INFLUENCE OF EDUCATIONAL RESOURCES ON QUALITY OF EDUCATION IN PUBLIC DAY SECONDARY SCHOOLS IN EMBU COUNTY, KENYA

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DECLARATION

This Thesis is my original work and has not been submitted for a registration in any other university

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To my departed and unsung heroes; my late parents, Mr Samuel Mbogo and Elizabeth Kiringa Mbogo

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ABBREVIATIONS AND ACRONYMS

ACER Australian Council for Educational Research

BoM Board of Management

CBE Curriculum Based Establishment

FAIR Freedom of Access to Information and Resources

FDSE Free Day Secondary Education

ICT Information Communication Technology

KCSE Kenya Certificate of Secondary Education

KEMI Kenya Education Management Institute

KNEC Kenya National Examination Council

MoEST Ministry of Education Science and Technology

NACOSTI National Commission for Science, Technology and Innovation

NBER National Bureau of Economic Research

NCRIBE National Centre for Research into Basic Education

NIEEIT National Institute for Educational Evaluation of Instruction and Training

OECD Organization for Economic Co-operation and Development

PISA Programme for International Student Assessment

RoK Republic of Kenya

SCCYP Scotland's Commissioner for Children and Young People

SEQIP Secondary Education Quality Improvement Project

SDG Sustainable Development Goals

TIMMS Trends in International Mathematics and Science Studies

T/L Teaching and Learning

TSC Teachers Service Commission

UNESCO United Nations Education Scientific and Cultural Organization

US United States

WFP World Food Programme

WHO World Health Organization

ABSTRACT

The realization of the significant role of quality education in economic growth and development of nations has led to the shift in focus in education development from access to its quality. Education in developing countries is characterized by high dropout and grade repetition rates, low enrollments and completion rates and poor test scores. One key feature, among others, of Kenyan secondary education is mass failure in the KCSE despite the government efforts to improve on quality of education. The intent of this study was to establish the influence of human resource staffing levels; adequacy of physical facilities; adequacy of teaching/learning resources; and adequacy of finances on ratio of quality grades; dropout rate; repetition rate; enrolments and completion rates. The study attempts to answer the following questions: What is the influence of human resource staffing levels on quality of education in public day secondary schools in Embu County? What is the impact of adequacy of physical facilities on quality of education in public day secondary schools in Embu County? How does adequacy of teaching and learning resources influence quality of education in public day secondary schools in Embu County? How does adequacy of financial resources affect the quality of education in public day secondary schools in Embu County? The study employed correlational research design. The study targeted 192 principals, 1743 teachers and 35124 students from all the 192 public secondary schools in Embu County. The study used a sample of 384 students, 97 teachers and 35 principals. The research instruments included questionnaires, interview schedule and observation checklists. From the correlation analysis student-teacher ratio and completion rate had a correlation of 0.625, adequacy of laboratories and enrolment rate had a correlation of 0.904 while cost of uniform and repetition rate had a correlation of 0.619. From the regression analysis the relationship between cost of stationery and dropout ratio was the most significant with a p-value of 0.000 followed by the one between the ratio of toilets to students and enrolment ratio with p-value of 0.001. The relationship between student-teacher ratio and completion ratio had a p-value of 0.003. The study did not find any significant relationship between adequacy of teaching and learning resources and quality of education. Based on these findings the study recommends that the government employs more teachers to alleviate teacher shortage. The government should also increase the maintenance and improvement fund and the tuition fund as well to enable the schools to acquire, maintain and improve their facilities and purchase the teaching and learning materials. The study also recommends for introduction of stipends to the very poor students to enable them afford educational expenses.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Education of good quality develops citizens who are capable and mindful which in-turn improves their livelihood and those of others around them. Quality education provides citizens with specific and relevant skills, knowledge, values and attitudes which facilitate changes in world view and behaviour of the individual, community and society as a whole. Citizens with such competencies are better agencies of addressing societal issues sustainably. However for several decades the international agenda in education development has not been quality of education but rather it has been access to education. In 1948 the human rights declared and affirmed that basic education was to be made free and compulsory and available for children in all nations. This goal was restated and reaffirmed many a times by international treaties and in United Nations conference declarations but there was no definitive commitment to quality. For instance the EFA goals set in the year 2000 were silent on the quality of education to be accessed (UNESCO, 2015). The UN millennium commitment to universal basic education was also set with no explicit reference to quality (UN, 2015).

After the many years of global efforts to close the gap in access to education while paying less attention on its outcome, the focus is shifting towards quality of education. Efforts in the new focus on quality are geared towards improving academic grades, completion rates, retention rates, enrolment rates, participation

rates, and reduce the drop out and grade stagnation rates. Enabling educational resources including adequate and qualified human resources, physical facilities, teaching and learning materials and finances are key inputs to education systems that focus on providing quality education. Quality must therefore be viewed multi-dimensionally in terms of providing sufficient resource inputs, professional processes, attaining satisfactory, immediate and broad-based outcomes.

Existing research suggest that the clearest means of enhancing the quality of education is by strengthening the institution's capacity through provision of adequate educational inputs. Educational resources which includes school buildings, learning equipment and the educational personnel facilitates the teacher-learner interactions, learner-learner interactions, improves on student test scores and reduces dropout rates, amidst other gains (Teixeira, Amoroso, & Greshem, 2017). Students in Schools with adequate and relevant educational resources have better educational outcomes when compared with their counterparts in schools with inadequate and or inappropriate educational resources (ibid). In the views of Dangara (2016) the amount and quality of educational outcomes is largely influenced by the amount and quality of the resource input and the effectiveness of processing the input.

Educational facilities are espoused indispensable to a learning institution; they do not only host the institution but also hold the key for all the operations and activities that are carried out in that institution. The facilities play a major role in the overall learning process of students and their mental and physical growth. In

other words school facilities directly affect the health, behavior, engagement, learning, and growth of the students. Academic performance is also affected to some extent. Thus it is of prime importance that every learning institution is hosted in a safe, secured and satisfactory physical environment (Llego, 2023).

Dahar and Faize (2011) construe that basic learning tools comprise of both written materials and non-print materials such as slide shows, video tapes, and digital recordings stuff that are prepared to help in content delivery in class. These resources play the role of enhancing memory level, giving sense of reality to what is being taught, enhancing creativity, and helping the teacher to illustrate or explain abstract ideas (Bukoye, 2018). On the other hand deficiency or absence of instructional materials and resources lessens the involvement of the learners such that they remain passive in class.

According to Sifuna and Sawamura (2010) governments world over have come to recognize the important role of institutional facilities and the teaching and learning resources, especially in the learning of science subjects. Incidentally many countries, particularly in the developing countries, the said inputs are hardly adequate. Considering the weak economies of these countries and the continued rise of the cost of education, provision of adequate educational resources remain a big obstacle in their struggle to enhance quality of education. Many studies continue to show that many governments encounter various obstacles in their efforts to improve quality of education. Some of these obstacles include shortage of qualified teachers, well-designed and appropriate physical learning

environment, and inadequate relevant teaching and learning materials as well as inadequate educational finances.

In any education system all over the world teachers duel the significant role to the improvement of the learning outcomes. However in many countries educational institutions are faced with the problem of shortage of teachers. A study by Dijkslag (2019) in Netherlands found that teacher shortage had negative impact on test-scores for all students who took the National grade 8 test. The study established that an increase of teacher shortage at school level with 10 percent points reduced students test scores with approximately 0.06 standard deviations. When a learning institution experience shortage of teachers, then definitely it is a serious obstacle in the course of goal attainment and advancement. Teacher shortage exacts unnecessary pressure on teachers by adding more responsibilities including handling overcrowded classrooms. An overloaded teacher has limited time to handle individual attentions of each student, may find no time to give and mark assignments and provide feedback to students. As a result students' academic performance is compromised.

