

IMPACT OF AVAILABILITY OF TEACHING AND LEARNING RESOURCES  
ON STUDENTS' PERFORMANCE IN KCSE PHYSICS IN PUBLIC  
SECONDARY SCHOOLS IN NDHIWA SUB-COUNTY, HOMABAY COUNTY,  
KENYA

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## DECLARATION

I declare that this research project is my own work to the best of my knowledge and hasn't been presented for award of a Postgraduate Diploma in Education in any University.

Signature:



Date:

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The research project report has been submitted for examination with my approval as University Supervisor.

Signature



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## **DEDICATION**

This study report is dedicated to a friend of mine, Brian Musa and my aunt Alice Achieng' for supporting me in my studies. I'm also very grateful to my research project supervisor, Dr. Joyce Otieno for guiding me in the whole research project.

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## ABSTRACT

Education being a basic human right as well as a core production input in the economic development of any nation, it is a very important aspect of social-economic life that should be studied in depth. It therefore gives the explanation as to why nations globally plan and allocate financial resources in their respective budgets every fiscal year to meet programmes' costs in education. However, there arises a concern when it comes to education quality being offered and the students' performance in KCSE Physics. The reason for conducting this study was to find out the impact of TLR on students' performance in KCSE Physics in Ndhiwa subcounty public schools (secondary) in Homabay county, Kenya. This research formulated six objectives to guide this study:

- a) To find out the existence of library and adequacy of physics textbooks.
- b) To determine the degree of utilization of Physics resources and its influence on the performance of students in KCSE Physics in public secondary schools in Ndhiwa subcounty.
- c) To establish the presence of a science laboratory and adequacy of physics apparatus.
- d) To find out how often the students conduct Physics practical under the watch of the teacher or laboratory technician.
- e) To find out how often the students visit library to borrow Physics books for individual studies.
- f) To find out which kinds of physics textbooks from different publishers or authors students prefer most.

The research study employed a type of research design (Descriptive Study Design). The data was gathered by using three giving out three categories of questionnaires for students, teachers of physics and principals. The targeted population comprised each and every public secondary school in Ndhiwa subcounty. Sample consisted of nine principals, eighteen physics teachers and ninety 2020 KCSE physics candidates. Data collected was analysed using Statistical Packages for Social Sciences (SPSS). The following methods of data presentation were used to present the analysed data; tables, bar graphs, percentages, means was then presented by use of tables, means, percentages, pie charts and bar graphs. This research also revealed that there were textbooks, chalk, erasers and charts with exception of inadequate human resource and physical facilities.

This led to overstretched resources with increased enrolment due to Government of Kenya's a hundred percent transition policy from primary school to secondary school, thus, leading to compromised education quality due to pressure on scarce educational resources. The Kenyan government, education stakeholders, surrounding communities and development partners should pool funds to provide sufficient Teaching and learning resources in order to improve the condition and status physical resources and employ additional teachers to make schools more so the subcounty schools which purely operate on FDSE. Following the study findings, the research recommended that a similar research should be done in different regions of Kenya due to differences in attributes.

# 1. CHAPTER ONE

## INTRODUCTION

### 1.1 Background Information to the Study

Education is composed of two parts, that's, inputs and outputs, this is according to Coombs (1970). The inputs include material and human resources while the outputs include outcomes and goals of the process of education. The output points on the changes the input undergoes in the education process and therefore if a person intends to do an investigative study to assess the effectiveness of a system of education with an aim of improving its performance, it is of essence to study the effect of one part in relation to the other part. Physics performance has been a concern for most education stakeholders in the country. For this reason, the study looked into the influence of TLR on the students' performance in KCSE Physics in public schools (secondary) in Ndhiwa subcounty.

Physics is a branch of science that studies matter and its relation to energy. It is taught in Kenyan secondary schools (both in 8-4-4 and IGCSE systems). Being an important branch of science taught and learned in secondary schools in Kenya, it is handled both theoretically and practically for better understanding and applicability by the learners. Physics has been identified as an important branch of science because it drives technological and scientific development in a country and the world as a whole.

In Kenya, the 8-4-4 education system sciences syllabi; Physics, Chemistry and Biology are each tested as follows; paper one, paper two and paper three. Papers 1 and 2 of all these three sciences are theories and are tested out of eighty marks each while paper 3 of each of the sciences is practical and is tested out of forty marks. According to Kenya National Examinations Council (KNEC), the total marks scored by a candidate in any of the science subject theories is converted out of 60 marks and the practical mark (out of forty marks) added directly to get the candidate's overall score which corresponds to a particular grade on the set grading system of that year in question.

According to Adesoji and Olantubosun (2008), effective teaching of science can lead to attainment of technological and scientific greatness. The Kenyan government has to emphasize on the science education within the 8-4-4 curriculum, as it is a way of preparing pupils for the world technology and science, Ndemo (2007).

The candidates' performance statistics in the KCSE Physics for the last four years are as shown in the table below.

Year	Paper	Candidature	Max. score	Mean score	Standard dev.
2016	1		80	32.49	19.3
	2		80	29.91	19.19
	3		40	17.15	6.56
	Overall	149,790	200	79.53	42.40
2017	1		80	24.57	15.82
	2		80	26.22	18.22
	3		40	19.33	8.33
	Overall	160,182	200	70.09	39.59
2018	1		80	22.98	14.87
	2		80	22.13	14.15
	3		40	19.43	8.5
	Overall	172,676	200	68.54	35.31
2019	1		80	25.63	13.83
	2		80	20.43	14.28
	3		40	19.13	7.98
	Overall	184,559	200	65.18	33.96

The following observations were made by KNEC in their 2019 KCSE report;

- ❖ The overall performance in Physics dropped from a mean of 68.54 in 2018 to 65.18 in 2019.
- ❖ There was slight improvement in the performance of paper 1 from a mean of 22.98 in 2018 to 25.63 in 2019 while paper 2 and paper 3 registered a drop in the performance.
- ❖ Analysis of the students' responses revealed that there is still lack of knowledge on comparative words that show differences in the physical characteristics or behaviour of materials. Application of knowledge in the new tasks is challenging to most candidates.

## **1.2 Statement of the Problem**

More emphasis needs to be made on the significance of Physics in as far as transforming Kenya into an industrial country in line with the Vision 2030 is concerned. It is therefore a point of concern to the entire education stakeholders; donors, government, NGOs to put reasonable quantity of resources in the education sector to spur economic growth and development in Kenya.

It is very evident that the performance in Physics in Ndhiwa subcounty is dismal and this is a point of concern to the stakeholders in education in this region. This means that corrective measures should be put in place to curb this situation so that the students in this region can compete with their fellows in other regions in Kenya more so in the choice of careers which are STEM related.

There are a number of factors that many educational researchers all over the world have attributed to low performance in science subjects like Physics. Just to mention but a few; methods of teaching, students' attitude, TLR availability among many others.

