

**Access and Utilisation of Instructional Materials in Teaching and Learning of
Biology in Secondary Schools: The Case of Dagoretti South Sub County,
Nairobi.**

By

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**A Research Project Submitted in Partial Fulfillment for the Award of Post
Graduate Diploma in Education to the School of continuing And Distance
Education University of Nairobi**

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DECLARATION

This project is my original work and has not been presented in any other university or institution for any award.

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

Signature.....

Date.....

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University of Nairobi.

DEDICATION

This project is dedicated to students, teachers, parents and all education stakeholders in Dagoretti South Sub-county. I also wish to dedicate it to my dear family, May God always sustain them.

AKNOWLEDGEMENT

I would wish to extend my appreciation to The University of Nairobi Department of Educational Studies for providing me with a chance to complete an empowering course.

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ABSTRACT

The goal of this study was to identify the level of access and utilization of instructional materials in teaching and learning of Biology in secondary schools. Instructional materials are items both print and non-print that are applied to empower students within formation. They may consist of items such as: schoolbooks, journals, newspapers, pictures, tapes etc. Instructional materials play a crucial part in the teaching and learning process to heighten the memory of learners. Oral instruction alone cannot lead to effective tutoring, the teacher require instructional materials for the process to be stimulating (Clark, 2009). This study is designed to gauge access and utilization of instructional resources in Biology. These findings will be used by various organisations, education specialists, teacher trainers, classroom teachers, school administrators and all stakeholders involved in policy formulation, development, and implementation. The researcher is optimistic that the research will inspire further investigation in the use instructional materials in education.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Education is a primary tool for promoting economic development as it aids people to use and cultivate their abilities (Adeyemi T.O. & Adu E.T, 2010). Outlook, expertise and knowledge that are important for effective living are acquired through education (Okeke, E.A. 2007). Secondary Education is a linkage between elementary education and the employment market and/or tertiary training and is an important in the training of human resource for advancement and provision of life opportunities (Onsomu, Muitaka, Ngwane & Kosimbei, 2006).

The government of Kenya has an obligation as a human right to provide quality education. (Kenya Education Act 2013). Kenya's greatest asset lies in its people, its potential lies in their creativity, work ethics, education and entrepreneurial skills among others according to Kenya vision 2030. "The Government intends to achieve Education for All (EFA) so as to give all citizens a chance to improve their livelihood" (MOEST, 2004).

Kenya 2030 vision intends to make the country a "Middle income state with high quality livelihood for its people". To spur development it targets to offer a globally viable education - (Kenya Vision 2030, 2007). The attainment of the Kenya's growth strategy is dependent on providing education and training to every citizen (MOEST, 2005). Vision 2030 further aims at creating a human resource force ready to meet the requirement of a fast industrializing country which can be achieved by development of high quality pool of technical, industrial skills which assist in developing entrepreneurial human resources (MOEST, 2004).

Science is the foundation on which present day technological breakthrough is hinged (Igwe, 2003). to cultivate scientifically knowledgeable students that are concerned with high competence for rational thoughts and actions is a key goal of science education. The goals of science education (Maduekwe, 2006) "consist of preparing learners to perceive and investigate their environment, elucidate natural-phenomena. Cultivate scientific attitudes like curiosity, critical reflection and objectivity, apply the skills and knowledge gained through science to solve

everyday problems in the environment, develop self-confidence and self-reliance through problem solving activities in science”.

Sciences in Kenya include Mathematics, Chemistry, Physics, and Biology. Secondary school students are examined in Biology in the Kenyan Certificate of Secondary Education, (KNEC, 2010) .It is a vital subject and a prerequisite for study of some science related careers like medicine, biotechnology, agriculture etc. In modern Kenya, more importance is placed on scientific and technological advancement hence learners are encouraged to study sciences. Biology permeates all arenas of man’s industry and plays a vital task in educational development. This is observed in all the technological advancement in the world today, which is because of scientific investigations.

A teacher passes on knowledge and skills to learners to prepare them to be leaders through motivational instruction (Tarum, 2009). They are professionals who are trained and given the obligation of effect knowledge-skills to learners (Soni, 2012), they do this with the utilisation of instructional materials.

These are materials used to pass across important details of a tutorial to learners to aid in comprehending and appreciation of objectives of the class session. The teacher exploits the resources when giving a lesson to make it comprehensible (Onyemezi, 1998).They can be two or three dimensional aids that assist learners from being lost in imagination and aid their comprehension (Abimbola & Udonsoro, 1997). Their significance is in transmission of information from teacher to learner, aiding the teacher in extending the learner’s possibility of comprehending, awakening learners’ curiosity and aiding to overcome physical confines during the demonstration of lessons. (Agbulu & Wever, 2011).

Instructional materials are indispensable tools needed for teaching and learning of lessons to advance teachers ‘effectiveness and develop learners’ performance. They make learning more interesting and allow the learners and teachers to participate keenly in class. They allow for attainment of skills, knowledge and advancement of self-confidence. (Ibeneme, 2000) explained instruction aids as resources utilized for demonstration in the classroom during lessons.

(Ikerionwu, 2000) viewed instructional materials as items that help a teacher present a session to the students in a logical way.

The study of science subjects in schools in Kenya faces the challenge of low enrollment of students and downward trend in performance of both teachers and the students. Several scholars have attributed this failure rate to non-utilization of appropriate and relevant instructional materials. Biology is a science course that deals with life and the environment and is also affected like all the science courses. (Olukoya, 2001) observed that tutors in secondary schools utilize teacher-centered method in tutoring science causing learning to be passive. Hence boredom, lack of comprehension and reduced attention. (Okon, 2008) stated that pupils of Biology see it as “dry” since teachers avoid instructional aids in their lessons.