Sufficiency in quantity and quality of educational physical facilities is a great determinant of access to education. According to a report by the Asian Development Bank (2020) too many of the possible student population in lower and upper secondary in Viet Nam were out of school. For instance in the school year 2015/16 a total of 1.4 million (33%) of upper secondary age population and 430,000 individuals of the lower secondary age were not enrolled (OECD, 2016).

The report shows that there were inadequate facilities to meet the demand for education from the student rising population. The large number of out of school youths was in remote areas where temporary, unmaintained, and out-of-date infrastructures still existed. Nationally only 25 percent of secondary schools in Viet Nam had adequate, quality and relevant physical facilities. In the rest of the schools libraries, laboratories and classes were inadequate and or out-of-date.

Research show that digital learning resources can be of great use in an effort to improve students' performance. According to a survey by OECD (2020) Estonian students emerged top in the PISA ranking of the European Union countries in the mean test scores in language proficiency, mathematics and science. The country had also the least number of low performers in the three subjects examined. The survey attributed the good performance to presence and better usage of digital learning materials. For instance the country has invested heavily on digital learning resources and information technology including key tools like the school management information systems, digital resource banks and internet connectivity. The digital resources facilitate the switch to online learning. Even when schools were closed during the covid-19 pandemic the learners could comfortably access the school system via the internet from home. There were also televised lessons that supported the student learning at home.

Contrary a study by Cristia, Czerwonko and Garafalo (2014) in Peru found that a programme that increased computers and internet access to schools did not reduce

repetition and dropout rates neither improve on enrolment rates. In a span of 5 years of the program the perentage of schools with computers increased from 68 to 85 percent. Those with computer labs increased from 39 to76 percent and those with access to internet increased from 16 to55 percent. Upon evaluation after the 5 years there was insignificant margin in the reduction of repeater rate while dropout rate remained unchanged. The report shows that much of the time was spent in learning the ICT skills but did not translate to its application in improving the quality of teacher- learner interaction and in syllabus coverage. There was also no clearly defined successful ICT model by then.

According to a survey by the parliamentary Institute of Cambodia (2016) on the progress and challenges in Basic education, teacher shortage and absenteeism in rural and remote areas had a serious impact on grade stagnation and dropout. In the school year 2015-2016 the dropout rate in lower secondary was 19.2 percent which was a decrease from 21 percent in 2014-2015 school year. In some areas grade repetition rate was above 10 percent in the school year 2011-2012. More teachers were retiring than those who were starting teacher training and others were exiting the profession for better pastures creating teacher shortage. As a result rural schools had overcrowded classrooms. The classroom environment was not conducive for meaningful teacher-learner interaction. It was difficult for teachers to control students in overcrowded classrooms. Stress and burn-out from high workload and responsibilities was cited as the cause of frequent teacher

absenteeism. Frequent teacher absenteeism results to loss of interest in schooling among students with some eventually withdrawing from schooling.

In another study by Alam and Kaneko (2019) in Bangladesh, access to electricity in schools significantly improved grade progression and reduced non-attendance, but had mixed effects on grade repetition. The study revealed that lighting increased the study hours as the students had an opportunity to study at night. Meanwhile Jackoski (2013) observed that the installation of community solar powers in Abu Hasheem State in Sudan resulted in improvement in passing grades of primary school students by 100 percent. With the solar power, study time both in school and at home increased. The learners were no longer required to do some chores like fetching water, instead water was pumped using the solar power. Students used this time to revise for examinations and do assignments.

In a quasi –experimental study by Ajoke (2017) in Nigeria one group of students was taught English language with the help of visual aids and another one, control group, was taught without. The study established a statistically significant difference in mean scores of the two groups. The experimental group which was taught using visual instructional materials had a higher adjusted mean score of 16.9 as compared to that of the control group of 13.9. Visual instructional materials promote memory retention, stimulate the interest of the learner and increase their concentration span in class.

UNESCO (2016) opines that textbooks are very effective means of enhancing the quality of class room instructions, particularly in overcrowded classes and where there is a large share of untrained teachers, and constrained time for learning. A study by Mupa and Chinooneka (2015) in Zimbabwe attributed grade stagnation and the high failure rate of grade seven pupils to lack or inadequate textbooks in primary schools. The schools had very few textbooks, revision books and resource books. Very few parents supported the education of their children by purchasing learning materials including textbooks. Pupils scrambled for the few textbooks available and this demotivated some learners who failed to secure a book and showed no interest in learning. Teachers had limited reference materials for supporting them in preparing the learning content. A large number of students could not complete the homework as pupils lacked textbooks to assist in doing the homework after school and over the weekends at home.

Elsewhere a case study by Amuriyaga, Hundu and Abujaja (2018) in Ghana attributed poor performance in agriculture subject senior secondary to lack of materials for practical work in agriculture. There were a few animals of limited species in the school farm, the farm tools and equipment were inadequate, and school farm was non-functional. Despite agriculture being a science course that involves practical work, teachers were using lecture method. The absence of the realia made it difficult for the teacher to explain facts theoretically. The students on the other hand get the perception that the subject is difficult leading to disinterest and low morale to strive for excellence.

According to a study by Ajayi, Audu and Ajayi (2017) in Ekiti State-Nigeria, many senior secondary schools had inadequate classrooms. Teachers taught overcrowded classes and had difficulties in managing students during the lessons. Academic scores were relatively low and grade stagnation was reported to be relatively high compared to other states. The teachers reported that they would rarely transit from one learning activity to another without being disrupted by students' misbehaviour. Some of the mischiefs of the students would go unheeded in overcrowded classes. It was also reported that teachers could not manage to attend to the needs of every learners which could have aggravated the disruptions, especially noise, in search of teacher's attention.

Availability and adequacy of school sanitation and hygiene facilities is such crucial in catering for the physiological needs of both the teachers and students. Discomfort from physiological needs greatly disrupts concentration and participation in class. According to a study by Singolyo and Ngussa (2019) in Tanzania poor sanitation facilities were the major cause of poor academic scores, absenteeism and dropout especially for the girls. School toilets lacked doors and locks for privacy and hence not safe and comfortable. They weren't clean nor were they neat and also lacked disposal pins for used menstrual pads. This negatively affected self-esteem of the students leading to feeling of inferiority, unworthiness and withdrawal thereby affecting their participation as they became uneasy in asking and answering questions in class.

Research indicates that lack of stable source of family income has negative effects on enrolment, test scores as well as grade progression. In a case study report by Master Card Foundation (2018) in Uganda late enrollment, low test scores and grade stagnation or dropout were common phenomena of secondary education. The study found that about a quarter of students could not afford to re-open the school at the beginning of the term/year owing to financial constraints. Most of the household heads were needy peasant farmers or single parents who were struggling to pay for the educational expenses required for their children to remain in school. Besides the late re-opening of school, a majority of these children were also more likely to be sent home for lack of fees or other school levies in the course of the term/year. As a result they would have less instruction time and were more likely to perform dismally and subsequently repeat the grade or dropout.

Introduction of educational subsidies to caution households of low economic status from pressures of economic hardships has profound effects on access to education. In a study by Evans, Gale and Kosec (2021) in Tanzania a cash transfer programme increased school participation by between 8-10 percent points and primary school completion rate by between 14-16 percent points. The very vulnerable including the orphans benefited the most. Cash transfers that began in 2010 were delivered by selected committees. For a family to qualify for the cash transfer children of 7 to 15 years were to be enrolled in school and those under 5 years should have attended health clinics at least six times a year. The study

established that the cash transfers were enough to meet the educational expenses for the children and therefore it was feasible for the families to educate children.

A free or subsidized meal in school is a powerful tool used to expand access to education, improve retention and reduction of dropout cases. According to the WFP (2019) free school meals in Poverty stricken region in Southern Madagascar was used to lure families to enroll their children to school rather than using them to provide labour. When the funding of the free school meals was stopped many students withdrew from school and this aggravated the already low enrollment in the region. In another study by Mwangi (2018) in Kitui County, Kenya the introduction of free day secondary education and government bursaries led to increase in both retention and completion rates. Completion rate moved from 70.4 percent in 2007 to 72.6 percent in 2013. The free day secondary education and the government bursaries made secondary education more affordable. The students were therefore able to attend school undisrupted by being sent home more often because of arrears in fees and other levies. Without disruptions a student is able to concentrate with studies, is more likely to perform well and complete within the stipulated time for the studies.