The focus of this research was to do an investigation on the effect of availability of TLR on the students' performance of students in KCSE Physics in some selected secondary schools Ndhiwa subcounty, Homabay county.

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

The study was purposive in that, it investigated how availability of TLR influences students' performance in KCSE Physics in some selected schools (secondary) in Ndhiwa subcounty.

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

Listed below, were the objectives of the study;

- a) To establish presence of libraries and physics textbooks adequacy in them.
- b) To establish the presence of a science laboratory and adequacy of physics apparatus.
- c) To find out how often the students conduct physics practical under the watch of the teacher or laboratory technician.
- d) To find out how often the students visit library to borrow Physics books for individual studies.
- e) To find out which kinds of physics textbooks from different publishers or authors students prefer most.
- f) To establish utilization extent of Physics materials and their influence on the KCSE Physics performance of students in Ndhiwa subcounty public secondary schools.

### **1.5 Research Questions**

- a) How is the students' performance in KCSE Physics influenced by the availability of Physics TLRs?
- b) What are the most critical or essential types of TLR for good students' performance in KCSE Physics?

### **1.6 Significance of the Study**

The outcomes of this research study would be vital to all Ndhiwa subcounty education stakeholders and their counterparts in the neighbouring sub-counties like Mbita, Homabay among others as well as the MOEST in curbing the challenges faced when learning and teaching Physics in public secondary schools. From the analysed data of

this research, education stakeholders would have the ability of doing a review of the teaching and learning of Physics and adjust towards enhancing better performance in Physics.

Physics as a subject if taught and learned effectively would widen and open up more opportunities to students from this sub-county to pursue very competitive careers in the world of technology and science. Kenway et al. (2007), made an argument that Physics and Chemistry are science subjects of high status and are perceived to be hard alongside Mathematics as they are the prerequisite for entering into institutions offering tertiary education in the high-end careers like medicine, engineering and science & technology-based courses.

Thus, this research's findings would act as bearing of further or similar research in other regions in the country. This would help government, private schools' proprietors and education stakeholders to plan well on how to acquire enough teaching-learning resources and establish their effects on students' KCSE Physics performance.

### **1.7 Delimitation of the Study**

The research study only covered nine public secondary schools in Ndhiwa subcounty. Due to few numbers of schools selected for this research study, the report findings would not give a more clear conclusion of the impact of the availability of TLR on the students' performance in Physics. Owing to the short time frame (May to August 2021), Covid-19 pandemic and inadequate resources to move and gather more information on physics performance in secondary schools in Ndhiwa subcounty, the research could not cover as many secondary schools as it wished to cover.

### **1.8 Assumptions of the Study**

Below were the assumptions which the research study was based on:

The schools and Form 4 students sampled would represent the whole population of schools and students taking physics in the Homabay county of which Ndhiwa subcounty is part.

It was also an assumption and a belief that those who were sampled to give responses would give honest and accurate data and that the school management boards and parents would provide the teaching and learning resources more so the textbooks.

### **1.9 Definitions of Significant Terms**

**Laboratory** is special building or room in a school equipped with chemicals and apparatus where experiments are conducted.

**Performance** refers to learner's achievement as examined in physics examination.

**Practical** refers to teaching-learning method that emphasises on the importance of observation and applies the senses in obtaining knowledge in science. In this approach the learners are the active participants as they manipulate the learning materials and resources under the guidance of subject teacher or laboratory technician.

**Academic performance** is the KCSE Physics average score of particular school as per the students' performance.

**Teaching and learning resources** refer to human and material resources that are utilized during process of teaching-learning. They include physical facilities, human resources and material resources.

**Teaching materials** refer to facilities and equipment that are used in the process of teaching-learning for example, equipment, charts and chemicals.

**Academic qualification** is the highest level of schooling attained by a trained and professional teacher.

**Access:** Is making education available and affordable to the target groups.

**Adequacy** is the TLR sufficiency for effective teaching-learning process.

**Assess** is TLR judgment making in order to evaluate the quality and nature of school resources.

**Free Day Secondary Education** is the government-provided education in the 2<sup>nd</sup> cycle of school system where students are day scholars and parents do not incur tuition fees



since it's being paid by government but just pay around Ksh. 3000 for lunch programme per term.

**Human resources** are school programme implementers or personnel of a given institution who ensure that the goals of an institution are met as set.

**Impact** refers to effect or power to influence something.

**In-service training** is teachers' training that occur once they are on active employment in order to equip them with pedagogical skills for better delivery of Physics contents.

**Physical facilities** refer to equipment and buildings that a school utilize in order to meet the set goals.

**Resource utilization extent** refers to the degree and utilization frequency of learning and teaching items, human resources and physical facilities in realization of the set goals.

### **1.10 Organisation of the Study**

This research study is five-chaptered. Introduction of the whole research study forms chapter one; and it includes the following study's background, problem statement, objectives of the research, research questions, study purpose, limitations, delimitations, assumptions and significant terms definitions used in the study.

## **2. CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

According to Mugenda and Mugenda, (2003), review of related literature is an identification done systematically where documents containing related and relevant data or information are located and analyzed in line with the research study topic under investigation.

This chapter gives the highlights of similar research works conducted by other researchers elsewhere on the factors that affect students' performance in Physics. It comprises of relevant themes which are research objectives-derived have been derived. Each research question has been reviewed as follows; print media (textbooks both course books and revision books, science journals, physics charts). Non-print media includes; radio and television broadcasts, programmed learning or programme, video and audio recordings, use of internet-enabled computers.

#### **2.2 The concept of resources used in learning and teaching**

According to DFID (2007), there are three fundamental components of resources used in Teaching and Learning (TLR). These are physical facilities, human resources and material resources. On the other hand, adequacy of TLR is the sufficiency in terms of quality and quantities of material resources, physical facilities and human resources. Instructional materials' adequacy like that of textbooks which are the primary materials of instruction are the most cost-effective educational input influencing performance of students in a particular subject being studied, say Physics.

According to Padmanabhan (2001), TLR adequacy determines the efficacy of the system of education. For effectiveness in teaching and learning process, TLR are fundamental tools and so their inadequacy or absence makes instructors handle science subjects like Physics as mere abstractions, portraying it non-interesting and dry to the learners. It's also important to plan the personnel appropriately for adequate physical facilities and instructional materials to support educational effort.

According to Coombs (1970), scarcity of TLR such as textbooks, physical facilities like libraries, computer laboratories and science laboratories would constrain system of education from responding promptly to newly arising demands. For the quality of education to be raised so that its efficiency and productivity to be visible and felt by the society, better learning materials, physical facilities and human resources are required. Some recent and similar studies looked into the adequacy and distribution of teaching-learning resources, TLR and established their effects on students' performance in KCSE.

### **2.3 Performance and Teaching and Learning Resources**

Teaching and learning resources are grouped into 3 categories; human, physical and material resources, DFID, (2007).

