

**IMPACT OF TEACHING METHODS ON STUDENTS PERFORMANCE IN  
BIOLOGY IN ARABIA SECONDARY SCHOOL, MANDERA EAST ZONE  
MANDERA DISTRICT, KENYA**

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## DECLARATION

I declare that this research work has never been submitted to any other university or any other learning institution for the award of any degree.

Signature .. Atto .....

Date .. 21/08/09 .....

## APPROVAL

This research report is submitted for extermination with my approval as a university supervisor.

Signature .....



Date .....

21.10.2023

## DEDICATION

I dedicate this work to my mum Saku Jillo and my dad Jillo Karayu.

## ACKNOWLEDMENT

My gratitude goes to my supervisor for the advice and guidance while I was writing this project and also for providing useful references in order to improve the quality of this project.

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## **CHAPTER ONE INTRODUCTION**

### **1.0 Overview**

In this introductory chapter of the study, the researcher gives the context and theoretical background of Biology learning difficulties. The researcher proceeded to give the statement of the problem, the objectives and the research questions that would guide the scope of the study. The researcher explained the limitations and delimitations that affect the progress of the study.

### **1.1 Background to the Study**

Considering the contributions of science, and technology to today's world, one would have expected mounting interest in these disciplines, but the reverse seems to be the case. Indeed, there is declining enrolment in science subjects among the youth, and poor performance in examinations, such as those taken in high school science courses (especially biology) by the brave few who enroll (Fieldman, 1999).

It is ironical that in our pro-science and technologically oriented world, the youth who would take charge of global affairs in the future - the running of industries and the means of production, research laboratories, space technology, and international politics - are shying away from the very subjects that should adequately prepare them for such roles.

Improvement of the quality of education in Kenya has been a key feature of reform proposals of the government. These educational reforms largely focus on basic education, which in Kenya covers both primary and secondary education. Attempts towards realizing these proposals have been made in many ways.

Free secondary education is now being offered to ensure every child has an equal opportunity to the secondary education. While the government is trying to ensure this, a lot of work is being done to improve the quality of the same education. Focus is on better student achievements in all the areas covered in the syllabus at all levels.

A lot of research has been done too to find out ways of producing better quality education for the Kenyan children. For instance a lot of research has been done in the area of Biology



because poor performance in the subject at the end of secondary school has been an age long problem.

Studies done show that there is constant poor performance in the subject and that gender differences, in favour of boys, is a major issue that influences the poor performance in biology (Eshiwani, 1985; Mondoh, 2006; Samumkut, 1999; Mwangi, 1996; Boit, 1986; Irumbi, 2005; Njuguna, 2002; Katiambo, 2004).

These studies will point out that the girls underachieve in Biology due to lack of self confidence and poor attitudes towards the subject. The gender differences in biology are found to be more persistent in upper classes than in lower classes and that the girls in single sex schools performed better than those in mixed schools

### **1.2 Statement of the Problem**

Biology teaching as a subject has drawn a lot of controversy on the appropriate methods to be applied for student's better understanding. Yet no clear method can be plainly pointed as the most appropriate since there is a decline in enrolment from the youth.

Hence the study investigated how the teaching methods affect a student's perception of Biology.

### **1.3 Purpose of the Study**

Investigate the impact of teaching methods on performance of biology by students

### **1.4 Objectives of the Study**

1. Investigate how teaching methods affect performance of students in biology.
2. Examine whether teachers are able to use better teaching methods for their students
3. To raise awareness of the importance of biology in the technological field

### **1.5 Research Questions**

1. How does teaching methods affect performance in biology?
2. How effective are teaching methods on student's perception of biology?

### 3. Whether biology is important in the technological field?

#### **1.6 Scope of the Study**

The study was carried out in Arabia secondary school, xxxx zone,yyyyy district

The research was carried out between February and April 2009. The study looked at the impact of teaching methods on effective performance of biology by students. The study was based on the teaching methods and its effects on performance of students.

#### **1.7 Significance of the Study**

The researcher was able to get first hand information on the effects of teaching methods on performance of biology by students. The schools in yyyyy district will benefit from the research as it will help them to evaluate the appropriate teaching methods to apply for better performance of students.