In a study by Samuel (2017) in Kathiani Sub-County, Kenya teacher shortage had a great effect on grade stagnation and dropout. The study found that cases of dropout and grade repetition were more prevalent in rural schools where problem of teacher shortage was more pronounced. When teachers are inadequate some

classes may go unattended or out of exhaustion from the high workload and responsibilities the teacher may just give out an assignment and take time to relax. In such a scenario students learn little and are likely not do well to be promoted to the next grade. Others get disinterested with schooling and may contemplate absenting themselves or even drop out.

In another study by Mabeya (2019) in Kenya teacher shortage arising from teacher attrition led to decline in KCSE mean score in Uasin-Gishu County. The study established that when attrition moved from 25 teachers in 2012 to 45 teachers in 2016 the KCSE mean score dropped by 1.8 points. According to the study when some teachers leave those who were left had to combine classes resulting in overcrowded classes. It was difficult to assess students work and offer personal assistance to slow learners. The students also found it difficult to write in congested sitting arrangement.

Meanwhile a study by Mbalilwa, Owiti, Shikuku and Pepela (2017) in Kakamega central sub-County, Kenya attributed the Poor performance in mathematics to insufficiency of teaching and learning resources. For the period 2011 to 2015 the mean score in mathematics ranged from 3.229 to 3.707, mean grades of D and D+. While some of the available teaching aids were available and frequently used, there were some whose usage was rare due to unavailability. For instance 58 percent of teachers didn't use playing cards, coins and dice when teaching probability and 85 percent did not use pictures and toys when teaching similarity and congruence. Learning aids help the teacher to actively involve the learner,

make the lesson more interesting and the learner is able to conceptualize the intended concept with more ease.

Hidden costs of education can greatly hinder educational attainment of children especially those from poor households. According to a study by Ngwacho (2015) in Kisii County hidden costs levied by a majority of schools had harmful effects on transition and completion rates of students in secondary schools. The study revealed that parents in boarding public schools were paying for prize awards, salary for B.O.M teachers, caution money, fee for optional subjects like computers and home science, supplementary text books, internal exams among others. Children of parents with unreliable sources of income would regularly be sent home for non-payment of these costs which reduced their participation rate and for those who failed to pay ended up withdrawing from schooling. The study established that annually 14 students failed to transit to the next class at an average hidden cost of KES 23,875. Further the study found that for a particular year if the hidden total costs were KES 20,000 the number of students who would fail to complete in four years would be 30. And if the total hidden costs were increased to KES 35,000 the number of students who would fail to complete in four years would increase to 60. Frequently absenteeism due to non-payment of school levies or because of other reasons reduces the instructional time and the student learns less. The chance of such a student performing well in exams is low which increases the likely hood of repeating a class. Such a student may also contemplate dropping out.

In another study by Jepchirchir (2019) in Uashin Gishu County found that inadequate physical facilities had adversarial outcome on access in secondary schools. According to the study there were no adequate classrooms to accommodate all students which resulted in large and overcrowded classes, schools lacked adequate laboratory facilities. A majority of schools had not met the ministerial guidelines on toilet to student ratio of 1:25 for girls and 1:30 for boys. From the inferential statistics of the data analysis the study established a strong positive correlation of 0.936 between the school physical facilities and access to education. Overcrowded classes compromise on the effectiveness of the teacher. Lack of enough space limits the teacher movement and may be difficulty to control students. Students easily get off the task and end up learning less.

For an educational institution or system to offer inclusive education it ought to have satisfactory of quality and relevant instructional resources to cater for the diverse needs of different learners including those with special needs. In a study by Okongo, Ngao, Rop and Nyongesa (2015) in Nyamira County, Kenya many children with special needs were not enrolled in pre-school centers. The drop-out rate for children with special needs was also very high. The study found that the available teaching and learning resources could not meet the diverse needs of the pupils in all the pre-school centers. For example the pre-schools had no braille slate required for reading and writing by children who are visually impaired. There were also no large print texts for those with partial visual impairment.

Schooling profile in Embu County indicate that the County has consistently faired relatively poor. In 2017 alone 1,016 (2.5%) students were repeaters out of 40,917 students enrolled in the previous year 2016. The county KCSE mean grades for the period 2016 to 2019 were 3.67, 3.45, 3.98, and 4.29 respectively (KNEC, 2019).

Table 1.1 KCSE performances for the period 2016-2019

		Grade					
Year		A and A-		C+ to B+		D+ and below	
		f	%	f	%	f	%
2019	Nationally	6,423	0.95	119,323	17.6	421,057	62.0
	Embu County	81	0.7	2,256	19.5	6,475	55.9
	Kirinyaga County	89	0.81	2,530	20.3	5,829	53.7
2018	Nationally	3,732	0.58	86,645	13.5	440,409	68.6
	Embu County	45	0.40	1,752	15.7	6,722	60.2
	Kirinyaga County	52	0.52	1,701	17.1	5,909	59.4
2017	Nationally	2,856	0.46	67,217	10.9	438,914	71.3
	Embu County	25	0.23	1,511	14.2	6,797	63.8
	Kirinyaga County	34	0.33	1,699	16.5	5,944	57.7
2016	Nationally	4,786	0.83	84,143	14.7	376,414	65.6
	Embu County	50	0.49	1,745	16.9	6,110	59.4
	Kirinyaga County	61	0.58	1,860	17.6	6,162	58.3

Source: County education office-Embu & Kirinyaga

From Table 1.1 it is evident that the ratio of quality grades in Embu County for the period 2016-2019 is below the national ratio. The ratio is also comparatively

lower than that of her neighbouring County of Kirinyaga. This trend warrants an investigation to unravel the issues contributing to the decimal performance. With public day schools being more and take more students than the public boarding schools the study sought to examine the influence of educational resources on quality of education in public day secondary schools in Embu County.

1.2 Statement of the research problem

In an effort to improve on the quality and access to secondary education, the government of the Republic of Kenya implemented various measures. The measures involve adoption of elaborate policy on information, communication and technology (ICT) in education to guide in its integration in education. This initiative was aimed to improve on the efficiency and effectiveness of curriculum delivery, improve on education governance and management, and enhance delivery of quality and relevant skills (Republic of Kenya, 2021). The Medium term plan III (2018-2022) of the vision 2030 endeavoured to improve access, equity, quality and relevance in in education, training, and research. The implementation of this strategy show the government increase student's capitation from Ksh 12,870 to Ksh 22,244 and continues to expand infrastructure and equipment through construction and rehabilitation of schools (Republic of Kenya, 2019). In 2017 the Government in conjunction with the World Bank initiated a project to improve quality of secondary education (SEQIP) in targeted areas through the provision of additional instructional resources (Republic of Kenya and World Bank, 2017). Contracting of internship teachers by the teacher service

commission is aimed at mitigating teacher shortage. In addition the government continues to strengthen the capacities of school managers through the training at Kenya Education Management Institute-KEMI.

However secondary education still faces a number of challenges in relation to staffing, financing, school physical environment and teaching and learning resources. For example the Global partnership report for education in Kenya (2019) shows that the country falls short of the required number of teachers to teach in all the schools. The report further indicates a financial resource gap of US$ 283 million needed to support education sector, particularly in financing of the free day secondary education. Other challenges facing the secondary education include large and overcrowded classes as the schools struggle to implement the 100 percent transition policy. Teachers in some learning areas like sciences and technical are in short supply. This has narrowed curriculum in a number of schools as they cannot offer some of these subjects which limits the career choices of the learners. There is also the challenge of insufficiency of teaching and learning materials. Further challenges are those of educational wastage out of class repetition and drop-out mainly due to diverse factors, such as the range of user charges being levied and child labour that impact negatively on school attendance and participation.