Recent research works have revealed that TLR are not always available in schools and this poses a challenge to educators. Learning is an activity which is complex and entails an interplay of physical facilities, curriculum demands, teaching resources and skills, students' motivation. TLR availability, thus has an enhancing influence on the schools' effectiveness as they form primary resources which brings about good students' performance in academics when it comes to examination results.

According to a research conducted by Momoh (2010) on instructional resources' impact on education, he noticed that these TLR have an impact on students' performance in the West Africa School Certificate Examinations (WASCE). The students' performance in WASCE was attributed to TLR availability. He drew a conclusion that resources (materials) have an impact of significance on performance of students in that, they make learning of science much concrete as opposed to mere theoretical abstractions of concepts and hence rote-learning is discouraged. Inadequacy of TLR compromises the education process hence leading to low performances among learners.

According to a research carried by Adeogun (2001), there is a very strong relationship of positive significance that exists between performance in academics and resources used in teaching. Schools with more resources tend to register better performance compared to schools with inadequate TLR. Material resources in Physics comprises of textbooks, charts, audio, visual, charts, audio-visual and electronic materials for instruction like radios, video-tape recorders, tape-recorders and television sets. Another

category of material resource includes papers, pens, erasers, exercise books, chalks, workbooks, notebooks, rulers, slate among many others (Atkinson,2000).

A similar research conducted by Babayomi, (1999) showed that public schools performed dismally in KCSE than their counterparts in private schools due to unavailability and inadequacy of teaching and learning materials. A related study by Mwiria (1985) is also in support that performance of students is influenced by TLRs' quality and quantity. The writer further noted that schools with enough facilities like textbooks are of better standing in terms examinations' performance compared to their counterparts which are poorly equipped with TLR. Thus, dismal academic is linked with inadequacy of equipment and learning and teaching materials.

According to the report by (MOEST, 2005), equipping schools with appropriate and adequate TLR is key for implementation of education programmes to be effective.

### **2.3.1 Effect of Human Resources Adequacy on Performance of Students in KCSE Physics**

Success or failure of a system of education is dictated by the adequacy of teaching and learning resources. Students-Teacher Ratio (STR) is a method of determining the degree teachers' adequacy. STR is the number of learners allocated to a teacher to teach. STR is employed to find the students' number that are allocable to each and every teacher in a given education level. It indicates the workload per teacher at every education level. It further forms a basis of determination of manpower in teaching required for projected enrolment of students or shows teachers shortage. Thus, student-teacher ratio can be used to tell whether the available are under-utilized or over-utilized (Afolabi, 2005). The human resource comprises teachers and non-teaching staff (support staff). Support staff include librarians, laboratory technicians, cooks, accounts clerks among others. If a good performance in Physics or any other subject is to be realized then an optimum number of human resources should be employed more specifically teachers.

According to ministry of education report (2005), in a case where inadequacy of teachers occurs, the headteachers on consultation with their corresponding Board of Governors (BOG) otherwise now referred to as board of management (BOM) can temporarily employ trained but unemployed teachers to reduce the workload for

effective teaching-learning process. Recent research works have revealed a strong relationship between human resources availability and performance of students. For example, the research study that was carried by Akungu (2014), showed that schools with inadequate human resource performed poorly in KCSE.

### **2.3.2 Effect of physical facilities adequacy on performance of students in KCSE Physics**

The physical resources development and maintenance by communities, government and sponsors in institutions offering education is highly encouraged since inadequacy of physical resources jeopardise the teaching-learning process.

From a similar study carried out by Akungu (2014) on the effect of TLR on KCSE performance, more so the physical facilities on KCSE performance of students in Embakasi District, Kenya, her study revealed that, availability of physical facilities has a direct effect on the students' KCSE performance in such a way that schools with adequate physical facilities were found to have better KCSE performance as compared to their counterparts which have inadequate physical facilities.

DFID, (2007) highlighted the significance of physical facilities of a school in connection to quality education. Due to differences in facilities which schools possess which include administration block, workshop, classrooms, libraries, playgrounds, laboratories, assembly halls, school clinics, school dormitories, cafeterias, toilets just to mention but a few. The report further emphasizes on attractiveness of learning experiences when there exists sufficient quality and quantity of physical resources. Where school buildings are unattractive and have congested classes, no playing fields and unattractive surroundings students in schools, academic performance in KCSE tend to be dismal.

According to Fonscea and Conboy (2006), organisation of schools and physical conditions facilitate or inhibit construction of success culture.

### **2.3.3 Effect of availability of Material resources on performance of students in KCSE Physics**

Textbooks, maps, exercise books, pencils, ink pens, rulers, charts, audio-visual, erasers, chalk, black wall, whiteboards, marker pens, Electronic teaching materials such as television, radio, video and tape recorders are examples of material resources and are vital in instruction and learning (Akungu, 2014).

Textbooks are very vital in the teaching-learning process since they are the ones which carry much relevant and logically sequenced information pertaining to a course.

According to Adeogun (2001), there exists a very strong relation of positive significance between instructional materials and performance in academics amongst schools and their respective learners. Schools that possess adequate TLM always perform better in examinations than their counterparts with inadequate or completely lack these material resources.

### **2.3.4 TLR utilization in Public Secondary Schools**

Resources utilization extent refers to the degree and frequency of use of TLR by both teachers and students. Recent research studies have shown that, schools where TLR are being used frequently and to a large extent by students and instructors, good performance is always registered. TLR utilization usually tends stimulate learning among students (Meghir, 2002). For instance, continuous use of laboratory in studying practical sciences has an impact of positivity on the performance in schools where such are practiced. School expenditure is a way of telling the extent of resources utilization.

Akungu (2014), since the start of free day secondary education policy, since the inception of FDSE policy, accessing secondary education in Kenyan public secondary schools has risen with the number of students' enrolments in secondary education rising. Her report further found that classrooms in public secondary schools were overcrowded and in bad conditions due to increased enrolments in schools brought about 100% transition from primary to secondary.

