDIX AQUESTIONNAIRE ON SCIENCE TEACHING (Q.S.T.)

This questionnaire is designed to obtain information about teaching and learning of science. The information which you will supply will be treated as confidential and will not be used in any way against you. Ideas from various teachers will be combined in such a way that your identity will not be revealed.

This questionnaire consist of 3 sections, A, B and C. For each section, instructions are given on how to respond.

SECTION I

Put a tick (✓) in the box corresponding to your answer.

Name of the school: \_\_\_\_\_

Teachers sex: Male ( ) Female ( )

Teachers age: \_\_\_\_\_

1. Are you a trained teacher? Yes ( ) No ( )

2. What is your highest educational qualification

A. C.P.E./K.P.E./K.A.P.E. ( )

B. K.J.S.E. ( )

C. K.C.E./E.A.C.E./G.C.E. ( )

D. K.A.C.E./E.A.A.C.E./H.S.C. ( )

E. B.Ed./B.Sc. ( )

F. Other specify \_\_\_\_\_

E. Outdoor activities and field trip

F. Other (specify) \_\_\_\_\_

3. What is your professional qualification?

A. Graduate ( )

B. S1 ( )

C. P1 ( )

D. P2 ( )

E. P3 ( )

F. P4 ( )

G. U.T. ( )

H. Other (specify) \_\_\_\_\_

4. For how long have you been a primary school teacher?

\_\_\_\_\_ years.

5. For how long have you taught science at upper primary level? \_\_\_\_\_ years.

6. What is your average teaching load?

\_\_\_\_\_ lessons/week.

7. Is science your favourite teaching subject? \_\_\_\_\_

8. What other two subjects do you prefer teaching

(i) \_\_\_\_\_ (ii) \_\_\_\_\_

9. Which 2 of the following methods do you commonly use to teach science?

A. Lecture ( ) B. Practicals ( )

C. Discussion ( ) D. Demonstration ( )

E. Outdoor activities and field trips ( )

F. Other (specify) \_\_\_\_\_

10. Which one of the above teaching methods do you least use in class? \_\_\_\_\_

11. Which 2 of the following factors greatly influence your choice of teaching method?

- A. Provision of required facilities, materials and text books ( )
- B. Class size ( )
- C. Teaching load ( )
- D. Emphasis on passing National examinations (K.C.P.E.) ( )
- E. Class discipline ( )
- F. Other (specify) \_\_\_\_\_

How do the factors you have identified above influence your teaching?

(i) \_\_\_\_\_

\_\_\_\_\_

(ii) \_\_\_\_\_

\_\_\_\_\_

12. In your own opinion, what two roles do you play as a teacher in a science class?

- A. A helper in the learning process ( )
- B. A source of knowledge for the pupils ( )
- C. A reference person for the pupils ( )
- D. An organizer of learning experiences ( )
- E. Other specify \_\_\_\_\_

13. Have you ever attended an inservice course to update your science knowledge?

Yes ( ) No ( )

If yes, when was the course/s and what was the aim of the course?

- (a) \_\_\_\_\_ (S.A.)  
 (b) Agree (A)  
 (c) Disagree (D)  
 (d) Strongly Disagree (S.D.)  
 (e) Not Applicable (N.A.)

Statements

14. Which of the following sources of information do you use to keep yourself informed about science development?

- A. Participating in science curriculum development projects ( )  
 B. Reading text books and manuals ( )  
 C. Reading science magazines ( )  
 D. Attending inservice courses ( )  
 E. From the Teachers Advisory Centres (T.A.C.) ( )  
 F. Other (specify) \_\_\_\_\_

Statements SECTION II

This section contains a number of statements relating to teacher training. Study each of the statements and indicate with a tick (✓) whether you:

- (a) Strongly Agree (S.A)
- (b) Agree (A)
- (c) Disagree (D)
- (d) Strongly Disagree (S.D) with the statement, or
- (e) Not Applicable (N.A)

Statements

	S.A	A	D	S.D	N/A
1. Most of the science topics are difficult to teach.					
2. Knowledge of science teaching gained in teacher training colleges is readily applicable in the classroom situation.					
3. As a trained teacher, it is easy to handle science lessons and related science activities with self-confidence.					
4. The idea of subject specialization should be introduced in the teacher training colleges.					
5. College curriculum is remotely related to the realities in the schools.					