The Embu County education profile is a replica share of these challenges. For instance the education statistics by the ministry of education (2019) show that the students who joined form one in 2014 and 2016 were 12,099 and 12,885

respectively. The number of students who sat for KCSE in 2017 and 2019 were 10,653 and 11,593 respectively. This implies that some students in the two cohorts either repeated classes or withdrew from schooling. Additionally the academic performance is also wanting. The data in Table 1.1 depicts that 60.3 percent of those who sat for KSCE for the years 2016 to 2019 in Embu County scored mean grades of D+ and below and only 17.1 percent managed university entry grade. According to the government policy, only those who score a mean grade of C+ and above qualify for a degree programme at a university. Those who score mean grades of C and C-minus qualify to pursue diploma and certificate courses. Thus a majority of students from Embu County cannot secure places in tertiary institutions to train and enhance their capabilities for both self and national development.

1.3 Purpose of the study

The intent of this study was to establish the influence of educational resources on quality of education in public day secondary schools in Embu County.

1.4 Objectives of the study

The research objectives that guided this study were;

I. To examine the influence of human resources staffing levels on quality of education in public day secondary schools in Embu County.

II. To determine the influence of adequacy of Physical facilities on quality of education in public day secondary schools in Embu County.

III. To determine the influence of adequacy of teaching/learning resources on quality of education in public day secondary schools in Embu County.

IV. To establish the influence of adequacy of financial resources on quality of education in public day secondary schools in Embu County.

1.5 Research questions

I. What is the influence of human resource staffing levels on quality of education in public day secondary schools in Embu County?

II. What is the impact of adequacy of physical facilities on quality of education in public day secondary schools in Embu County?

III. How does adequacy of teaching and learning resources influence quality of education in public day secondary schools in Embu County?

IV. How does adequacy of financial resources affect quality of education in public day secondary schools in Embu County?

1.6 Significance of the study

The findings of the study may provide the teacher employer with some vital information about staffing levels. This will be of great help to the employer when recruiting, managing, and remunerating teachers to resolve the problems of staffing levels. The findings of the study may give school managers useful insights on how to gainfully utilize the available resources to enhance the learning outcomes. Policy makers may use the findings to formulate or amend the existing policies and their frameworks with regard to resource acquisition and management. Planners in the education sector may use the findings to plan and

provide the government with useful insights on resource level for both access and quality of education. This will be useful information for budgeting purposes. The findings will also add to the pool of knowledge in the field of educational planning essential to scholars and researchers.

1.7 Limitations of the study

The main constraint in data collection was that a good number of the sampled schools could not reschedule some of their activities to enable students and teachers to fill in the questionnaires. As such the respondent students missed the scheduled lesson or activity in order for them to provide responses to the research. To minimize on the untimely disruptions of the school programmes which could have also put off the respondents, the researcher had a prior-visit to the sampled schools to request to be scheduled for data collection exercise. Also the researcher physically visited each of the sampled schools to get a clear picture of the schools frameworks to arrange for data collection. This enabled the researcher to visit maximum number of schools in a day.

Whereas it is admissible that the dynamics in the different aspects of quality in education vary across the different communities and their socio-economic contexts in Kenya, this study focused on Embu County. The findings of this study may therefore not be generalized to reflect the situation in the entire republic.

1.8 Delimitation of the study

Although the pressure on educational resources and the possibility of their increasing scarcity is common to both public boarding and public day secondary schools, the study zeroed in on public day secondary schools in Embu County. Public day secondary schools account for 85 percent of all pubic secondary schools in Kenya and enroll more than 70 percent of the student population (Republic of Kenya, 2019). Unlike public boarding secondary schools, day secondary schools benefit fully from the FDSE. However the resource level for a majority of them is yet to march that of the boarding schools. This poses a challenge to provision of quality education. Principals, teachers and students were the respondents as they were considered information-rich for this study. The main research tools for garnering data were questionnaires and interview schedule. An observation checklist was also used to record status of the facilities.

Quality of education has varied measures in terms of input and output. This study focused on human resource staffing levels, physical facilities, teaching and learning resources, and financial resources as educational inputs. The outputs considered were academic performance, dropout cases, grade repetition, enrolment, and completion rates. Even though there are other educational inputs such as time and family involvement and other outputs such as future earnings, employability, and occupation status, the study focused on the aforementioned measures.

1.9 Assumptions of the study

The study was based on assumption that:-

i. Educational resources significantly influence quality of education in learning institutions.

ii. Improving the quality of education catapults economic growth and development of a nation.

1.10 Operation definition of terms

Completion rate-will refer to percentage of students who join form one and finish secondary education within four years.

Dropout rate-will refer to percentage of students who were enrolled in a given school year who are no longer enrolled in the following year.

Enrollment rate-will refer to number of children of official secondary school age who are enrolled in secondary school expressed as a percentage of the total number of children of the official secondary school age population.

Educational resources- will refer to teachers, teaching and learning materials, physical facilities, and school finances.

Financial resources-will refer to school funds inform of student capitation, grants, bursaries, fees, or those from school income generating activities.

Human resource -will refer to mainly teachers.

Overstaffed- Having more number of teachers as per the CBE.

Physical facilities-refer to school premises including classes, laboratories, libraries, and other properties such as electricity, internet and playgrounds.

Quality education-refer to education whose outputs are academic excellence, high completion and enrollment rates, low or no repetition and or dropouts.

Quality grade-will refer to KCSE grades of C+ to grade A.

Repetition rate-will refer to number of learners who have stagnated in particular grade in a given school year expressed as a percentage of enrollments in that grade in the previous school year.

Staffing levels - number of teachers in a given school with regard to the CBE.

Teaching and learning resources-refer to instructional materials used in organizing and supporting in content delivery.

Understaffed –refer to having less number of teachers as per the CBE.

1.11 Organization of the study

This research work is organized in chapters. The first one discusses the study back ground, definition of the research problem, research purpose, study objectives, the null hypothesis, importance of the study, constraints and scope of the study, assumptions of the study, operation definition of terms and organization of the study. The second chapter discusses the review of related literature consisting of the outset, the viewpoints on quality of education,

human resources, physical facilities, teaching-learning materials, and financial resources. This is followed by the summary, theoretical and the conceptual framework. The third chapter deals with the systematic ways to resolve the research problem consisting of frame work of research methods and techniques, the defined population, representative of the defined population and its selection procedures, research instruments, legality and consistency of the instruments, steps in gathering data, techniques of analyzing data, and the focus in research ethics. The fourth chapter includes data presentation, analysis of the research findings and discussions while the fifth chapter presents the overview of the study, conclusion, recommendations and proposition for further research.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

The chapter begins with an overview of the concept of quality in education. It is then followed by exploration of the relevant literature on the relationships between human resource staffing levels and quality of education, availability of school facilities and quality of education, availability of teaching and learning resources and quality of education and adequacy of financial resources and quality of education. The theory that guided the study and the conceptual framework are also presented in this chapter.

2.2 Concept of quality education

The concept of quality in education is elusive as there is no bound to the scope of education, but rather it keeps on evolving and in reference to the diversity of education systems and structures of social values. In other words there is no unified conceptual approach to the definition of quality education. It has been defined differently by various scholars. Schindler (2015) note that the strategies of defining quality focus on a number of discourses such as the main goal to be achieved or the specific indicators of the appropriate input, process or the output. Garira (2020) asserts that the primary focus of research on quality of education should be the educational input, process or output either at pre-school level, school level or at national level. Determination of quality of education should

have a holistic approach in terms of inputs, process and outputs. Therefore besides the test scores measuring quality of education should consider additional parameters such as completion rates, enrolment rates, repetition rates, participation rates and dropout rates (UNICEF, 2020).