## **2.4 Theoretical Framework**

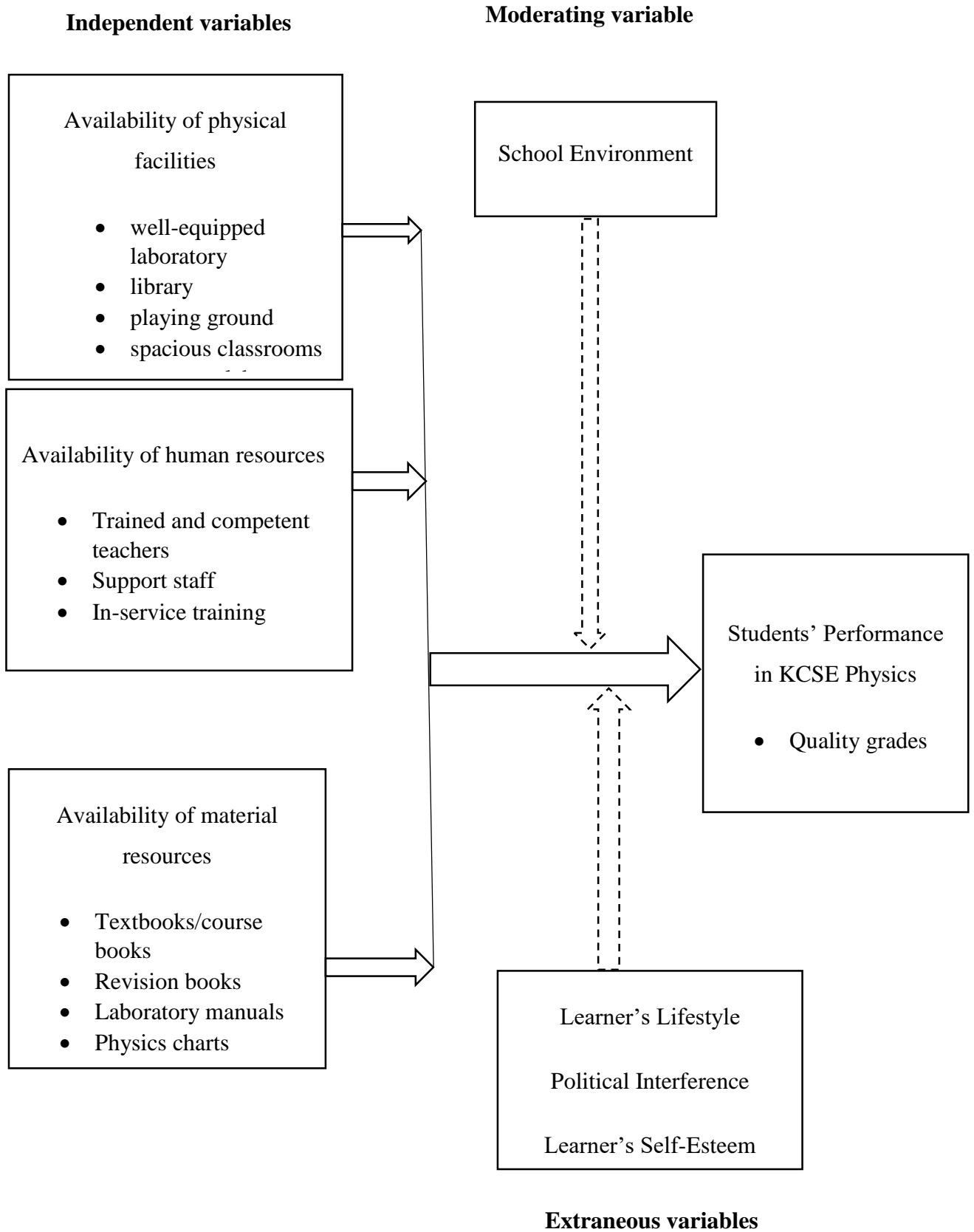
The Education Production Theory was the premise onto which this research was based since there's little consensus in measurements of educational outputs and inputs as well as definitions of educational outputs and inputs. Ultimately, after inputs have been utilized, performance of learners in KCSE is used as a standard measure of success in education process.

## **2.5 Conceptual Framework**

A conceptual framework is basically a schematic diagram which shows relation connecting the independent factors and dependent factor. The factors are called variables and whose effects on each other are to be determined. Dependent factor (variable) in this study is students' performance in KCSE Physics while independent variables include availability of adequate physics textbooks (course books and revision books), availability of qualified and competent teachers, availability of well-equipped science laboratory and availability of relevant technology in teaching-learning of Physics for instance, internet-enabled computers and projectors.

The extraneous variables for this study include individual learner's self-esteem, lifestyle and political interference among others while the intervening variable is school environment.

Figure 2.1: Conceptual Framework





### **3. CHAPTER THREE**

#### **RESEARCH METHODOLOGY**

##### **3.1 Introduction**

Chapter three of any research work outlines the study methods and procedure employed in a particular research in question. This chapter was divided and discussed into the following themes; research design, population being targeted, procedures of sampling and size of sample, research instruments, methods of collection of data, methods of analysing data and ethical issues in research.

##### **3.2 Research Design**

Descriptive survey design was employed in the investigation of how availability of TLR affects the students' KCSE Physics performance in Ndhiwa subcounty public secondary schools. According to Kerlinger (1973), survey design is the best method to be method to be used for systematic factual data collection for decision making and an efficient method of descriptive information regarding the population characteristics and current practice and conditions.

Since there are fifty-one secondary schools in Ndhiwa subcounty that had presented candidates for KCSE examination, taking a keen study of a representative sample and generalizing of the results to cover the entire population that share the same characteristics as the sample would be sufficient enough.

Descriptive survey design, according to Krishnaswani (2001), is used in studies where facts are required to found and it involves direct data collection from population of interest at a particular time instant. This research design was found to be suitable for this research and was thus used, since it works best where direct feedback from respondents is necessary as the phenomenon in existence is being investigated without variables' manipulation. This design of study was advantageous in that, it gave the respondents opportunity to provide and describe their opinions with respect to factors under investigation in details.

### **3.3 Target Population**

Target population, according to Mugenda & Mugenda (2003), is that population which the researcher would want to make results generalizations from. Target population, according to Niekimas & Niekimas (2009), is the whole set of units of relevance to data analysis.

### **3.4 Sampling Procedures and Size of Sample**

A sample, according to Mugenda & Mugenda (2003), is a small group obtained from the accessible population from which data is collected. On the other hand, sampling is the process of selecting a small individuals' number for the study are picked in such a manner that the selected individuals forms a representative of the whole population. (20-50) % of the population is an appropriate sample size for a descriptive survey design. This research was restricted to public secondary schools in Ndhiwa subcounty because they share similarities with respect to the use of same curriculum (8-4-4).

The population targeted in this research consisted of 9 out of 51 public secondary schools in Ndhiwa subcounty. Majority of sub-county schools are day schools which enjoy FDSE programme, both county and extra-county schools are purely boarding schools. The sample was systematically selected after categorizing the schools into three groups namely; subcounty, county and extra county schools. For each category of schools, first three schools were picked systematically from each category. A sampling method called simple random sampling, was employed in picking students for administering questionnaires. For case of picking Physics teachers, two Physics were picked from the nine sampled schools for data collection purposes. In some cases, the research utilized direct observation to ascertain that the data given by respondents were accurate and true. Ninety 2020 KCSE Physics candidates, eighteen Physics teachers and nine principals filled in the questionnaires.

In a simple random sampling, the entire population's individuals have equal and independent probabilities of being sampled (Kombo & Tromp, 2005). A sample size of ten percent is good enough to represent a large population while a twenty percent one is ideal for a small population (Gay, 1992).