This lapse has the tendency to continue to create gap; in classroom communication that will greatly affect the performance of both teachers and the students.

1.2 Statement of the problem

Instructional equipment utilization in Kenya, is inadequate (Muriithi, 2005). Teachers make requisitions to have different kinds of instructional materials and make attempts to utilize them but finally the classroom instructional learning has limited use of the materials. There is need to use instructional technology to promote learner-centered education by incorporating instructional aids in instruction (Muriithi, 2005).

Apart from acquiring new knowledge about a new material in teaching, this should be interlaced together with the curriculum, class organization, and prevailing Instructional knowledge. The teacher needs to know the “how” and “why” of meaningful ways to use the new material and or machine (Clark, 2009). Lack of knowledge and skills regarding either elements (nature and application) can significantly limit the impact that such powerful resources like animated instructional materials could have on students learning. Educational psychologists over the years have expressed the view that there is a connection between teachers’ beliefs to use of instructional technologies. Self-efficacy according to (Martins, 2005) is a major factor in

understanding the frequency and level of success with which teachers and students use instructional materials and technology.

1.3 Purpose of the study

The purpose of the study is to identify the level of access and utilization of instructional materials in teaching and learning of Biology in secondary schools in Dagoretti South sub-County.

1.4. Research objectives

- i) To determine the extent to which teachers of biology utilize instructional materials in teaching Biology in Secondary schools in Dagoretti South Sub County.
- ii) To establish the kinds of instructional materials available for the teaching of Biology in secondary schools.
- iii) To find out the teachers' level of competence in the use of instructional materials in teaching biology.
- iv) To find out the level of accessibility to instructional resources for teaching in secondary schools.

1.5 Research questions

In order to meet the objectives of this study the following questions will be used.

- i. To what extent do teachers of Biology use instructional materials in teaching Biology concepts in Secondary schools in Dagoretti South Sub-county?
- ii. What kinds of instructional materials are available for the teaching of Biology in Secondary schools?
- iii. To what extent are the teachers of Biology competent in utilizing instructional materials?
- iv. What is the level of accessibility of teachers to teaching and learning resources in Biology?

1.6 Significance of the study

This study is aimed at gauging access and utilization of instructional resources in teaching and learning of Biology and the results will be valuable to institutes, and all education stakeholders involved in policy formulation, development, and implementation. The results should also give a picture on what needs to be emphasized or improved in regards to instructional materials. It should inspire more research in the area of education involving instructional aids.

1.7 Limitations of the study

The study has some limitations.

- a. Challenges and limitations in accessing and utilization of instructional resources affect all subjects but the study is limited to only Biology.
- b. Teachers in Kenyan secondary schools have challenges in accessing and utilizing instructional resources in teaching and learning of Biology yet the study only focuses on secondary schools in Dagoretti South Sub County only.
- c. Insufficient time was also another limiting factor

1.8 Assumptions of the study

This study makes some assumptions:

- a. There is limited accessing of instructional resources in instruction of Biology.
- b. There is poor utilization of instructional resources in teaching and learning of Biology in secondary schools.
- c. The teachers questioned had been tutoring biology in the specific schools for some time
- d. The respondents were honest in answering all questions.

1.9 Definitions of key Terms

Instruction – Is the purposeful, orderly, controlled sequencing of experiences to reach specific educational goals.

Instructional resources- Materials used by teachers to facilitate teaching and learning

Accessibility- Availability of instructional resources in instruction of Biology

KCSE- Kenya Certificate of Secondary Education

Teaching- It is the facilitation of learning by exposing the learner to all skills and attitudes in life.

Pedagogy- Study of approaches to teaching.

Utilization - Act of putting into use

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section focused on approaches in accessing, extent teachers utilize, teachers' level of awareness and competence and Barriers to the use of instructional materials Theoretical frame work and conceptual frame work.

2.2 Concept of Instructional materials

Instructional resources can be explained as instructive tools intended ease learning.(Oladejo et al., 2011).Instructional tools can be locally-made can greatly impact a lesson when used prudently (Abdullahi,1982). They are items that aid teachers make a class vibrant. (Isola, 2010). Instructional tools are similarly defined as objects which offer audio-visual stimulus in class (Agina-obu, 2005).

Instructional tools bring about development in teaching and learning, allowing tutors and learners to interact in an environment managed for best aims. (Eniyewu, 2005). (Adewoyin, 1991) Asserts that imaginative usage of a range of instructional resources enhances the prospect of learners learning, recalling and executing the skills projected of them. Instructional resources likewise help tutor sex tend their sphere of understanding (Osalusi, 2003). Further they provide the teacher real experiences and a basis for thinking and understanding (Ismail, 2001).Further they scale confines of time, dimension and space as they assist learners comprehend concepts or items that maybe very small or gigantic, very slow or very fast (Adeniyi,1991).

Instructional resources include tools used in aiding learning to better results. It is the use of the chalkboard, diagrams, models, motion picture, and digital tools in the course of instruction (NERC, 2004). It cannot be not be presumed to be only utilization of technology but a methodical, cohesive organization to the answer to problems in education. To guarantee an effective instruction process, it's vital for tutors to be widely acquainted with instructional resources available. Modules of instructional tools handy to the class will differ depending on each ones role (Sulaimain, 2013). Examples of instructional materials Real objects and models

,books, images, chalkboard, motion picture, radio, CD, Television, internet, Globe, laboratories museums, digital technology etc.