Perhaps a more simplified approach to define quality education is to consult the international indicator systems and refer to what they describe and measure. The international indicator systems include those of OECD, World Bank, UNESCO, European Commission and UNICEF among others. For example according to the OECD (2007) perspective, definition of education quality is based on the indicators of a context-input-process-output model. The context indicators include the financial and economic level of the society, structure of education system and demographics, and the educational goals. The indicators of the input include the educational cost per child, cost of training and employing teachers, expenditure on research and monitoring and developments. The process indicators include the learning environment involving teacher-learner-material interactions. The outcome indicators refer to statistics on access and participation and the data on educational attainments.

The World Bank (2008) conceptual framework on quality of education constitutes the inputs, access, equity, efficiency, and quality and outputs. The inputs are in the form of physical, human and financial capital. The quality is assessed through pupil-teacher ratio, the percent of trained teachers, and the public expenditure on

education. Access to education is measured in terms of gross and net enrollments at various levels of education. Equity is assessed through gender parity index in gross enrollment rates, gross intake rates, and repetition rates. Efficiency is assessed through the survival rates, completion rates, dropout and private enrollment share. Meanwhile quality and output is assessed through TIMSS scores in mathematics and sciences, adult literacy rate and the average years of schooling for the adults.

In the views of Nwana (2000) quality of education is the scale to which, out of the process, the inputs lead to desirable outputs which are acceptable, beneficial, and effective or efficient in the views of education stakeholders. Taking this into consideration it is worth to conceptualize how quality of inputs influences the quality of output. For instance according to UNICEF (2000) the quality of school premises is related to other aspects of school quality like the instructional materials and physical space available to allow teachers to use specific teaching method. Meanwhile the availability of toilets, clean water, furniture, and electricity will all influence amount of time on task in the process of teaching and learning. When students queue for the few available lavatories, for example, they get late for the lesson. When school is far and children have to walk for long distance concentration and participation in class is affected. In all the given scenarios academic performance would be the most and negatively affected output.

It therefore follows that quality of education in the perspective of inputs will be defined as provision of sufficient and relevant educational resources. This means that teachers and other educational staff are of the right numbers and qualifications. The facilities are adequate, purposely designed, spacious and safe for use. Teaching and learning materials are adequate, timely availed and appropriate for the intended instructions; while the finances are adequate and timely availed for the intended use. And when quality is defined in terms of education outputs then quality will refer to excellence in academic performance, high rates of school enrollment, completion, attendance and participation as well as low rates of school dropout and grade repetition.

It is thus through proper investment into the educational inputs that inclusive and equitable quality education for sustainable development as proposed by UNESCO (2016) can be realized. For instance for individuals with disability to have access to education, the school will require to have the necessary facilities and instructional materials suited for their use. Such include braille slates for their reading and writing, furniture, toilets and pavements specifically designed for them. The deaf, the blind, and the mentally challenged will require teachers of special needs. And for the economically disadvantaged and less fortunate in the society, social protection programmes like cash transfers, free education, or free uniforms need to be available for them to afford to enroll to school. Otherwise insufficient or lack of such inputs will lock out a section of the society out of the system and thus no inclusivity.

2.3 Human resource staffing levels and quality of education in schools

Among all the educational personnel, teachers are the main players in provision of education as they have the central role to instill knowledge, skills, values and attitudes to the learners. Taking this into consideration adequacy level of teachers and their qualifications are significant attributes to the quality of education. The number of qualified teachers available influences a number of measures which point out the quality of learning including class-size, pupil-teacher ratio, workload, and amount of productive learning time. Effective educational policies on staffing levels are thus essential to implementation of educational plans.

According to a study by Ronfeldt, Loeb and Wyckoff (2012) in New York City, frequent teacher turnover resulted in teacher shortage and negatively affected the performance of students. For example the scores in mathematics were 6.1 to 7.9 percent of standard deviation lower in years when there was high percentage turn-over of teachers as compared to when there was none at all. Staff turn-over disrupts the coherence of school instructional programmes and the quality of trust among teachers and between teachers and students. In some instances students learn less when teachers leave and are not immediately replaced and this creates a void where students go unattended for some days.

According to the Pennsylvania's department of education (2019) teacher turnover in Harrisburg school district had detrimental effect on students test scores. The district was ranked among the bottom. For instance in 2017-2018 school year only 7.1 percent of students scored proficient and above in algebra against the State

average of 45.5 percent. The report indicated that some teachers left without being replaced and students would miss lessons. Some schools ended without certified mathematics teachers to offer daily thorough teaching and exposure. In many schools where teachers had exited without replacements the students were taught by part-time untrained substitutes. When students are taught by unqualified teachers the quality of learning gets compromised as the teacher may fail to deliver as per the needs of the learners. Students may become disinterested; develop a negative attitude towards the teachers and the subject as well.

According to the OECD (2016) report of analysis of the PISA results, students in schools with higher incidents of shortage of teachers had 0.23 probability of attaining low scores in mathematics. This was even after holding constant the socioeconomic positions of both the school and the student across all the countries of OECD. The scenarios reported in cases of teacher shortage included missed lessons, unmarked students work, large overcrowded classes among others. Teachers being the key instruments of impacting knowledge and skills, and in the attainment of desired values and attitudes by the learners, in a missed lesson there was no learning that took place. This is because learners need to be told new things and how to do them. Teacher's feedback on students work serves to communicate, guide and encourage the student to do more. In overcrowded classes the feedback is not guaranteed as the teacher time for each student is reduced and or may not be available altogether.

In a review of the public expenditure on education in Jamaica by the joint efforts of the World Bank and UNICEF (2021) pupil-teacher ratio was correlated to the academic performance of the learners. The pupil-teacher ratio in secondary schools was 25:1 which was higher than of the neighbouring Caribbean countries. From the analysis of the review an addition of a student per teacher lowered the chances of attaining an advanced level in English language and mathematics by 1 percent point. The increase in pupil-teacher ratio was often caused by emigration of teachers causing a shortage especially in mathematics and sciences. The review also established that the presence of a qualified teacher with a bachelor degree correlated to improved academic performance of students. However in rural areas the ratio of pupil to a graduate teacher with a bachelor degree was as high as 100:1 due to inequitable distribution of teachers. This implied that students in rural schools had very low chances of excelling academically as large class-size suggest heavy workload for teachers. With large class-size teachers have limited teaching methods due to available physical space and resources and as such the method applicable may not be in favour of quality teacher-learner interaction. Individualized instruction as per the needs of the learner proves difficult in large class-sizes.

The educational statistics by the Afghanistan Research and Evaluation unit (2013) show that the number of girls' enrolment at elementary school is half that of the boys while at secondary level this number drops to a third that of the boys. Noori (2017) highlights lack of female teachers as one of the main reasons for low

enrolment of girls as less than 20 percent of all teachers were females. The mothers feel more comfortable when their daughters are taught by female teachers. Female teachers acts as role models and encourage girls to enroll and successfully complete their studies. Girls also feel safe when confiding their personal problems to female teachers who can offer protection from unwanted attention by boys and male teachers (Kirk, 2006).

In a study by Hoque and Mahanta (2021) that examined the role of a teacher in improving quality of education in 40 developing countries, pupil-teacher ratio had statistically significant and positive impact on dropout rate. The study established that reducing class-sizes by recruiting more teachers led to reduction in dropout cases. When students are few in a class the teacher is able to have a one-on–one instruction with individual learners in a manner that would not work in overcrowded classrooms. When individual needs of a learner are met he or she feels motivated to learn; especially those at risk of dropping out due to low test scores. Small class-sizes also reduce workload for the teachers giving them more time to offer other services like guidance and counseling students who may be at risk of dropping out due to indiscipline or teenage pregnancy among other issues.