This research study only concentrated on the Form 4 classes where 20% of candidates registered to write KCSE examinations were interviewed at long break time, lunch break time and games time. The interviews were short ones so as to save the learners' time due to rigid academic calendar brought about by Covid-19 pandemic. Few schools were selected due to high travelling costs and the covid-19 pandemic.

For a representation with fairness of the groups, random sampling was employed. The research made a choice of the candidates because majority of them have stayed long enough in the schools in comparison with any of the other classes.

### **3.5 Research Instruments**

Administration of questionnaires is more common method of collection of data in educational research since it is cost effective in terms of its construction and administration to large samples (Mugenda and Mugenda, 2003). Questionnaires, direct observations and content analysis were the methods used to collect data; the questionnaires were developed with both closed and open-ended quizzes to principals, teachers of Physics teachers and candidates registered to write Physics examinations in 2020 KCSE. Observations were directly made on physical facilities and material resources used in learning and teaching Physics.

The research designed three kinds of questionnaires; the principals' questionnaire which contained key demographic data on qualification, gender and length of service; characteristics of school demography such as enrolment in schools and KCSE performance for the last two years, information pertaining to availability, frequency of usage and availability of learning and teaching resources. Teachers' questionnaire also contained key demographic data pertaining to length of service, gender, and qualifications of teachers; TLR availability in their schools and resources' utilization extent while the students' questionnaires contained key demographic data pertaining to age, adequacy and availability of TLR as well as the frequency of use of TLM. Another aspect that was also evaluated was the presence, size and condition of physical facilities in their schools, adequacy and availability of TLM in the school and human resources availability and grade expectation at the programme's end. Analysis of document involved sourcing for secondary data on KCSE Physics results for the period (2019-

2020) which the researcher sourced from Ndhiwa Subcounty Director of Education's office and analysed in relation to availability of TLR.

### **3.6 Reliability and Validity of Research Instruments**

Instruments' validity, according to Mugenda & Mugenda (2003), revolves around accuracy of the data collected by researcher to represent the study variables. On the other hand, construct validity, refers to claims extent of a test measurement in line with what it should measure or expected to measure; that is, giving operationalization legitimacy of the research in accordance with constructs of theory. According to Orodho (2009), reliability is the degree of consistency of a given procedure to display same results over a number of times of trial repetition.

### **3.7 Methods of Data Analysis**

Analysis of data is the evaluation process, where data is evaluated logically and analytically, in order to examine each of the components of the data collected by the researcher by the use instruments of research. After gathering data, checking of data analysis instruments was done to ensure completeness and errors, followed by arranging the questionnaires, coding and making entries into the computer SPSS for analysis were done. Descriptive statistics was employed for data analysis by filling in table of frequencies and percentages presentation, graphs and charts. Direct observations made and open-ended questionnaires were analysed qualitatively in form of a narrative and presented in the tables.

## **4. CHAPTER FOUR DATA ANALYSIS, PRESENTATION AND INTERPRETATION**

### **4.1 Introduction**

The research findings, analysis of data and interpretations of the data collected are contained in this chapter. All the thematic areas discussing the questions posed by the research were presented and analysed. This starts with the information pertaining to respondents and schools' demography followed by analysis of data, data presentations, data interpretation and discussions of study findings in accordance with schools and respondents' demographic characteristics followed by research questions. Bar graph and Tables were the main data presentation methods which were applied to present the research findings whereas frequencies, means and percentages were used to do discussion of data.

### **4.2 Rate of return of questionnaire**

Rate of return a questionnaire which is also referred to as rate of completion of questionnaire is the fraction of the sample which or who participated in the whole the research procedures as intended by the research study. The whole sample, that is, all the nine principals, eighteen physics (class) teachers and ninety 2020 KCSE Physics candidates sampled, completed filling in and returned the questionnaires (100% rate of return). According to Mulusa (1988), it's always an assumption that when the rate of return of questionnaires is high, it is more likely that the results depict a true reflection of the population so long as appropriateness in sampling is considered, thus a 100% rate of return of questionnaires is deemed an accurate representation of the feedback from the entire population. For this research study, the rate of return of questionnaires was a hundred percent, that is, all the sampled respondents in each category filled and returned the questionnaires and therefore the results gotten were taken as the true representation of the entire population's responses.

**Table 4.1: Rate of Return of Questionnaires**

Respondents of the study	Expected number of responses	Actual number of responses	Percentage
Headteachers (Principals)	9	9	100
Physics teachers	18	18	100
Students (candidates)	90	90	100
<b>Total</b>	<b>117</b>	<b>117</b>	<b>100</b>

### 4.3 Schools and respondents' demographic information

The data pertaining to the demographic information of principals and Physics teachers was based on teacher's experience length in the teaching profession, gender and length of experience of teacher in the profession while for the demographic characteristics of students; length of time the student has stayed in the current school and age. For schools' demographics the following information were collected; performance in KCSE physics for the last two years, enrolment trends of schools, number of students per class and number streams of Form 4 class.

**Table 4.2: Teachers and Principals Responses on the Distribution of Academic Qualifications**

Qualification	Principals		Physics teachers	
	With	%	With	%

Doctorate in Ed.	-	-	-	-
M.Ed.	3	33.3	5	27.8
Bachelor of Ed.	6	66.7	13	72.2
Diploma in Ed.	-	-	-	-
Total	9	100	18	100

The human resources in the schools which were sampled for the study to represent the 51 public secondary schools in Ndhiwa subcounty showed that most of subcounty schools were understaffed and therefore the schools had to employ qualified teachers under BOM on contract terms. The problem pointed out with this, was that whenever the Physics teachers on BOM find greener pasture they usually leave their current work stations for the new ones where payments seem better. This movement was found to have an impact on the performance of students in KCSE Physics because even if schools tried to replace the teachers leaving certain stations for better ones, it always takes the students to adapt to new teachers hence effect on students' performance in Physics. Teacher's academic qualification has been established to have an influence on students' performance in Physics as well as other subjects. As indicated in the above table, it is clearly shown that majority of the teachers who were sampled for this study possessed bachelor of education.

It is very clear from data collected from field that, all the schools sampled regardless of their categories are understaffed in terms of numbers of Physics teachers employed.