2.2.1 Categorization of Instructional Materials

Instructional tools are Classified in to three main groups: visual (sight), audio (sound only) and audio-visual aids (combination of sound and vision) (Oodianwu and Azubike, 1994),

AUDIO: These include Radio, cassettes, cd gramophone etc. They support instruction through hearing.

VISUAL: consists of maps, samples, images, charts, etc. They support instruction through sight. Visually, students appreciate the significance of notions, ideas and details.

AUDIO-VISUAL: is a combination of audio and visual tools. Examples are TVs and video Sulaimain, 2013)

2.2.2 Selection of Instructional Materials

“Never settle on a media without first considering the lesson” (Smith & Ragan, 1999, p. 286).

Media selection is done after lesson analysis and concurrently with establishment of instructional plan. Study the needs of instructional status before deciding what medium or blend will fit the lesson. (Smith & Ragan, 1999, pp. 286-287)

Studies have revealed that no media enriches education better than other media irrespective of assignment, student personalities, course content, or situation (Clark & Salomon, 1986, p. 474).

Some media are appropriate for certain situations, others are proficient than others to capably providing situations that enable education for specific results and individual students.

2.2.2.1 Factors to consider when selecting instructional media

First is learning assignment and lesson settings that will ease learning. The traits of students are to be considered. Instructional settings that would impact on the suitability of the media are also taken into account.

Other factors include: The potential media characteristics (what they are capable of), accessibility-tools should be available, accessible to the tutor at required time.

Affordability- cost ought to be within limits of the school budget. (Smith & Ragan, 1999, p. 287)
Further the suitability-resources ought to be suitable for the students. They need to be age appropriate and also in aptitude and familiarity that is easy to control and operate. (Sulaimain, 2013)

2.3 Approaches in accessing and utilizing instructional materials in instruction of Biology

In Africa, the World Bank and African Development Bank that are loaning organizations in education are induced that endowment with instructional tools, particularly textbooks is the best cost effective method of growing education. The organizations are alarmed with shortage of classroom learning resources .According to (African Development Bank) "Supply of suitable instruction resources is insufficient in many areas of the continent. To some degree it is an issue of funding but also reaches past the issue of finances. Since there exist a critical need, for resources that are in harmony to needs of the continent a major ground for lending unlocks".

“Developing nations assign a small percent of school expenses to teaching materials. Developed nations allot 14 % of elementary school recurrent expenditures to teaching and learning materials and 86 % to salaries, 9% and 91% in Asia, 4 and 96% in Africa .A slight increase of funds could boost efficiency; 10% minimum of public recurrent expenditures should be dedicated to teaching material ” (Heyneman, Jamison,& Montenegro,1984).

Proof in studies from Southern, Central, Eastern Africa show that there is a scarcity of teaching materials in most schools due to financial inflexibility encountered in African nations. The shortage is not just about accessibility of finances. Many in the region do not have a national capability to develop of affordable instructional materials which would be tutorially rigorous. Absence of proficiency in designing, grounding and appraisal of teaching resources; low capability of teachers to utilize these materials; disconnect in distribution and production incapability. Are factors which cause ineffectiveness in Africa in production of instructional resources.

(Eshiwani, 1983) in "Crowded Classrooms in Kenya" explored the availability of instructional materials in classes and their use by the tutors. From the classrooms which were surveyed 96% were equipped with at least one chalkboard; 75% being for inscription with chalk. Astoundingly 45.8% and 37% of tutors had white and colored chalk respectively. 37% had boards for inscription with special markers. The chalkboard is the most utilized visual aid in tutoring in the classroom because teachers will use it more than five times a day. Hence teachers should be well trained on the use this visual aid.

After the chalkboard, exercise and textbooks are the other crucial instruction materials. In the research tutors had textbooks owned by the school for their teaching subjects. Very few teachers possessed personal copies of the textbooks. In preparation for lessons The teachers utilize the textbooks.

2.4 The extent teachers of biology use resources materials in teaching

African countries have recently started to take keen interest in progress of science and technology. They have come to the realization that unless science and technology education develops, Africa will never remain develop in terms of technology. Hence teaching and learning resources that touch science need proper consideration.

“Laboratories and science equipment are chief resources which have substantial impact in tutoring of science.” (Musoko, 1980).Musoko tried to establish the state of affairs of biology laboratories that are used in the role of teaching of biology and found them to be unacceptable condition. Laboratories in unassisted schools are few hence most offer Arts subjects majorly. Half of Government-funded schools have physics and chemistry laboratories sufficient to permit them to carry out practical work. In private schools 35% **have** a single laboratory for all sciences.

(Musoko 1980) observed that learners do not get enough practice with the apparatus because there is shortage of apparatus for experiments even though laboratories are equipped. Science laboratories equipment are expensive and many schools are unable to buy them. Hence individual practical work is difficult. Demonstration and teacher-focused

instruction is thus used instead with result being minimal involvement by learner's leading to bad grades in practical test papers.

2.5 Teachers' level of awareness and competence in the use of instructional materials.

Instructional resources vary in a class from chalk to electronic equipment. Instructional resources are seen from different perspectives by tutors, learners, guardians, and education administrators. (Psacharopolous, 1985) observed that it is not just the provision of teaching and learning resources that matter but also their proper and effective utilization. (Fuller, 1985) pointed out major areas where few researchers have ventured in relation to use of teaching and learning resources: The impact of teaching practice to teaching and learning resources. Utilization of teaching and learning resources in relative to class organization. And the associations of administration practices to use of teaching and learning resources.

2.6 Barriers to the usage of instructional resources in the learning process

Barriers to the use of instructional tools in instruction situations are varied and many. As clearly stated by (Ema, 2010) these barriers fall into two main categories, and they are: Extrinsic and Intrinsic barriers.