According to UNICEF (2019) teacher shortage in Madagascar was such serious that average class size had over 68 students. This had negatively impacted on academic achievements and completion rates. More than 50 percent of children completed the primary level without the basic skills in mathematics and French language. Out of 100 children who enrolled in primary, only 40 completed the

cycle, 20 completed middle school and 10 completed secondary school. An earlier study by Wills, Reuter, Gudiel, Hessert and Sewall (2014) in Madagascar found that the large class-sizes were difficult for teachers to handle and this led to poor learning outcomes. Subsequently children with low test scores were forced by the system to repeat classes and this worked against completion rates. Qualification of teachers especially in primary school was wanting as a large number of them had not completed high school. Such teachers lacked the competence in teaching and this affected quality of content delivery.

According to a study report by Marchetta and Dilly (2019) in Burkina Faso teacher shortage due to challenges in teacher recruitment had considerable effects on repetition, dropout, transition, and completion rates. Completion rates were as low as 65, 24 and 9 percent in primary, lower and upper secondary respectively. The low completion rates were as a result of grade repetition and dropout cases which were attributed to academic failure. In particular the study noted that in the 2017 school year 28 percent of learning time was not taught due to lack of teachers in some areas. When instruction time is lost the syllabus will likely not be completed by exam time and as a result academic performance will be dismal and may lead to grade repetition, disinterest in schooling and or even dropout.

The Eritrean education sector analysis report by the Ministry of Education (2017) indicated that insufficient number of qualified teachers in rural schools was an

obstacle to secondary education achievements. The constraint in teacher training and recruitment was compounded by high rate of teacher attrition particularly in rural areas. In 2012/13 academic year alone 1,306 teachers quit from teaching. The report highlights that in the period 2013-2017 the country had a shortage of 1865 teachers at lower secondary with rural areas being the most affected. Dropout rates were lower and grade progression was higher in school located in urban areas. In urban centers schools had relatively sufficient teachers owing to low attrition and high retention of teachers courtesy of better social amenities. In rural areas most teachers were unqualified; some teachers were teaching subjects which they had not trained in thereby compromising the quality of delivery and of the content learnt. Favour (2012) points out that unqualified teacher recite the materials in the text book and require the students to memorize in order to pass their exams. Unqualified teacher also lack knowledge and self-confidence in managing classes that entertain diversity of opinions which discourages students from thinking critically. Teacher absenteeism was also high and this reduces time for instruction and thus students learn less. Big class sizes and heavy work load in remote areas worked against teacher quality time for individual learner.

According an education assessment report by Windle Trust (2017) in South Sudan teacher factor had greatly influenced students' enrollment, dropout and academic achievements in secondary schools. For example in 2016 the average dropout for girls was 15 percent while for boys it was 8 percent. The high dropout for girls was attributed to shortage of female teachers who accounts for only 14 percent of

the teaching force. In rural areas the percentage of female teachers was much less. Secondary school girls are at a very sensitive age of their development and in the absence of female teachers whom they can confine to or seek assistance the girl may feel insecure being in school. The parent may also be reluctant to send their girls to schools dominated by male teachers. The problem of teacher shortage was compounded by the fact that only 56 percent of the teachers were trained; more than 25 percent were untrained and the professions of the rest were not known. This had negative impacts on the effectiveness of content delivery due to lack of appropriate pedagogical skills. Owing to delayed salaries for as many as 8 months and insecurity some teachers had exited the profession leading to acute shortage of teachers in some regions. The shortage had led to overcrowded classes in which teachers had difficult meeting the need of individual learners.

In Kathiani sub-County, Kenya a study by Musyoka, Cheloti and Maithya (2018) established a significant and a positive relationship between teacher adequacy and academic performance. A majority of the respondent principals disagreed with a statement that their schools were sufficiently supplied with teachers as per the curriculum based establishment. Adequate teachers translate to small and manageable class sizes that allow the teacher to attend to every student; students behave better and are more attentive. According to this study, when teachers were increased by a unit, academic performances of the students tend to increase by 0.6 of a unit.

2.4 Physical facilities and quality of education in schools

Physical facilities lie at the heart of any education system. They include the school land, buildings, electricity, internet connectivity, and furniture-all which form the school physical environment for teaching and learning. According to the RoK (2005) adequate, well designed, well maintained and sufficiently furnished and equipped school facilities have a profound positive effect on both participation and achievement rates. Arguing in the same vein the Development Bank of Latin America (2016) opines that well-designed, sufficient, safe, comfortable and spacious school facilities have positive effects on student's attendance, completion rates, enrollment and academic performance.

A study by Ramli and Zain (2018) in Malaysia attributed low test scores of students at Peng Kalan Chepa city campus to the physical conditions and organizations of the classrooms. The students were overcrowded in large class-sizes. The classrooms were also untidy and uncomfortable and worse still there were so much noises interruptions from where they were located. In classrooms where students are many and congested the sitting position and posture may make it difficult for one to take/write notes. Communication between the teacher and the learners may be ineffective especially if compounded by noise from within or without. The untidiness of the classroom environment and noise can greatly interfere with concentration and the focus reducing the time on learning task.

In Ghana a research on managing the effects of overcrowded classes on quality education by the National Centre for Research into Basic Education (NCRIBE) (2017) reported that overcrowding resulted in increase in grade stagnation and dropout especially for girls. Primary schools and senior high schools in Northern Ghana had the largest class sizes of 84 and 96 learners respectively. Ashanti and Northern regions had the largest class sizes of 63 learners for junior high schools. The large class sizes were attributed to fast rise in population and inadequate school physical facilities. It was stressful and exhaustive for teachers in managing overcrowded classes as some student would disorientate others by making noise, bullying and quarrels. In most instances teachers were not able to handle disruptive behaviour of students effectively. Due to lack of flexible space over which the teachers would move round the class, demonstrate and use learner centered approaches, the teachers opted for lecture method.

Another study by Kibuthu (2016) in Narok North sub-County, Kenya attributed the poor performance of students in the Kenya certificate of secondary education examination to inadequate and poor state of school classrooms. In a majority of schools classes had corrugated iron sheets without sound proof ceiling which would make noise in windy times and leaked during the rainy seasons. Student would struggle to hear and concentrate during the lesson. Learning in classes which were constructed using iron sheets for the walls and the roofing was very uncomfortable. This was because during dry seasons the classes got very hot and students would feel drowsy thereby losing the concentration. The classes were

also overcrowded and some students would make noise or distract others getting them off the lesson task without the notice of the teacher. In teaching and learning it is very important that the learner is in a state of ease of mind and body. Discomfort and disruptions disorients the mind and the smooth uptake of new ideas that builds on one's skills and knowledge.

Various studies have documented the influence of school laboratory on the educational attainment of learners. In a quasi-experimental study in India by Yadav and Mishra (2013) the treatment group which was taught through laboratory approach had better academic performance compared to the control group taught in the usual classroom set up without visiting school laboratory for experiments. The objectives of the work of the school laboratory are; to train learners on scientific methods of discovering and investigation; and integrating the theory with the practical work. Besides experiments in the laboratory enhance the observation, interpretation and prediction skills which improve on the creativity and innovativeness of the learners.

In a similar quasi-experimental study by Shana and Libdeh (2020) in United Arab Emirates experimental group performed better than the control group. The study involved administering a pre-test in both chemistry and biology. This was followed by teaching experimental group using intensive practical method in the laboratory while the control group was taught using lecture method in usual classrooms in chemistry and biology. A post-test was then administered to assess

the effect of practical work in understanding of sciences. In the pre-test all the students in the two groups were at the same academic level but the experimental group outperformed the control group in the post-test. The analysis of the post-test revealed that students in the experimental group had much greater understanding of the information covered, especially regarding questions that required interpretation. Hodson (1990) posit that practical work motivates the students; inspire them in teaching and learning; improve the learning of scientific knowledge, and broaden their way of thinking.