The research will be of great help to other students in the faculty of education and other researchers who might wish to enhance the same later.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Chapter overview**

This chapter will give reference to what other scholars have written about biology as a subject and the effective teaching methods used in class. The literature review in the study concerned the teaching methods and performance of students in biology. The literature review will help the researcher with data compilation, statistics analysis as well as in understanding the problem. The materials to be used in the review will include magazines and journals on teaching methods, newspapers articles and education related websites over the internet.

#### **2.1 The impacts of teaching methods on students performance in biology**

Education in Kenya consists of one to two years of pre-primary education (ages 4-6), eight years of primary education (ages 6-14), four years of secondary education (ages 14-19), and four years of university education leading to a bachelors degree. Two major examinations are set by the National Examinations Council; the Kenya Certificate of Primary Education (which takes place at the end of primary school), and the Kenya Certificate of Secondary Education (which takes place at the end of secondary school). Each exam determines whether or not students progress to the next level of education.

In Kenya the curriculum is controlled by the Kenyan Institute of Education, which draws its representation from a wide range of teachers and experts from universities. (MOE, 1976).Biology syllabus is very demanding on the majority of students, many of whom find certain topics extremely difficult to comprehend, hence servers to explain why its only offered to secondary school students.

In Kenya about 10% of the children like and are willing to study biology. The rest have to be persuaded or pushed to study biology (although it's an elective subject). They have a completely negative attitude towards the subject (especially the girls), and therefore, teaching biology in Kenya has been, and still is, an uphill task. (Eshiwani, 1983)

The main reason for these problems is that up to the late 1970s, nobody chose to go to the university to study education as a profession. The good biology students studied engineering, medicine, accounting, or any other course but teaching.

Many of those who failed to meet the minimum requirements for their preferred careers became teachers. Such biology teachers tended to scare the learners to cover up their lack of content knowledge and their inadequate preparation to teach the lessons.

Students seem to find the learning of biology difficult and painful. It took a very bright and brave student to accept the pain and learn biology. It was even worse for girls as they often could not withstand the fear.

The situation got even worse in the 1980s as those educated in this manner became the educators. In addition, many students came to school having heard horror stories about biology learning from their parents. These factors gave biology a monstrous face, and to date, we are still trying to change this image to one with a more friendly face.

In the early eighties the government restructured the biology syllabus, which previously had options to take care of varied potentials in biologists. Now there is a common syllabus for all (although reviews had been carried out in the past few years).

Allowing different options of biology units had a very negative effect on learners who ended up with the option considered to be for weak students, while encouraging arrogance in those who took the option for stronger students' i.e. Pure and practical options of biology. This arrogance developed at an early stage in life and unfortunately spilled over into the teaching of biology by those students who ended up being biology teachers. (Eshiwani, 1983)

The common syllabus used now is appropriately designed to take care of students with different potential. While there are many textbooks, they have the same basic content. The Kenyan Institute of Education approves books, and teachers have a vote in approval. These steps have helped to improve the image of the subject. Many people now appreciate the value of biology.

Also, since March of 2001, the Kenyan government has banned corporal punishment in schools. This should go a long way toward making biology acceptable and, therefore, easy to teach. The good news is that in the year 2000, only 12% failed biology at the KSCE (secondary) level. Four years ago the failure rate was 38%. This is a great improvement. (MOEST, 2002)

## **2.2 Teaching methods used by biology teachers**

Different strategies have been used across our countries to motivate students to learn biology. High stakes national examinations that have serious consequences for students are one means. Sometimes in the past, punishment has been used. Making biology interesting, meaningful, and useful to students is seen as a way to motivate their learning. (Akpan, 1986)

An individual's perceived ability to do well in a subject is one variable that has received Considerable attention in psychological literature considering American females. Within an African context, Lee and Lockheed (1990) conducted a study of 1,012 students enrolled in single-sex and mixed-sex secondary schools from ten Southern states in Nigeria. The authors found that perceived ability positively related to higher achievement in sciences and biology.

Similarly, in a study of secondary and college students selected from seven state secondary schools and one federal college in Nigeria, Aghenta (1989) found that "perceived difficulties of science occupations" was a significant factor in preventing girls from entering STM fields.

The attitude that one holds towards biology or science in particular appears to be a powerful predictor of achievement in the respective fields. A prior positive attitude towards STM (Aghenta 1989), the development of a positive attitude towards STM by a teacher (Mordi 1991), or a strong positive attitude toward science (Akpan 1986)

In her study of secondary students, Aghenta (1989) found that a poor attitude towards STM was a barrier to access of STM fields. Conversely, she found that a good or positive attitude was one of several factors that facilitated performance in STM

Eshiwani (1983) reported that girls in Kenya generally have negative attitudes towards biology and these attitudes tend to depress their achievement.