**Table 4.3: Responses given by principals on the physical facilities' adequacy**

Physical facility	Responses %				
	5	4	3	2	1
TLR availability					
Capacity and resources in library	-	3 (33.3)		6 (66.7)	-
Lockers and chairs in classrooms	-	3 (33.3)	5 (55.6)	-	1 (11.1)
Capacity and equipment in the science laboratories	-	3 (33.3)	5 (55.6)	1(11.1)	-
Number of latrines or toilets	-	-	9 (100)	-	-
Number of allocated offices	-	2 (22.2)	3 (33.3)	2 (22.2)	2 (22.2)
Reliability of water supply	-	5 (55.6)	2 (22.2)	2 (22.2)	-
Size of the play ground	2 (22.2)	6 (66.7)	1(11.1)		
Reliability of power supply	-	-	2 (22.2)	6 (66.7)	1 (11.1)



Capacity of the dining hall	-	-	8 (89.9)	1(11.1)	-
Tables and chairs in the staffroom	-	4 (44.4)	2 (22.2)	3(33.3)	-

Key: 1: strongly disagree 2: disagree 3: neutral 4: agree 5: strongly agree

From the information recorded in the above table, it was clearly indicated that, the principals who agreed on the chairs' and tables' adequacy in the staffroom were 4(44.4%), this indicates that almost half of the sampled schools agreed that they have adequate chairs and tables for the staff.

In terms of capacity and resources in the science laboratories, 33.3% of the sampled schools agreed that they have adequate capacity and equipment and capacity in laboratories their respective schools. These schools were extra-county schools. 11.1% of the schools disagreed that they don't have adequate enough equipment and capacity in their laboratories while 55.5% were neutral on the availability of equipment and capacity in their laboratories. Lack of laboratories or presence of laboratories without enough equipment was observed in the sampled schools more so in subcounty schools. This was attributed to low performance in KCSE Physics by majority of students. Practical examination at KCSE level in any of the pure sciences like account for 40% of the Physics examinations. It is therefore very important for any secondary school to have a well-equipped science laboratory for learning sciences practically and to improve grades in sciences.

In terms of the size of playgrounds, 22.2%, 66.7% and 11.1% of the schools were having responses; strongly agreed, agreed and neutral respectively. Playgrounds are very important in schools since they form arena for psychomotor developments among learners as well as physical fitness of learners which researchers have been trying to link with academic performance among learners.

Following the direct observations and interviews conducted by this research alongside administration of the questionnaires, it was found that most extra-county schools more than half of county schools have well-established and spacious libraries while most

subcounty schools lack libraries but just bookstores which could not be used by learners to study but were rather used for storage and collection of books.

**Table 4.4: 2020 KCSE Physics results for the sampled schools**

NAME OF SCHOOL	CATEGORY OF SCHOOL	NO. OF 2020 KCSE PHYSICS CANDIDATES	SCHOOL MEAN IN 2020 KCSE PHYSICS
Mirogi Girls high	Extra-County	14	6.000
Ratanga Boys high	Extra-County	54	5.462963
Mirogi Boys high	Extra-County	43	4.418605
Lwanda Kawuor Mixed sec.	County	29	3.931034
Nyamanga Mixed sec.	County	17	5.3125
Okota Mixed sec.	County	14	4.428571
Ojode Pala sec.	Sub-county	35	3.694444
Ogango Mixed sec.	Sub-county	24	2.71486
St. Peters Rambusi sec.	Sub-county	13	2.076923

From the above table the following observations were made:

Generally, extra-county schools performed in 2020 KCSE physics better than their county and subcounty counterparts due to vast amount of resources they have accumulated since they began existing.

Most of teachers in county and extra-county schools possess bachelors and master degrees hence which translates into improved performance in methods of teaching hence higher achievement in candidates' physics performance in KCSE.

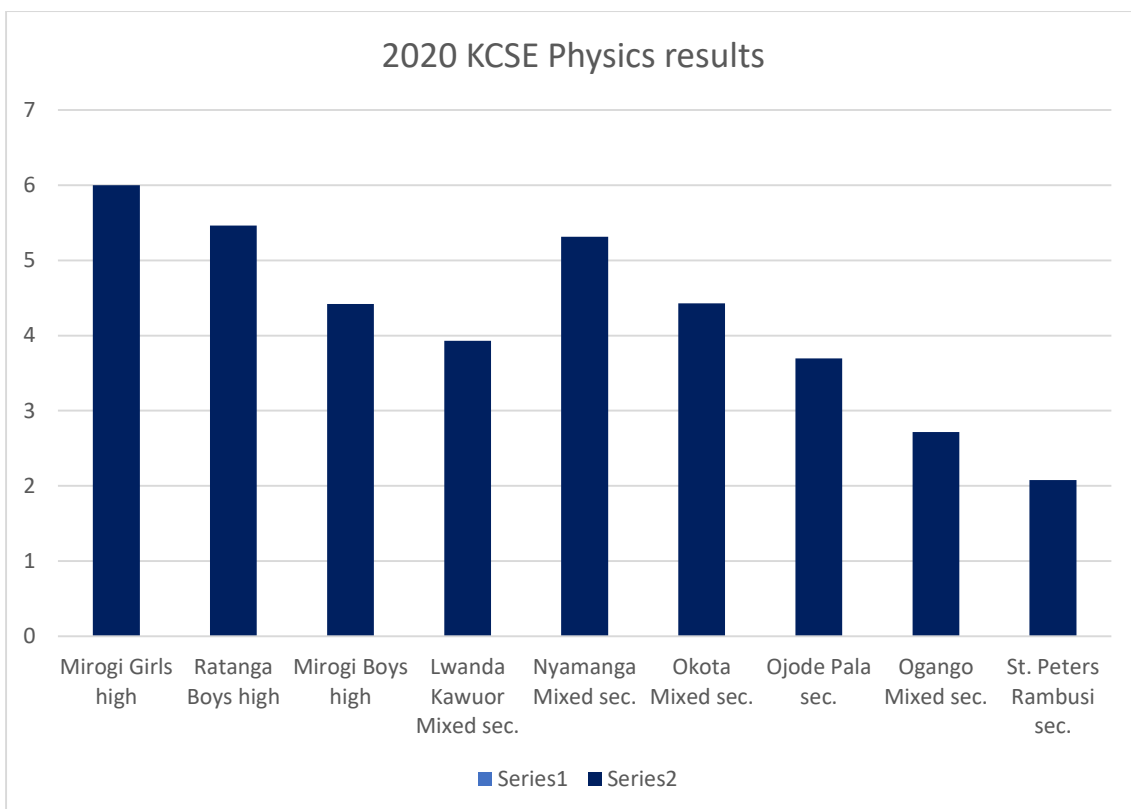
Subcounty schools lack many physical facilities such well-equipped science laboratories (some subcounty schools do not have computer laboratory and science laboratory buildings and even library buildings.

Student-textbook ratio is 1:1, since the government began supplying books to public schools in 2016 by itself.

Even though textbooks are nowadays being supplied by government since 2016, making the student: textbook ratio 1:1, the research found that, this is not the only factor that can be attributed to good performance.

St. Peters didn't do well in Physics due to lack of well-equipped science laboratory, lack of internet-enabled computers as well as lack models and other resources used teaching and learning Physics as compared to resource-rich schools like Mirogi girls and Ratanga boys.