Extrinsic has to do with: Access, time, support services, resources and training.

Intrinsic has to do with: Attitudes, beliefs, practices and resistance. These concepts and practices impact is in one way or the other on the level and regularity of utilization of instructional resources in class. Insufficient level of understanding can lead to rejection and discontinuance of its use because of the stress, strain and frustration likely to be encountered. It is highly recommended that flyers or booklet serving as guides should accompany any instructional material to provide information dealing with the functioning principles underlying how the material works in the instructional process. Every technology or material used in class is subject to the teacher's control. The level of the teachers' creativity and performance skills will determine the level of success or failure of the activities. (Kwasu&Ema, 2015)

The type of material to be used should vary according to the grade level of the learners and the subject matter to be studied. In whatsoever form and level of usage the teacher must know "how" and "why" they should be used.

2.7 Theoretical frame work

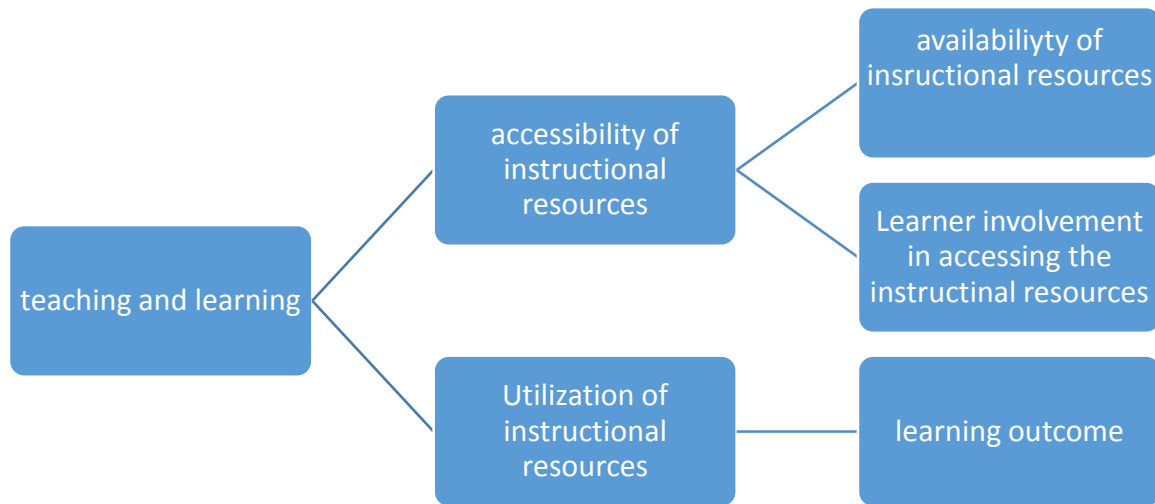
This research is supported by B.F Skinner's operant conditioning theory as a model of learning in influencing behavior. Operant conditioning according to Skinner is the active learning by direct participation of the student. The learner changes behavior due to the stimulus given. Behavior change is directly proportional to the incentive given. In a learning situation a student learns by experience and not mere reflexes. Learning during the operation involves responding to stimuli. Environmental conditioning is a significant element of operant conditioning. The teaching and learning instructional resources are stimuli that promote behavior change in students.

Response towards particular stimuli within a given environment is another feature of operant conditioning. A learner's good response to the content taught will depend on the instructional resources being utilized appropriately if present. Skinner explained that the response can be repeated to prove its reliability. When the instructional resources are constantly utilized the response will assist learner's mastery of content delivered. This repetition in Skinner's theory is reinforcement of the stimuli. This research sought to ascertain approaches used in access and use of instructional tools in study of Biology (Lefrancois, 1988).

2.8 Conceptual frame work

The researcher perceives effective teaching of Biology to be that which instructional resources are easily accessed and utilized. An effective learning process depends on accessibility and utilization of instructions resources. Accessibility of instructional resources is thus directly proportional to the utilization; however in schools the accessibility is normally inversely proportional to the utilization of the instructional resources. The chart below illustrates the researchers' view of instructional process in summary.

Figure 2.1: Conceptual Framework



CHAPTER THREE

RESEARCH DESIGN AND METHODS

3.1 Introduction

The chapter entails procedures that the researcher will utilize in the research. In the study the researcher endeavors to bring out desired results. The important areas will include research design, target population, the area of study, sampling procedures, data collection procedure and analysis.

3.2 Research Design

Most suitable design for this type of study is survey design. Orodho (2004) states that the design is the commonest for collection of information on respondents' opinions in education and social issues. Sproul (1995) applauds it for studies where outlook, thoughts, remarks and opinion is a under examination. It is appropriate in determining origins for current position under investigation. Bless and Higson (1995), Kombo and Tromp (2006) and Mugenda and Mugenda (1999) it wishes to portray of the state of affairs as is. "It can acquire information from a characteristic selection of the population from where the researcher presents the outcomes as being characteristic of the total" (Bell 1993).

3.3 The Locale of study

The researcher carried out the study in Kenya, Nairobi County, Dagoretti South Sub County. This sub county borders other sub counties like Dagoretti North Langata and Kibra sub counties. It also borders Kiambu County. Dagoretti south has 5 wards.

The best locale for investigation is one that is reachable to the researcher and one that allows instant rapport between the researcher and the informants (Singleton, 1993). Thus Dagoretti South was selected because of its convenience and the researcher acquaintance with the area that boosts administration of the research. Acquaintance with a region, confines of time and funds can determine a choice of location. (Gay, 1996)

3.4 Target population

Target population of the research is five secondary schools in Dagoretti-South Sub-County. Teachers and students shall be used as research population Form three students will be involved owing to lengthier contact with biology course. They can provide correct information in the since form fours will be getting ready for final examination. Principals will be interviewed to give recommendations of the learning process in relation to school aims. The responses from the respondents will be used to make inferences based on gathered data.