Generalizing from STM education to the broader context of women's education, a review of sector studies reveals a positive relationship between female education and several well-being indicators.

According to King, "All of the evidence from Third World countries shows a close link between women's education and social and economic development and between the size of the education gender gap and national development" (1990:6).

The links are already well-established between women's education and fertility, child health and survival (US-AID 1982; Bourque and Warren 1990; King 1990); formal labor force participation (OE & OWD 1990); income and wage employment (King 1990); and women's empowerment into the rights and responsibilities of citizenship (King 1990). Furthermore, the links for education in the STM fields are presumed to be particularly strong for women.

Girls who become interested in, persist in studying, and then work in STM fields, significantly improve their life chances (e.g., standards of income, health, fertility, and Productivity), as well as those of their family (e.g., through increased resources, and by being available as a role model for younger female kin).

Several African authors suggest that overall attitudes are partially responsible for girls' low or poor participation in biology and science in general. (Akinuli 1982; Onobowale 1982; Oyedonkun 1983; Aghenta 1989; Bajah and Bozimo 1989; Osibodu 1989). Yet, these authors fail to identify the specific attitudinal components presumed to have an inhibitory or enhancing effect on actual behavior.

Attitudes and their respective components deserve closer examination. This research, will attempt to critically examine specific components of attitudes towards biology and their relationship to achievement.

Previous research has found that students who perceive the utility of studying biology will tend to perform better in the subject (McLeod 1989). Conversely, students who fail to see the practical or future utility in studying biology tend to enroll less often in higher-level biology courses, perform less well in biology courses, or find biology less than interesting than other courses.

Stereotyping biology as a predominantly male domain is an important variable in Understanding the complexities of gender and biology achievement. In both Western and African samples, stereotyping biology may account for poor performance of girls (Fennema and Sherman 1977; Osibodu 1989).

Within the West African socio-cultural context, occupational decisions frequently separate along rigid stereotypical lines with specific jobs being perceived as more masculine or feminine.

These stereotypical attitudes likewise may affect students' perceptions of their ability to study certain subjects or pursue a certain career path.

Additionally, one might hypothesize that the longer girls stay in the educational pipeline, the more likely they are to challenge existing traditional ideas or beliefs based on the rigidity of gender. Likewise, the longer they stay in school, the more chances they have to be exposed to successful female role models in biology and other related subjects; these role models may positively affect the formation of students' attitudes.

An additional interpretation of this finding suggests that students with less stereotypic views of biology might possess a history of successes in biology that in turn influences their idea of appropriateness of the subject for them as a female.

It is possible that rural mothers perceive the value of education as higher than that of urban mothers, and thus, are more likely to encourage their daughters to achieve. The fact that

their daughters have persisted to the secondary level of formal schooling suggests that there is family support for their continued education.

Along this line of reasoning, one might expect that girls would be more likely to be withdrawn from school in the rural area due to conditions such as: the high demand for their labor contribution, early or forced marriage, lack of family financial resources to support further education, and distance between home and school. These conditions are believed to be more pronounced in the rural area in contrast to that of the urban area; thus, those who do remain in school might have been more strongly encouraged to do so.

Educators and parents alike need to become active change agents in fostering positive attitudes in young girls and women in order to enhance their interest and achievement in biology.

“Because teachers are important role models and career counselors of students, the participation of women in the teaching profession can be a critical factor in challenging existing stereotypes and in promoting and supporting the expanded aspirations of female students” (Adams and Kruppenbach 1986)..

The role of teachers cannot be overemphasized, particularly when “entry barriers against women serve as obstacles for education. Some of the barriers begin at the lower classes of secondary school level with teachers and textbooks projecting attitudes that discourage school attendance and performance of girls, or promoting stereotypes of girls not being as good as boys in technical subjects or biology” (King 1990).

The role that parents play should not be overlooked. Much of the socialization that shapes a child’s life comes from the family, especially from mothers.



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.0 Research Design**

The study used a descriptive research design. This enhanced the researcher to obtain a better understanding of the problem of biology as a subject. The method chosen allowed a collection of comprehensive intensive data and provided an in-depth study on why past initiatives had not produced the desired results.