<u>Statements</u>	S.A	A	D	S.D	N/A
6. Mastery of methodology is possible without a teacher training course					
7. Mastery of content is possible without a teacher training course.					

2. What kind of problems greatly affect science teaching in your school.

(a)

(b)

(c)

(d)

(e)

(f)

3. What kind of assistance do you get from Teachers Advisory Centres (TAC).

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## SECTION III

4. Suggest ways which you think would improve science teaching in Kenyan primary schools.

Give your responses in the spaces provided.

1. When a new curriculum is introduced, what kinds of problems do you encounter?

(a)

(b)

5. The following is a list of teaching materials expected to be available in your school. Indicate with a tick (✓) those which are available in your school.

(c)

(d)

2. What kind of problems greatly affect effective science teaching in your school.

(a)

(b)

(c)

(d)

(e)

(f)

3. What kind of assistance do you get from the Teachers Advisory Centres (TAC).

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4. Suggest ways which you think would improve science teaching in Kenyan primary schools.

5. The following is a list of teaching and learning materials expected to be available in primary schools. Indicate with a tick (✓) those that are available in your school, and if not, those that you have been able to improvise.

Material and Facilities	Available	Improvised
Animal cages		
Fish pond/Tank		
Torch		
Torch batteries		
Bulbs		
Wires		
Wind vane		
Rain gauge		
Anemometer		
Hygrometer		
Barometer		
Thermometer		
Weighing balance		

Materials and Facilities	Available	Improvised
Bicycle pump		
Pendulums		
Hammer		
Saws		
Chisels		
Pulleys		
Levers		
Scissors		
Razor blades		
Balloons		
Candles		
Mirrors		
Hand Lenses		
Insect Killing jars/tins		
Fuel/Charcoal/Paraffin/gas		
Jiko/Stove/ Bunsen burner		
Measuring tapes		
Polythene bags		
Bottles		
Metals		
Iron fillings		
Magnets		
Acids		

Material & Facilities	Available	Improvised
Alkali		
Funnels		
Pesticides		
Soil testing kit		
Disinfectants		
First Aid kit		
Cello-tape		
Rubber bands		
Glue		
Jembe		
Panga		
Manilla papers		
Felt pens		
Charts - reproduction		
- circulation		
- digestion		
- Others		
Locable storage cupboard		
Others (add to the list)		

APPENDIX BTIME SCHEDULE FOR THE STUDY

District Office  
P.O. Box  
KIambu  
7th  
DATES (1988)

- REL: ERU/107/Vol. VIII/197
1. Preparation of proposal 1st April - 28th May
  2. Pilot Testing 1st - 10th June
  3. Collecting Data 11th - 30th June
  4. Analysis of Data 1st - 14th July
  5. Writing up final project 15th July - 14th Aug.
  6. Presentation of Project to Supervisor 15th August

Mrs E.N. Kariuki who is a postgraduate student at Kenya  
conducted the study under the supervision of the District Education Officer  
and assistance.

*[Signature]*  
E.N. Kariuki  
DISTRICT EDUCATION OFFICER  
KIAMBU DISTRICT

cc  
Divisional Assistant Education Officer  
Kiambu Division

UNIVERSITY LIBRARY

APPENDIX C

MINISTRY OF EDUCATION

District Education Officer  
P.O. Box 9  
KIAMBU

REF: KBU/107/Vol. VIII/197

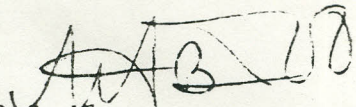
7th June 1988

The Headmaster of Primary Schools  
KIAMBAA DIVISION

RESEARCH ON SCIENCE TEACHING IN PRIMARY SCHOOLS IN

KIAMBAA DIVISION

Mrs E.M. Kariuki who is a postgraduate student at Kenyatta University is conducting the above research. Give her all the necessary information and assistance.

  
B.C. Mbugua  
DISTRICT EDUCATION OFFICER  
KIAMBU DISTRICT

CC  
Divisional Assistant Education Officer  
Kiambaa Division