3.5 Sample and sampling procedure

Kombo & Tromp (2005) state that sampling is choosing a certain quantity of subjects among the targeted population with aim of representing that population. Simple random sampling will be used in this study.

The five schools from Dagoretti South Sub County were purposively sampled; Teachers and principals at the five schools were purposively sampled. The schools have been purposively sampled as since they are densely populated with students while the principals have also been purposively sampled since they do play major roles in facilitating the learning process. The information given by the sampled population was used to make deductions and approaches used in the access and deployment of instructional resources in Biology.

3.6 Research Instruments

Observations and questionnaires will be the approaches to data collection; comments will be made on physical amenities. Questionnaires will be made for the head teachers, class teachers and students.

3.6.1 Observation of the learning process

The researcher will observe directly as well as indirectly the learning process in the school. The researcher observed different ways of learning, and also instructional materials used in Biology. The observation of these aspects will be necessary to confirm and ascertain the data given from the interviews and questions as the two had to be congruent.

3.6.2 Questionnaire

The researcher will use a questionnaire as the primary source of data. The questionnaires will be closed ended for the teachers. The questionnaire will aim at identifying approaches used in accessing and utilizing instructional resources in teaching Biology. The closed ended questions will save on time.”Some of the advantages of the questionnaire are; low cost, freedom from the Interviewer’s bias as answers are in respondents own words and that it gives respondents sufficient time to give well thought answers”(Kothari ,2004).

Questionnaires shall be used as the students will be free to give their opinions without acknowledging their names for the purpose of deductions.

3.7 Validity of research instruments

“Validity is a degree to which results obtained from the analysis of the data actually represent the phenomenon under study” (Mugenda & Mugenda 2003).The researcher shall seek aid of research specialists, experienced graduates, and lecturers to better content validity of instruments.

3.8 Reliability of research instrument

Kombo & Tromp, (2006) reliability is consistency of scores attained, their consistency between one instrument administration and another. Orodho (2008) emphasises on the use of test-retest strategy. “If reliable it will yield the expected outcomes after use for more than once to collect samples from two samples randomly drawn from the same population. The researcher will use test-retest reliability on the total number of students tested” .To improve on reliability the researcher will follow these steps: Getting approval from sampled school to carry out the study, organizing for a pre-test study in Dagoretti south Sub County Secondary schools, presentation of the instruments in person and assuring respondents of the confidentiality of the data given.

3.9 Data collection procedure

First, a letter of introduction and permission to conduct a research shall be obtained from the University of Nairobi.Then the researcher will visit the sampled schools for introduction to the principals to get approval to conduct research at their institutions. Questionnaires will be provided to the students and teachers as the researcher waits and collects on completion.

3.10 Ethical Issues

The respondents will be assured that information accessed in the course of this study would be protected from unauthorized persons and that information obtained would be used for academic purposes only.

3.11 Data analysis

In the study, the data analysis shall encompass organizing collected data, categorizing, finding explanations of the data and then writing a report.

After data collection the researcher will recheck the data for comprehensiveness of the questionnaires then compile the data. The quantitative and qualitative data will be organised conferring to specific research questions. Quantitative data will be tabulated and analyzed using simple frequencies, percentages and means. The findings will be used to make recommendations on approaches in accessing and utilization instructional resources in Biology.

CHAPTER FOUR

DATA COLLECTION, ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter entails collection of data and analysis. Findings from the data gathered are discussed so as to give recommendations in the next chapter. The researcher endeavored to identify kind of instructional resources used in instruction of biology and their level of utilization by teachers of Biology. The level of teachers' competence in utilization of various instructional materials was identified and analyzed.

4.1 Questionnaire return rate

Table 4.1: Completion rate of questionnaire

Respondents	Expected responses	Actual responses	%
Head teachers	5	5	100.0
Class teachers	8	8	100.0
Students	100	100	100.0
Total	113	113	100.0

From table 4.1 there was a 100% return rate. "The higher the response rate, the more likely the results are representative of the population provided the sampling is appropriate," (Mulusa, 1988).

4.2 Background characteristics of the schools

4.2.1 School category

Respondents were drawn from three different school categories: Boys' only, girls' only and mixed schools. The findings are represented on Table 4.2.

Table 4.2: School category

Category of School	Frequency	%
Boys only	23	20.35
Girls only	23	20.35
Mixed	67	59.30
Total	113	100

Table 4.2 provides information on sampled students' distribution based on school category. Of the total sampled respondents, 23 (20.35%) were drawn from boys' only which included Lenana high, 23 (20.35%) from girls' that is Nembu girls only and 67 (59.3%) from mixed schools category that is Ruthimitu and Dagoreti mixed.

4.2.2 Principals and teachers' academic credentials

Table 4.3: Principals and teachers' academic credentials

Qualification	Head teachers		Teachers	
	F	Percent	F	Percent
PhD.	-	00	-	00
Masters	3	60	2	25
Bachelors	2	40	4	50
Diploma	-	00	2	25
Total	5	100	8	100

Table 4.3 indicates majority of head teachers, 3(60%), have a degree. Most teachers, 4(50%), had a bachelor of education. Both groups are qualified for their job

4.2.3 Gender of students

Table 4.3.1.Gives a summary of information on gender distribution of the respondents.