#### **3.1 Population of Study**

The populations of study were the teachers and students in Arabia secondary school.

#### **3.2 Study Sample and Sampling Procedure**

With regard to the above the study employed stratified sampling,

Sampling was as follows: -

- Students – 30 of the sample suffice.
- Teachers- 10 teachers in the targeted sample size.

#### **3.3 Research instruments**

##### **➤ Questionnaire**

Primary data was collected by use of questionnaire and interviews, filled by relevant parties to obtain ideas on what constitutes teaching methodology. These were designed in both open and closed ended form. The method ensured high proportion of responses and higher returns rate.

#### **3.4 Research Procedure**

The researcher had an introductory letter from the university to present to the area authority to obtain permission for study. This gave the directive to the local administrators at grass root level for acceptance. On acceptance by the authorities the major task of collecting data began.

#### **3.5 Data Analysis and Interpretation**

The information to be collected was analyzed and edited to create consistency and completeness. After collecting the questionnaires they were edited for completeness and

consistency across the respondents and to locate omissions. Information to be obtained from the research study was presented and analyzed using bar charts, narratives, and statistical figures. That is:-

**Descriptive statistics:** This was used to measure central tendency, variability and relationship between variables. It included proportions, mean scores and percentage.

**Summary statistics:** This was used in the presentation of analysis. It included use of mean & percentages, summarized tabulations and frequency distribution.

## CHAPTER FOUR

### 4.0 DATA ANALYSIS AND PRESENTATION

#### 4.0 Introduction

In this chapter an attempt is made to interpret and explain the findings. Also key information enables to relate to the specific objectives and give a clear picture of the results.

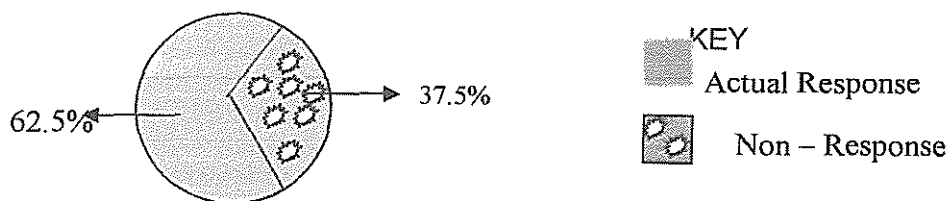
#### 4.1 Data analysis and processing

**Table 1 on response rate of the targeted sample**

Planned no. of response	40	100%
Actual response	25	62.5%
Non Response	15	37.5%

*Source; primary data (2009)*

$$\text{Response Rate} = \frac{\text{Actual response} \times 100}{\text{Planned No of response}}$$
$$25/40 \times 100 = 62.5 \%$$



#### Comment

The shortfall was due to some problems like unwillingness of some respondents to produce information regarded as confidential in floor of victimization another major problem was the displacement of people witnessed after the post-election violence in the country which made it difficult to get the required information from some of the respondents. However 62.5% is an adequate proportion of the sample size. A breakdown of the above is shown in the table below:-

**Table 2 on non-response**

Type of response	Planned Response	Actual Response	Non- Response
Teachers	10	7	3
Students	30	18	12
Total	40	25	15

Source: primary data (2009)

#### 4.2.1 Bio-data analysis for teachers

##### Age of respondents

According to study, 14% of the teachers who responded are below 30 years of age. This implies that they form the minority within the teaching staff. 43% of the respondents are between 31-35 years of age. 29% of the respondents are between 36-45 years. 14% also of the respondents are above 46 years. This shows that the respondents cut across all the age groups.

**Table 3 on distributions of staff by age**

Categories	Number	Percentage
Below 30 years	1	14%
Between 31-35 years	3	43%
Between 36-45 years	2	29%
Above 46 years	1	14%
Total	7	100%

Source: primary data (2009)

##### Distribution of staff by gender

Majority of respondents represented by males with 56% this shows more than half of the respondents are men while female respondents were 44%.

**Table 4 on distributions of staff by gender**

Category	Number	Percentage
Male	4	56%
Female	3	44%
Total	7	100

Source: primary data (2009)

### **Staff experience**

From the research findings we can establish that 14% of the teachers have been teachers for less than 2 years, 43% of the teachers have been in the profession for 3-5 years, and 29% have worked for 6-10 years. 14% have been in the profession for 11-15 years.