Whereas science laboratories play the ascribed vital role in learning of sciences a study by Daba and Anbesaw (2016) in Afar region of Ethiopia attributed the poor performance of students in sciences to unconducive laboratory rooms. The number of available common laboratories was inadequate to accommodate all the students. In some schools even the rooms which were being used as 'laboratories' were not originally built for this purpose. The rooms lacked ventilation and would become very hot, particularly in summa. The doors, windows, and roofs were broken. The rooms lacked running water, working benches and sinks. Generally the laboratory environments were dirty and not suitable to work in. A majority of teachers (68.8%) were not using practical activities in the teaching of science with 78.7 percent indicating that they did less than 5 percent of the practical activities as per the text book. When the learning environment is unconducive the students get disinterested. The teachers also lose the motivation as they struggle to impact abstract ideas theoretically which they would simply teach practically. The dirty

laboratory environment, the unmaintained broken facilities and absence of ventilation can put off and discourage both the teacher and students from carrying out experiments. As a result, as suggested by Kamba, Libata and Usman (2019) the students will have a low level of understanding and thus unable to comprehend abstract and complex scientific concepts.

The Freedom of Access to Information and Resources (2016) posit that well-resourced school libraries help students in critical thinking and research. Large and flexible learner space in the library allow for free discussions and collaboration which promote imaginativeness and originality. Access to digital study materials make students less dependent of their teachers. These views are supported by a number of studies. One such study by Marzoli and Papa (2017) in Italy established a significant difference in the scores of students attending schools with well-resourced libraries compared to those attending schools with small library-collections or without library. Using the results of NIEEIT test the study found that grade 10 students in schools with well-resourced libraries had an average of 49 percent in mathematics and 64 percent in Italian. The average score for their counterparts in schools without school libraries were 43 and 58 percent in mathematics and Italian respectively. In well-resourced school library students have access to a variety of reading materials that if well utilized promote reading and comprehension skills. The library also provides a suitable and rich environment for student discussion as they interact with academic materials that they use to complete class projects or assignments. When a student appropriately

uses the information from library materials, there are higher chances of academic excellence. In Backing these assertions the World Bank (2008) posit that the outputs of an effective school library is the ability to access required information to widen the scope of understanding all the curriculum subjects.

In a case study by Omenyo (2016) in Achimota Basic School in Ghana, improvement of performance in English language was attributed to availability of library and level of library materials. The study found that there was improvement in pronunciations and use of new words; spelling and appropriate use of vocabularies that lead to the overall improved performance in English language. The library was located close to the classrooms. Students visited the library to search for information to be able to complete assignment, homework and project work and borrowed materials to read after classes and over the weekends. They also visited the library to play games, and prepare for competitions in drama and debate as well while teachers visited the library facility to prepare for lessons. The proximity of the library enabled students to visit the library as many times and with less effort. Access to reading materials within reach prompts and encourages reading habit. The students were also able to access books which they did not personally have and this helped them to broaden their understanding of what was taught in class. Once a student understands what the teacher is teaching they perform better in the examinations.

Meanwhile a study by Leo (2016) in Tanzania observed that students in schools with good library services had a lower proportion of students with failure compared to those in school without libraries. For the period 2012 to 2014 the percent of students with failure in schools with good library services were 2.9, 3.1 and 4.4. The percent of students with failure in schools without libraries for the same period were 37.4, 35.2 and 32.8 respectively. School libraries provide a serene-quite study place with text books and other reading materials of interest to doing assignments and revise for examinations. When students devote substantial time being exposed to library materials they develop a reading culture that promote their literacy skills and also become more responsible to their own schooling.

Research shows that investing in school water and sanitation has significant impact on educational outcomes. According to a study by Adukia (2014) in India building school-latrine led to reduction in dropout rate and improvement in enrollment particularly for pubescent girls. The study analyzed the impact of a government programme that constructed 220,000 toilets in the year 2000 in schools called 'School Sanitation and Hygiene Education-SSHE.' The study revealed that gender-exclusive latrines contributed to the girls' privacy and security from verbal and physical harassment, and reduced gender disparities. Girls are less likely to attend schools where their health, privacy and security are not guaranteed. School latrines also improved the ratio of female teachers and their willingness to show-up for work especially in schools with gender-exclusive

toilets. A large share of female teachers has much benefits to female students as they act as role models and girls can confine their personal issues to them (World Bank, 2001). Further the study revealed that presence of school latrines had a major impact on child health, particularly health side effects from unmanaged waste. School absenteeism due to prolonged ill health can easily lead to dropout.

In a similar study by Hamza (2016) in Punjab, Pakistan investment in school latrines led to a significant increase in enrollment. The study analyzed the enrollment trends for schools that initially lacked toilet facilities before 2012 and 2 years after the toilets were constructed in 2012. The study established that after the construction of toilets enrollments in secondary schools increased by 7.9 percent points and by 5.3 percent points in primary schools. The parents were hesitant to enroll their children to schools without basic and proper facilities due to fear of their security. Children, particularly the girls, are usually comfortable with regard to their health when attending school with facilities that meet their physiological demand.

In another study by Ochieng (2013) in Maseno division in Kenya, inadequate and unclean latrines had an enormous influence on the performance of pupils at elementary schools. On average there were six latrines in each school which were far much less than the recommended ratio of 1:25 for girls and 1:30 for boys. This resulted in long queues of pupils waiting to access the few available facilities. Those who failed to access the toilets had to withhold the urine and stool in class,

were anxious and stressed and could barely concentrate. The study further revealed that pupils did not wash hands after visiting toilets due to lack of water and this together with drinking of untreated water exposed them to infections. The pupils occasionally fell ill and subsequently failed to attend school. School sanitation and water resources serve one of the most essential human physiological needs. If well monitored and managed properly, they can offer a significant place in schools that provide a valuable means of support for children in managing their own well-being, and upholding their rights. However, poor toilet hygiene can be a very specific risk of passing on infection and disease which can cause short term illness and absence from school (SCCYP, 2013). According to WHO (2009), a child's ability to learn may be affected by inadequate water and sanitation, and the hygienic conditions in diverse ways. These include helminths illnesses, continued exposure to chemical pollutants in water, diarrheal ailments and malaria causing parasites-all which increases school absenteeism. A sick child cannot participate and concentrate well in class and when this is compounded by poor school attendance the child's learning will have learnt less content not adequate to meet the exam requirement.

Availability of power in learning institutions is an essential component especially in integration of ICT in education and in extending study hours. For instance According to the Economic Survey report by Sengupta (2020) in India academic performance and literacy rates were higher in Indian states that had more schools connected to the power grid. Access to electricity enabled teachers to use modern

pedagogies that incorporate the information communication technology (ICT). The use of ICT in curriculum delivery attracts the attention of students, raises their curiosity and motivates them to learn. With lighting in schools students are able to study at night and early in the morning. The teachers are easily retained in electrified schools a factor that greatly influences performance of students and their completion rate.

2.5 Teaching and learning resources and quality of education in schools

According to Lewis (2020) teaching and learning resources refer to a whole set of educational stuff that teachers exploit when presenting a lesson to achieve the lesson objectives. They include amongst others: books; videos; games; flashcards; model clay; overhead projector transparencies; computer software and software applications; and visual aids. In another perspective Amadioha (2009) defines teaching and learning materials as diverse means of interaction, which a teacher can utilize to authenticate a concept in the process of teaching and learning.

The number of students enrolled in some subjects is determined by the quantity of the available teaching and learning resources. In a study by Gaotlhobogwe (2015) in Botswana the decline of student enrolled in design and technology in junior secondary schools was due to lack of learning tools, equipment and machinery. Despite the government's effort to popularize the subject the enrollment in design and technology continued to decline at an annual rate of 6 percent for a span of 10 years. The study found that tools, equipment and machinery were insufficient in

the workshops and other rooms designated for the learning of the subject. And even for those available, some of them were not safe for use due to lack of maintenance. The shortage of these resources had adversarial impact on students taking the subject and on the other students through peer influence. The study also established that students took too long to complete the assignment and projects as they would queue for the shared tools, equipment and machinery. In the end some would hand in poorly completed or incomplete work and this affected their overall performance and subsequently their attitude towards the subject.