Table 4.4: Gender distribution

Type of school	Boys		Girls		Total	
	Frequency	%	Frequency	%	Frequency	%
Boys Only	20	20 00	00	00	20	20
Girls Only	00	00	20	20	20	20
Mixed	26	26 34	34	34	60	60
Total	46	46 54	54	54	100	100

From Table 4.4 results from data analysis shows that the respondents comprised 46% boys and 54% girls.

4.2.4 Students' length of time at the school

Students specified their length of time at the school.

Table 4.5: Students' time at the school

Duration in years	Frequency	Percent
1year	00	00
2 years	4	04
3years	94	94
3+years	2	02

Most students 94 (94%) had been in the school for 3 years.

4.2.5 Teachers' experience

Teachers specified their experience. Results are presented in figure 4.1

Figure 4.1: Teachers' length of service

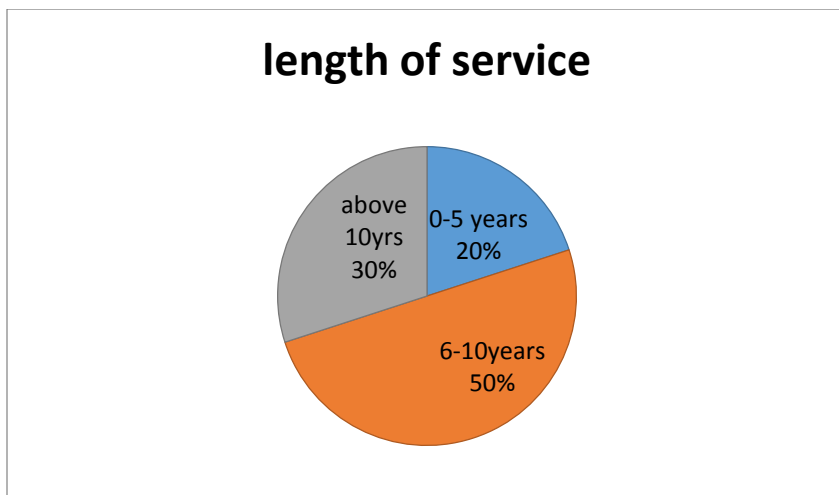


Figure 4.1 shows most teachers 50% had an experience of 6-10 years, 20% had 0-5 years of experience. Hence teachers had sufficient capability to teach efficiently

4.3 Availability of teaching and learning materials

The respondents (head teachers and teachers) answered statements that wanted to establish availability of teaching and learning materials.

Table 4.6: Principals responses on teaching and learning material availability

		5	4	3	2	1
Physical facilities						
1	There are sufficient desks and chairs in class	-	2	1	1	1
2	Assets in library are sufficient compared to population of learners.	-	1	2	1	1
3	Equipment in biology laboratory is sufficient for learners population	-	1	1	2	1
Teaching and learning materials						
4	Textbook/student ratio is good	1	1	2	1	-
5	there are sufficient biology reference books	-	2	1	1	1
6	biology teachers guide sufficient	-	2	2	1	-
7	Materials such as charts pictorials, chalk board cloths, chalk, diagrams, are adequate	-	2	2	1	-
8	computers and internet are commonly utilized in learning	-	1	1	2	1

The findings in Table 4.6 indicate that 40% of head teachers were neutral while 40% agreed on sufficiency of teachers' guides indicating number of teachers' guides were fairly sufficient. Most schools had not taken up the use of ICT in teaching and learning as 40% disagreed while 20% strongly disagreed that computer use is common in teaching. This was probably due to high cost of implementing computer related instruction in schools

4.4 Teachers' responses on availability of teaching and learning resources

Table 4.7: Physical facilities

	5	4	3	2	1			
1 There are sufficient desks and chairs in class	1(12.5%)	2(25)	3(37.5%)	1(12.5%)	1(12.5%)			
2 Assets in library are sufficient compared to population of learners.	-	3(37.5%)	2(25%)	3(37.5%)	-			
3 The capacity of laboratory is sufficient compared to school population	1(12.5%)	1(12.5%)	3(37.5)	2(25)	1(12.5%)			
4 Equipment in biology laboratory is sufficient for learners population	-	1(12.5)	3(37.5%)	3(37.5%)	1(12.5%)			
Teaching and learning materials								
5 Number of Textbooks in the school is sufficient				1	2	3	2	-
6 there are sufficient biology reference books				1	3	2	1	1
7 biology teachers guide are sufficient				1	4	2	1	-
8 Materials such as charts pictorials, chalk board cloths, chalk, diagrams, are adequate				3	2	2	1	-
9 Use of computers in teaching and learning is common				-	2	2	3	1

The findings in Table 4.7 show that majority 37.5% of teachers are neutral concerning the quantity of desks and chairs. This also applies to capacity and equipment in the laboratory.37.5% and 25% of teachers strongly agreed and agreed respectively that manilas dusters chalk and charts were adequate.