This shows that most of the teachers in school can boost the morale of the students in mathematics learning as they are young. Hence the information obtained was highly credible.

**Table 5 on length of staff experience**

Categories	Number	Percentage
0-2 years	1	14%
3-5 years	3	43%
6-10 years	2	29%
11-15 years	1	14%
Total	7	100%

Source: primary data (2009)

### **4.2.2 Bio-data analysis of students**

Out of the 30 target students, only 18 responded. The researcher deemed this as adequate and sufficient for the purpose of data analysis since it represented 80%.

### **Age of respondents**

According to study, 11% of the students who responded are below 15 years of age. 28 % of the respondents are between 15-16 years of age. 39% of the respondents are between 16-17 years. 22% also of the respondents are above 17 years. This shows that the age of the respondents is representative of all age groups at secondary school level.

**Table 7 on distributions of students by age**

Categories	Number	Percentage
Below 15 years	2	11%
Between 15-16 years	5	28%
Between 16-17 years	7	39%
Above 17 years	4	22%
Total	18	100%

Source: primary data (2009)

### **Gender**

Majority of respondents represented by female students with 56% this shows more than half of the respondents are girls while male students were 44%.

**Table 8 on distribution of respondents by gender**

Category	Number	Percentage
Female	10	56%
Male	8	44%
TOTAL	18	100%

Source: primary data (2009)

### **4.3.0 Teachers analysis**

#### **4.3.1 Response on how teaching methods affect performance in biology.**

Out of 7 respondents representing 60 percent said that teaching methods had impact on biology' performance. While, 40 percent said that performance was not affected by the teaching methods employed.

**Table9 on response to how teaching methods affect performance in mathematics**

RESPONSE	FREQUENCY	PERCENTAGE
Yes	4	57
No	3	43
Total	7	100

Source: primary data (2009)

#### **4.3.2 Responses on how effective are teaching methods on students' perception of biology.**

Majority of response represented by 86 percent indicated that effective teaching methodology will encourage students to perceive the subject positively. While 14 percent of the teachers sample size indicated that effective teaching methods will not affect students' perception towards biology.

**Table 10 on responses to whether effective teaching methods affect students' perception of biology.**

RESPONSE	FREQUENCY	PERCENTAGE
NO	6	86
YES	1	14
Total	7	100

Source: primary data (2009)

#### **4.3.3 Response on whether mathematics is important in the technological field**

Out of 7 in the sample target respondents, 71 percent said that biology is important for one to venture in the technological field while, 29 percent said it's not vital.

**Table 11 on responses to whether mathematics is important in the technological field.**

<b>S RESPONSE</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
Yes	5	71
No	2	29
Total	7	100

Source: primary data (2009)

#### **4.4.0 Students analysis**

##### **4.4.1 Response on whether teaching methods affect students' performance in biology**

Majority of response represented by 76 percent indicated that most students will perform well in the subject where the teaching methods are effective. While 24 percent indicated that they do not mind the teaching methodology employed.

**Table 12 on response to whether teaching methods affect students' performance in biology.**

<b>RESPONSE</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
NO	13	72
YES	5	28
Total	18	100

Source: primary data (2009)

##### **4.4.2 Responses on how effective are teaching methods on students' perception of biology.**

Out of the 18 respondents 67 percent said that effective teaching methods contributed to their perception towards the subject. Whiles 33 percent said that they were not concerned with the teaching methodology used at school.



**Table 13 on Responses to how effective are teaching methods on students' perception towards biology.**

RESPONSE	FREQUENCY	PERCENTAGE
Yes	12	67
No	6	33
Total	18	100

Source: primary data (2009)

#### **4.4.3 Response on whether biology is important in the technological field.**

Majority of response represented by 86 percent indicated that biology as a subject is important in the technological field. While 14 percent did not see it as vital in the technological field.

**Table 14 on response to whether teachers act as role models to students.**

RESPONSE	FREQUENCY	PERCENTAGE
NO	15	83
YES	3	17
Total	18	100

Source: primary data (2009)

## **CHAPTER FIVE**

### **DISCUSSION, CONCLUSION AND RECOMMENDATIONS**

#### **5.0. Chapter Overview**

The major purpose of the study was to investigate the impacts of teaching methods on students performance in biology in Kamanzi secondary school, Manyatta zone, Kangundo district District, Kenya.

This chapter focuses on the discussions of the findings, conclusions and recommendations. Finally the chapter ends with suggestions for further research.