Putting all other factors constant, Mirogi girls performed better than Mirogi boys and Ratanga boys because it registered very few candidates compared to Ratanga boys, Mirogi boys and Ojode Pala secondary schools whose candidatures were 54, 43 and 35 respectively.



**Figure 4.1: Bar graph showing the students’ performance in 2020 KCSE physics.**

**Table 4.5: Teachers’ Responses on the extent of Resources utilization**

Extent of Utilization of Resources	Responses in percentage (%)				
	5	4	3	2	1
Usage of the charts in teaching	3 (16.7)	7 (38.9)	2(11.1)	3(16.7)	3(16.7)
Teachers’ guides usage in teaching	6(33.3)	7(38.9)	2(11.1)	2(11.1)	1(5.6)
Class discussion groups usage in teaching	7(38.9)	2(11.1)	3(16.7)	3(16.7)	3(16.7)

Calculators usage in teaching	5(27.8)	2(11.1)	4(22.2)	5(27.8)	2(11.1)
Books of reference usage in teaching	1(5.6)	4(22.2)	3(16.7)	8(44.4)	2(11.1)
Field trips use in teaching	1(5.6)	6(33.3)	5(27.8)	2(11.1)	4(22.2)
Resource persons usage in teaching	7(38.9)	3(16.7)	1(5.6)	2(11.1)	5(27.8)
Models usage in teaching	1(5.6)	5(27.8)	3(16.7)	8(44.4)	2(11.1)
Text books usage in teaching	7(38.9)	2(11.1)	4(22.2)	3(16.7)	1(5.6)
Use of computers in teaching Physics	1(5.6)	-	-	16(88.9)	1(5.6)
Laboratory facilities usage	4(22.2)	4(22.2)	1(5.6)	3(16.7)	6(33.3)

Key: 1: strongly disagree 2: disagree 3: neutral 4: agree 5: strongly agree

Following the information given by the respondents on Table 4.5, it could be depicted that teacher respondents had the following responses towards the usage the Physics course textbooks; 38.9% strongly agreed, 11.1% agreed, 22.2% were neutral while 16.7% and 5.6% respectively disagreed and strongly disagreed on the use of textbooks in teaching Physics. On the other hand, the teachers responded towards the use of teachers' guide in teaching in the following order; 33.3% strongly agreed, 38.9%

agreed, 11.1% each were neutral and strongly disagreed while 5.6% strongly disagreed on the use of teachers' guide in teaching.

In terms of usage of science laboratory and equipment, 22.2% each strongly agreed and agreed on the use of laboratory in teaching Physics. Half of the teacher respondents disagreed on the use of laboratory in teaching since their respective schools do not have laboratory however the few equipment they have were being used in class demonstration. This study attributed the dismal performance in KCSE Physics among the students to lack of self-practice among students in order to gain the confidence in manipulating the equipment and recording the correct results during examinations. It can be clearly drawn from the tables that the county and extra-county schools registered higher performance than their subcounty counterparts in KCSE physics since they had science laboratories (well-equipped) which gave the individual students to practice practical physics hence they developed confidence in manipulating equipment to get the accurate and desired results hence better scores in KCSE physics results.

According to the teacher respondents, 5.6% strongly agreed to use resource persons in teaching, 16.7% were neutral in answering the question on the use of resource persons in teaching Physics. 55.5% of the teacher respondents disagreed on the use of resource person, because of covid-19 pandemic which posed challenge on teaching and learning in the whole globe. Generally, the resource persons have been very instrumental in teaching physics. They include examiners, motivational speakers, subject specialists among others. The examiners usually sharpen students with skills in answering the physics questions.

The use of calculator in teaching was good since nearly half the teacher respondents agreed to use calculators in teaching the mathematical relations in physics. This means that calculators have proved to be very useful in calculations more so in simplification in physics. Students who are taught to use calculators in simplification tend to score better than their counterparts who are taught physics and left to do mathematical manipulations alone.

There are around 60 resources used in learning and teaching Physics that make students learn much more and have better retention on what they were taught by their instructors. These resources also sustain and promote interest of a learner in a subject, say Physics,

this is according to Abimbade, (1997). Learners are also allowed to exploit their full potentials as they are given opportunity to discover their individual abilities.

In terms of use of field trips in teaching physics, almost 50% of the teacher respondents agreed they had been using excursions in teaching physics in their respective schools. Out of these, majority were from extra-county and few from county schools, subcounty schools are disadvantaged in the use of field trips because of the cost involved as well as lack of school buses. Few teachers who were interviewed, they observed that excursions were very meaningful in teaching the learners because it gave them an exposure to real-life applications of physics. This was also observed to be motivative on the learners' ambitions on their respective dream careers.

On the use of class discussion groups, 50% of the respondents agreed that they had been using it to foster learner-centred teaching, 16.7% were neutral in response and 33.4% disagreed on the use of class discussion groups saying it was time consuming. This was noted to be used a lot in extra-county schools than county and subcounty schools and truly its influence alongside other factors was reflected on students' performance in KCSE Physics in those respective schools like Ratanga boys, Mirogi girls and Mirogi boys.

Only school out of the 18 sampled schools, agreed to be using computers in teaching physics while rest disagreed not be using computers in teaching citing the lack of enough funds to buy, install and maintain the computers. They also claimed that lack of power connectivity in some schools or fluctuations of power which always cause disruptions when using computers in teaching-learning.

**Table 4.6: 2019-2020 KCSE Physics mean scores**

Mean scores in KCSE Physics	Ratings	2019 %	2020 %
0-4.0	Poor	23 (53.5%)	28 (54.9%)
4.1-6.0	Fair	15 (34.9%)	21 (41.2%)

6.1-9.0	Good	5 (11.6%)	2 (3.9%)
9.1+	Very good	-	-
Total		100	100

From the Table 4.6 above, it was clearly evident that, more than 50% percent of the public schools in Ndhiwa subcounty performed poorly in KCSE Physics two consecutive years, that's 2019 and 2020, since the mean scores were 4.0 and below. None of the public secondary schools scored a mean above 9.0

In 2019 only 5 (11.6%) out 43 public secondary schools who registered candidates for KCSE Physics examinations scored a mean between (6.1-9.0) as compared to only 2 (3.9%) out of 51 schools. This means that there was a decline in quality grades. This poor performance was attributed to lack or inadequacy of teaching and learning resources in these schools.

#### Textbook: Student Ratio

Principals were asked to indicate the student/textbook ratio in Physics. It was found that the student/book ratio was 1:1. This means that Physics course books were sufficient, since the GoK usually supply textbooks to all public secondary schools in Kenya. However, the revision textbooks were noted to be very few, which they had to share during physics revision. Textbooks are vital in curriculum implementation.