Table 4.8: Students' responses on availability of teaching and learning resources

Facility	Condition and equipping			Size			Average	Inadequate (small)3
	present	absent	1Good	2Fair	3Poor	1Adequate (big)		
Library	80	20	11	48	21	21	33	26
Laboratories	80	20	10	42	28	15	33	32
Classrooms	100	00	15	50	15	20	51	29

4.5 Resource Utilization Extent**Tables 4.9: Resource Utilization Extent****(5-Always 4 – Often 3-Occasionally 2-Rarely 1-Never)**

		5	4	3	2	1
		A	Of	Oc	R	N
		%	%	%	%	%
1	I utilize laboratory specimen in instruction	-	25	62.5	12.5	-
2	I make use of laboratory equipment in teaching	-	75	25	-	-
3	I utilize amenities in the library in instruction	-	25	37.5	37.5	-
4	I make use of video, film media in teaching	-	-	25	37.5	37.5
5	I use biology reference books in teaching	-	25	75	-	-
6	I use biology teachers guide in teaching	-	25	50	25	-
7	I utilize text books in the teaching of biology	25	75	-	-	-
8	I utilize models in teaching	-	-	25	62.5	12.5
9	I make use of ICT in teaching	-	-	25	37.5	37.5
10	I utilize charts in teaching	-	37.5	62.5	12.5	-
11	I make use of real objects in teaching	-	-	62.5	37.5	-
12	I utilize field excursions/trips in instruction	-	12.5	50	37.5	-
13	I make use of audio media(tape, discs,) in the teaching	-	-	12.5	37.5	50

Table 4.9 indicated that most teacher respondents occasionally use laboratory specimen in teaching at 62.5 % while 75% indicated that they use laboratory equipment in teaching.75% of the teachers use textbooks often, while the rest 25% always use textbooks. Only 25% of teachers’ opted to using ICT occasionally while the rest rarely or never used ICT in teaching at 37.5% and 37.5% respectively.

Table 4.10: Teachers level of competence in use of teaching and learning resources

		V high %	High %	Average %	Low %	V low %
1	capable of utilizing laboratory equipment for teaching	75	25	0	0	0
2	capacity to use ICT for teaching	12.5	12.5	50	25	0
3	capacity to utilize video and film media for teaching		25	50	25	0
4	ability to use teachers guides and reference books in teaching	87.5	12.5	0	0	0
5	proficiency in use of models in teaching	0	25	62.5	12.5	0
6	ability to utilize real objects in teaching	87.5	12.5	0	0	0
7	Capability to integrate field trips in teaching and learning	12.5	62.5	12.5	0	0
8	Capability to use audio media as a teaching aid	12.5	62.5	12.5	0	0
Average competence		35.5%	29.7%	26.8%	7.8%	0%

Teachers indicated have very high capability in utilizing laboratory equipment for teaching at 75%.Majority 87.5 % also reported to having very high competence utilizing real objects in teaching.50% of respondent indicated they have average capability to use ICT for teaching.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The summary of the whole study will be presented in this section and recommendations derived from the findings and also further suggestions for investigation or study.

5.1 Research problem summary and procedure

The study problem of this work was that; most teachers in secondary schools in Kenya find it difficult in accessing and utilizing of teaching materials when teaching biology which can in turn affects students' performance in this subject.

The researcher first developed the instruments to be used to collect the information, the reliability of the instruments such as observation guide; questionnaire and interview were ascertained through a pilot study of the problem in Dagoreti South sub-county in Nairobi County. Only teachers especially who teach Biology in both pretest district schools and sub county schools were interviewed about level of accessibility of instructional materials for teaching biology.

The schools Lenana high, Nembu girls, Ruthimitu, Elyon and Dagoreti mixed from Dagoretti South Sub County were purposively sampled; from each school tutors and the principals of the five schools were purposively sampled. The information given by the sampled population was used to make deductions and approaches used in the access and utilization of instructional resources in the teaching and learning of Biology.

5.2 Summary on Kinds of instructional materials used to teach biology.

There are a number of materials available for teaching biology in secondary schools which include Biology textbooks; biology charts laboratory facilities as well as ICT animations and use of power point. The commonly used resources in secondary schools are textbooks.

5.3 Summary on Level of accessibility of instructional resources in teaching of biology

Some schools can access to these teaching materials adequately but in most schools accessibility is below average. Most schools lack adequate teaching materials as a result of high enrollment. Opinions of most of those interviewed were; schools are not well equipped with a variety of teaching resources especially in science subjects.

5.4 Summary on Teachers level of competence in using instructional materials in teaching biology

Most teachers of Biology are adequately trained and equipped with skills and knowledge on using instructional materials when teaching. Only a few need more training especially on how to integrate the use of ICT when teaching.

5.5 Summary on. Impact of access to instructional materials in teaching biology on learners' performance

When all instructional materials required in Biology are put in place and fully utilized in schools, learner's performance will improve as many are motivated in different ways. The materials provide scientific skills and a big picture to the minds of the learners hence ability to recall.

5.6 Conclusion

There are a number of instructional materials which need to be utilized when teaching biology to enhance learners' performance. They include biology text books. Biology charts, Laboratory facilities. Biology specimens, ICT animations and use of power point. Teachers and learners need accesses to these materials to make learning process more practical. Most secondary schools only have access to textbooks which are frequently used in the learning process as other resources such as ICT and power point are still inadequate.

5.7 Recommendations

This study recommends the following;

- i) There is need for Government through the Ministry of education to equip schools with adequate instructional materials to enhance performance.
- ii) Schools through administrations need to train teachers on how to improve and be innovative in using some of the available materials when teaching.
- iii) Schools need to construct and equip laboratories to enhance practical lessons for science skills.

5.8 Suggestions for further studies

More studies can be done to establish the link of accessibility of instructional materials and learners results in science subjects

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APPENDICES

Appendix I: Letter of introduction to respondents

Kamau S. Njuguna,
University of Nairobi,
P.O. Box 30197,
NAIROBI.

Dear Respondents,

RE: RESEARCH PROJECT FOR A POSTGRADUATE DIPLOMA PROGRAMME

As a postgraduate learner I am undertaking a Post Graduate Diploma in Education at the University of Nairobi. I am doing a research for my project, a prerequisite for qualification. This questionnaire is intended for collecting information on **access and utilisation of instructional materials in teaching and learning of biology in secondary schools in Dagoretti south sub county.**

I have chosen your institution to be in research sample. Kindly provide information to all questionnaire items.