#### **5.1 Discussions**

The first objective of the study was to investigate the impact of teaching methods on performance of biology. The study found out that teaching methods affected the performance of students. According to Mafabi (1995) teaching methods are an underlying factor in school curricula; they cannot be pursued without it. In the absence of teaching methods, there is anarchy, a situation which makes it impossible for schools goals to be achieved.

The second research objective was to determine Quality of teachers and academic performance. According to the study when teachers are well trained students are likely to perform well. The study revealed that teachers who are well paid perform better than

those who are underpaid. According to Craig et al (1998) that the quality of the teachers' performance determines the students' achievement. Factors such as the year of teacher training, the teachers verbal fluency, subject matter knowledge, having books and materials, knowing how to use them, teacher expectation of pupil performance, time spent on classroom preparation and frequent monitoring of student progress determine the quality of performance of a teacher.

Finally the study sought to determine the importance of biology in the technological field. According to the study the biology was not very much important in the technological field rather more important in medicine. Nsubuga (1977) holds the view that an important element of biology is that it is more important in the disease research and curing than in technology. He emphasizes that a good school should have adequate facilities which help with teachers and students to effectively teach and effectively learn in a convenient and comfortable environment.

## **5.2. Conclusions**

The main purpose of the study was to investigate factors affecting academic performance in biology of students in Kangundo District, Kenya

Teaching methods is one of the factors that lead to poor or better performance of students in biology.

For students to perform well in biology the teachers have to be of good quality. Therefore they are well versed with different teaching methods. Quality can be achieved by motivating teachers.

Facilities in a school are very important for students to perform well because it helps them understand what the teacher is teaching them.

### **5.3. Recommendations**

The government as a stakeholder in education should provide more funds to secondary schools to ensure they are able to include various teaching methods in their lessons.

Having identified the importance of teaching methods and the relationship played by them in ensuring students performance. The government should ensure that various teaching methods are more applicable to schools.

The government should also ensure that the teachers can pass biological concept to the students by ensuring that universities offer a curricula that takes into consideration the importance of teaching methods.

Teachers should be included in plans to improve on the academic performance of students because they contribute greatly to the achievement of a child.

### **5.4 Suggestions for further research**

Research should be done on teacher factors and academic performance of student's biology. Few studies have focused on it and yet it is very important.

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## APPENDIX I

### QUESTIONNAIRE

My name is Abdi Jillo Karayu, a student from Kampala international University Institute of Open and Distance Learning.

I am collecting data in relation to teaching methods on biology in Kenya, I request for your cooperation and I promise not to take much of your time. Please note that we do not mention people's names to ensure privacy and confidentiality.

### TICK WHERE APPROPRIATE

#### PART ONE; BIO-DATA FOR RESPONDENTS

##### A) SEX

☐

Male

☐

Female

##### B) AGE

Age bracket	Tick where appropriate
13-16 years	
18-25 years	
26-30 years	
31-35 years	
36-40 years	
41-45 years	
46 years and above	

##### C) Education level

Please indicate your educational level

Educational/professional level	Tick where appropriate
Secondary education	
Tertiary/college level	
University level	

## PART ONE; TEACHERS QUESTIONNAIRE

You are kindly requested to tick or fill as accurately and appropriately as possible.

The information will only be used for academic purposes and will be kept confidentially by the researcher. No name or any personal particulars are required.

I. What is your biology teaching experience?

1 year or less	
2 years	
3 years	
4 years or more	

2. How often do you assess your students?

Weekly	
Monthly	
After every topic	
Termly	

3. Do your students often come for your assistance?

1 Rarely	
2. always	
3.often	
4.not at all	

4. How would you rate the conditions of each of the following facilities in your school and/or in your class?

FACILITY	Not available	inadequate	Adequate	Under utilized	Available
Biological laboratories					
Biological supplementary books					
Teaching guides i.e. charts					
Classrooms					
Desks					



**PART TWO; STUDENTS QUESTIONNAIRE**

**TICK WHERE APPROPRIATE**

i) Is biology teaching interesting at your school?.....  
.....  
.....

ii) Do you believe that the mode of teaching biology affects students' performance at your school?  
.....  
.....  
.....

iii) How effective are teaching methods on students' perception toward biology?  
.....  
.....  
.....  
.....

vi) Is biology important in the technological field?  
.....  
.....  
.....

**THANKS**