**Table 4.7: Students' Responses on the size, condition and presence of physical facilities**

School facilities	Present		Absent	
	Found	Percentage %	Found	Percentage %
Laboratory	59	65.6	31	34.4
Library	50	55.6	40	44.4
Classrooms	90	100	0	0
Dining hall	40	44.4	50	55.6
Latrines/ toilets	90	100	0	0
Playground	90	100	0	0

According to the information given the students in the table above, it showed that classrooms, latrines and playgrounds were present in all schools. Library (55.6%), dining halls (44.4%) and laboratory (66.7%). From this data it is evident that more than 30% of schools lack science laboratories and libraries. Laboratory and library are very important and have direct correlation to students' KCSE Physics performance.

## **5. CHAPTER FIVE**

### **SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS.**

#### **5.1 Introduction**

The presentation of the findings, conclusions and recommendations that were arrived at in the study are indicated below. This chapter also highlights suggested topics for further investigations.

#### **5.2 Summary of the Study**

This research's focus was to do an assessment on the impact of TLR on students' KCSE Physics performance in public secondary schools in Ndhiwa subcounty, Homabay county, Kenya.

#### **5.3 Conclusion**

From this study it is very clear that the government has done well in supplying textbooks to all public secondary schools in the republic of Kenya, of which Ndhiwa subcounty is part. However, schools complain that the contents of the Physics textbooks are shallow and some with errors with exception of Form 2 Physics textbooks, which are from the Kenya Literature Bureau, (KLB). So, Physics teachers and students prefer using other books like KLB because of the arrangement of contents, depth of contents and minimal errors, therefore, the teachers have to guide the learners on what content to take.

From the data collected and analysed by the researcher, it can be clearly depicted that teaching and learning materials were available with exception of physical facilities which were small-sized, inadequate and in bad condition. The recreational facilities and human resources were also found to be inadequate and were linked to dismal performance in KCSE Physics among candidates due to 100% transition from primary to secondary which caused overstretch on the available learning resources.

Only few schools (extra-county), have computer laboratories with computers which are internet-enabled to aid in teaching and learning Physics. Generally, subcounty schools' performances in Physics are dismal because of inadequacies of TLR. Entry behaviour

of learners as they transit from primary to secondary schools was found to be a major contributing factor of dismal performance in KCSE Physics among students in subcounty schools. outside the factors that were being studied. Lack or inadequacy of Physics revision materials was also pointed out as another contributor to low performance which is not affecting some county and extra-county schools because they have, hence they registered a better performance in Physics regardless of high entries in candidature.

The study findings revealed that toilets/ latrines are available in schools. Some schools more so the subcounty ones don't have science laboratories but rather buy apparatus, equipment and chemicals when KCSE was nearing, denying the learners and candidates the opportunity to learn and conceptualise Physics as a practical subject, hence they registered low mean in KCSE Physics.

The study further revealed that the number of TSC teachers are inadequate and the respective schools' BOMs had to employ trained, qualified and registered teachers to reduce the workload on the teachers.

From the research findings, the study concluded that most secondary schools in Ndhiwa subcounty didn't perform better in 2019 and 2020 KCSE Physics due to inadequacy of TLR. It was also revealed by study that teachers and students prefer books from Kenya Literature Bureau in teaching-learning process. Only Form 2 Physics textbooks out of all the books supplied by government of Kenya were from the preferred author while the rest of Physics textbooks were found to be having a lot of errors and shallow in contents.

#### **5.4 Recommendations**

Basing on the findings of the research, analysis of data and conclusions, the following recommendations were arrived at;

Following the findings of the research, analysis of data and conclusions, the research study suggested following;

The Kenyan government and other education stakeholders need to allocate extra funds to equip schools with physical facilities where there is either lack or inadequacy and for

equipping the schools with adequate human resources, internet facilities and field trips and excursions and well as recreational facilities. For effective teaching and learning of physics as better performance in sciences more so chemistry and physics more funds should be allocated to build and equip science laboratories with chemicals, apparatus and equipment.

Schools should always motivational speakers and KCSE Physics examiners or rather sponsor Physics teachers to train as KCSE Physics examiners to help the students in answering theory and practical questions appropriately. If the Physics teacher(s) can't make it to training of KCSE Physics examiners, then it's important for teachers to access KCSE Physics report released by KNEC after examinations results, to know areas that pose challenges to candidates.

TSC should employ more (trained and qualified) teachers to curb the teachers' shortage in public secondary schools in Ndhiwa subcounty and the whole nation at large.

This proposed that, further research should be done to establish the impact of motivation of teachers, students' attitude or school environment on students' performance in KCSE Physics.

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## APPENDICES

### Appendix I: Data Collection Letter



**UNIVERSITY OF NAIROBI  
FACULTY OF EDUCATION  
DEPARTMENT OF EDUCATIONAL AND DISTANCE STUDIES (DEDS)**

**Your Ref:**

**Kikuyu Campus**

**Our Ref:**

**P.O. Box 30197  
NAIROBI**

**Telephone: 318262 Ext. 120**

**16<sup>th</sup> August, 2021**

**REF: UON/ODeL /SODL/NLC/107**

**RE: OTIENO VICTOR -REG NO – L40/27703/2019**

This is to confirm that the above named is a postgraduate Diploma in Education student at the University of Nairobi, Faculty of Education, Department of Educational and Distance Studies (DEDS).

He has successfully completed his coursework and is ready to start data collection for his Research project work. His research title is '*The Impact of availability of teaching Resources on student's performance in Physics in Secondary Schools in Ndhiwa Sub -County, Migori County, Kenya*'

Any assistance accorded to him will be highly appreciated.

Thank you

A handwritten signature in blue ink, appearing to read 'Anne Aseeey'.

**DR. ANNE ASEEEY  
CHAIRMAN, DEPARTMENT OF EDUCATIONAL AND DISTANCE STUDIES**

## Appendix II: Rate of return of questionnaires

Respondents of the study	Expected number of responses	Actual number of responses	Percentage
Headteachers (Principals)			
Physics teachers			
Students (candidates)			
Total			



**Appendix III: Responses of Teachers on the extent of utilization of resources**

Extent of Utilization of Resources	Responses in percentage (%)				
Usage of the charts in teaching					
Teachers' guides usage in teaching					
Class discussion groups usage in teaching					
Calculators usage in teaching					
Books of reference usage in teaching					
Field excursions/field trips use in teaching					
Resource persons usage in teaching					
Models usage in teaching					
Text books usage in teaching					
Laboratory facilities usage					

Key: 1: strongly disagree 2: disagree 3: neutral 4: agree 5: strongly agree

**Appendix IV: 2019-2020 KCSE Physics mean scores**

Mean scores in KCSE Physics	Ratings	2019 %	2020 %
0-4.0	Poor		
4.1-6.0	Fair		
6.1-9.0	Good		
9.1+	Very good		
Total			

**Appendix V: Responses of Students on the size, condition and presence of physical facilities**

School facilities	Present		Absent	
	Found	Percentage %	Found	Percentage %
Laboratory				
Library				
Classrooms				
Dining hall				
Latrines/ toilets				
Playground				