Information provided here will remain private. No names should be written on the form.

Thank you

Yours Sincerely,

Kamau Samuel Njuguna
L40/78764/2015

Appendix II: Principals' Questionnaire

Information provided here will remain private.No names should be written on the form.

Guidelines

Tick correctly in brackets () agreeing closest to your answer

Section A: Background information

1. Specify your sex Male () Female ()

2. How many years have you been principal at the school?

Under 1 year ()

1-5 years ()

5-10 years ()

Over 10 ()

3 .indicate academic Level?

PHD [)

Masters [)

Degree [)

Diploma [)

Other (indicate).....

4. Indicate the number of streams in your school

1 [)

2 [)

3 [)

above 3 [)

Section B: ResourcesAvailability

Tick correctly in brackets () agreeing closest to your answer

5- Strongly Approve 4- Approve 3-Neutral 2-Disapprove 1-Strongly Disapprove

	Physical facilities	5	4	3	2	1
1	There are sufficient desks and chairs in class					
2	Assets in library are sufficient compared to population of learners.					
3	The capacity of laboratory is sufficient compared to school population					
4	supply of power is dependable					
5	water supply is dependable					
	Teaching and learning materials					
6	student / Textbookratio is good					
7	there are sufficient biology reference books					
8	biology teachers guide are sufficient					
9	Materials such as chartspictorials, chalkboardcloths, chalk, diagrams, are sufficient					
10	computers are commonly used teaching and learning					

Thank you for your cooperation

Appendix III: Teacher's Questionnaire

Information provided here will remain private.No names should be written on the form.

Guidelines

Tick correctly in brackets () agreeing closest to your answer

SECTION A: Background Information, Teacher's Qualifications

1. What is your highest academic qualification?

PHD ()

Masters ()

Degree ()

Diploma ()

Others (indicate).....

2. Indicate your experience as a teacher

0 – 5 years ()

6 – 10 years ()

Over 10years ()

SECTION B: Availability of Resources

Tick correctly in brackets () agreeing closest to your answer

5-Strongly Approve 4-Approve 3-Neutral 2-Disapprove 1-Strongly Disapprove

School amenities

		5	4	3	2	1
1	There are sufficient desks and chairs in class					
2	Assets in library are sufficient compared to population of learners.					
3	The capacity of laboratory is sufficient compared to school population					
4	Equipment in biology laboratory is sufficient for learners population					

Instruction materials

5	there are sufficient biology reference books					
6	biology teachers guide sufficient					
7	Materials such as chartspictorials, chalkboardcloths, chalk, diagrams, are adequate					
8	Utilization of real objects and models is regular					
9	Use of chalkboard in the school is frequent					
10	Use of audio media(tape, discs,) in the school are frequent					
11	Use of video ,film media(tape, discs,) in the school are frequent					
12	Students have adequate number of exercise books					
13	Use of printed visuals(charts ,photos, pictures) is regular					
14	computers and internet are commonly utilized in learning					

Level of utilization of resources

(5 Strongly Approve 4 Approve 3 Neutral 2 Disapprove 1 Strongly Disapprove)

		5	4	3	2	1
1	I utilize amenities in laboratory for instruction					
2	I utilize services in library for tutoring					
3	I utilizevideo, film media in tutoring					
4	I utilize biology reference books in teaching					
5	I utilizebiology teachers guide in teaching					
6	I utilizetext books in tutoring of subjects					
7	I utilizemodels in tutoring					
8	I utilize internet in instruction					
9	I utilize charts in tutoring					
10	I utilize real objects in tutoring					
11	I utilize field trips in tutoring					
12	I utilize audio media(tape, discs,) in the teaching					

Teachers level of competence in use of teaching and learning resources

		V high	High	Average	Low	V low
1	capable of utilising laboratory equipment for teaching					
2	capacity to use ICT for teaching					
3	capacity to utilise video and film media for teaching					
4	ability to use teachers guides and reference books in teaching					
5	proficiency in use of models in teaching					
6	ability to utilise real objects in teaching					
7	Capability to intergrate field trips in teaching and learning					
8	Capabilityto use audio media as a teaching aid					

Thank you for your cooperation

Appendix IV: Learners questionnaire

Information provided here will remain private.No names should be written on the form.

Guidelines

Tickcorrectly in brackets (□)agreeing closest to your answer

SECTION A:

Background Information:

1. Specify your sex Male () Female ()

2. Did you start form one at current school?

Yes ()

No ()

3Indicate number of years you spent in this school?

1[] 2[] 3[] more than 3[]

4. a) at school do you posses enough textbooks in biology?

Yes ()

No []

b)atschool do you posses enoughpersonal biology textbooks?

Yes ()

No []

Accessibility of amenities

Indicate the occurrence, form and dimension of these amenities

			Condition			Size		
Facility	presen t	absen t	Goo d 1	Fai r 2	Poo r 3	Adequate(bi g) 1	Averag e 2	Inadequate(small)3
Library								
Laboratorie s								
Classrooms								

Extent of Resource Utilization

		5	4	3	2	1
1	My teacher uses amenities in the laboratory for tutoring					
2	I utilize services in the library for learning					
3	We make use of video, film media in learning in the biology classroom					
4	I use biology reference books in learning					
5	I utilize text books for learning					
6	We utilize models for classroom learning					
7	We utilize ICT for biology class					
8	We utilize charts for learning biology					
9	We make use of real objects in biology class					
10	We make use of field excursions/trips in learning biology					
11	We make use of audio media(tape, discs,) in the learning biology in class					

Thank you for your cooperation