In Kenya a study by Imbovah, Mackatiani, Getange and Bogonko (2018) established that teaching and learning resources contributed in a big way to the students' completion rate in secondary schools. Using a regression model the study found out that availability of adequate materials that are designed to help facilitate learning and knowledge acquisition predicted secondary school students' completion rate by 9.4 percent points. The study found that there were inadequate teaching and learning resources in Kenyan secondary schools. The absence or the inadequacy of these resources prevents teachers from using student-centered approaches that ensure that the learners are actively involved in the learning. Even when the resources were shared, say for instance the text books, some learners would not have an access to the resource at home to assist in doing the assignments and also to revise for the examinations. Such students feel demotivated, get disinterested in schooling, may not do well in the examinations, more likely stagnate and fail to complete education within the stipulated period.

Audio visual aids have been found to be more effective especially in the learning of foreign languages. A study by Bal-Gezegin (2014) in Turkey observed a significant difference between teaching vocabulary using audio-visual materials and audio only materials. One group was taught social expressions in conversation dialogue by watching videos of the conversation. The other group was presented with the audio version only of the same conversation. Upon evaluation the audio-visual group had better vocabulary, responded to questions more precisely, were more motivated and participated more in class compared to the audio group. The mean score for the first group was 74.5 and the mean score for the second group was 43.21. Audio-visual aids that involve listening and watching enable learners to see the real character talking and learn about their mimics and gestures. They help students to acquire knowledge and skills on how to use visuals correctly in their communication. They also enable the teacher to make learning more realistic, effective, interesting, inspirational, meaningful, and vivid. However with audio only, the learner just listens and may be difficult to understand the conversation without seeing the context itself. It is also easy to lose attention to the conversation.

A study by Gulzar and Asmari (2014) in Saudi established that use of print media (newspapers and magazines) in addition to the prescribed textbook significantly improved students' test scores in English language at Taif University. Using a quasi-experimental design the lesson for the treatment group was prepared using the English text book and the print materials. The lesson plan for the control

group was prepared using English text book only. The lesson plans covered four course units selected from the prescribed English text book. Before manipulation a pretest analysis did not give any significant difference in the scores of the control and the experimental group. The groups were then taught for 5 hours every week for one month. Upon evaluation the treatment group attained an average of 63.7 percent while the control group attained an average of 58.13 percent. Print media provide fascinating reading experiences which slowly foster the reading habit and the use of the language. With print media the students get a glimpse of real experience whose visuals capture the attention of the mind and the curiosity to explore more.

Using a quasi-experimental study, Hoopes (2018) established that both print visual aids and the real objects have statistically significant improvement on student test scores and motivation, particularly for the slow learners. The study involved mathematics class students from Youngstown University. A pretest was administered a week prior to the treatment and then the students were put into two different classes. The two classes were taught for two days on the topic of basic trigonometry identities. One class was presented with 3 dimension printed diagrams while the other was presented with paper modelled objects as learning support materials. At the end of the second day a posttest of the same questions that had been administered in the pretest was repeated. Upon analysis the study found that both classes improved in the posttest and there was no pronounced variation in the improvement points of the two classes, an indication that indeed

type of the visual aids did not matter. However the average improvement index of the slow learners from pretest to posttest was 7.14 points as compared to 3.95 points of the fast or high achievers. Both the slow and the fast learners expressed confidence and motivation to learn after the treatment. Teaching aids provide slow learners a space to explore other alternative areas that stimulate their cognitive process more than the high achievers. In other words teaching aids elevates the motivation, engagement and effort which lack in slow learners. The essence of using teaching aids is to captivate the interest of the learners, make them active, prompt them to reason out and create a flow of ideas. In light of this then the print and real objects enabled the teacher to meet the objectives.

Integration of ICT in education is increasingly becoming indispensable means of improving the quality of education. ICT as an arsenal of communicative components include radio, television, smart phones, computers and accessories, connectivity and broadcasting systems, among others (Amutha, 2020). According to a case study by Opati (2013) at Makerere University- Uganda, access and use of ICT (computers and their accessories) by both the students and lecturers boosted the academic performance of students. Students could make their own notes from online materials and this helped them to develop autonomy of thoughts. Science students watched biological and chemical process from the internet which enhanced their understanding. Further, doing assignments and homework using computers and internet increased their engagement with course materials that increased learning motivation. The lecturers reported that they

regularly downloaded materials to enrich their knowledge and update their teaching materials. ICT improve students' interest and retention ability in learning difficult tasks. It has immense ability to create, manage and disseminate knowledge. ICT also allows the learners to progress at their own pace, they are free to select learning content and use a media of convenience, and can study from a place of their convenience.

In a quasi-experimental design study by Abass, Bimbo and Ojo (2012) in Nigeria use of animated agricultural science instructional package lead to improvement of students' academic performance. Using the Pretest and post-test mean scores of control and experiment groups of students the study revealed that there was no significant difference in pretest means scores of the two groups but after treatment, the experiment group had a posttest mean score of 53.0 while for the control group was 46.5. Use of ICTs raised the interest of the learner and improved their attitudes towards learning. The animations help the student to visualize and retention of the memory of the content learnt. It also helps the student to conceptualize abstract ideas.

In a study by Oguta, Egessa and Musiega (2014) in Bungoma County, Kenya a majority of secondary schools that had embraced the use of ICT as a tool to improve quality of learning registered better KCSE results. Out of the 40 percent of schools that embraced the use of ICT, 69.2 percent of them recorded improvement in the KCSE for the years 2012 and 2013. The use of computing

devices to store and retrieve information enables teachers to easily retrieve and print materials for learning. This makes it easy for teachers to give many revision exercise and tests that helps learners to revise and exercise what they learn hence easy acquisition of knowledge and skills development among them.

The Kenya National ICT policy encourages the use of ICT in schools, colleges, Universities and other educational institutions in the country so as to improve on quality of teaching and learning (RoK, 2006). Ease of storage and retrieval of students' performance data help in identifying the weak students and find appropriate ways to assist them. When students are regularly exposed to revision exercises and tests they get exposed to examination experiences and learn how to answer questions correctly. It also takes away the fear for exams and instead strengthens end give them confidence.

In the leaning of practical subjects such as in biology, chemistry, physics and even agriculture, the availability of school laboratory equipment and consumables and their efficient utilization cannot be overlooked. In a study by Abubakar (2020) in Sokoto region of Northern Nigeria the declining performance of physics in secondary schools was due to inadequate teaching and learning resources. The study found that teaching and learning materials in physics were only available and sufficient in 41 percent of schools laboratories. In the rest of schools these materials were either inadequate or lacked in totality. According to 95 percent of teachers, use of teaching and learning resources helped them to improve on

academic performance. This was affirmed by 60 percent of students who agreed to the question that use of teaching and learning resources had contributed to their improvement in physics. Prior exposure of learners to science laboratory apparatus improves their ability to understand the intended concepts and also when they find relevance of apparatus and the associated activities they are likely not to forget (Akinbobola & Afolabi, 2010). In essence laboratory experiences and carrying out of experiment allow student to find out, change information and learn by themselves as opposed to lectures and teacher domineered learning activities.

A study that used pretest-posttest quasi experiment design by Olatoye (2017) in Nigeria established a significant main effect of treatment on students' achievement in mammalian skeletal system concepts. The data was analyzed using Co-variance (ANCOVA) and Scheffe post-hoc analysis used to further interpret the basic findings [$F3, 111 = 10.489$; $p< 0.05$]. The results implied that students' achievements in mammalian skeletal concept were far much higher for the treatment group. The treatment group was taught using charts, real specimens and videos while lecture method was used to teach the control group. As Amadioha (2009) opined, use of instructional materials develop continuity of thought, exposes the learner to first-hand experience which stimulates self-drive in students, and also provides reasonable grounds for conception thinking.

A study in Nyakach sub-County, Kenya by Owino, Osman and Yungungu (2014) established that poor performance in biology was due to inadequate learning

resources. For five consecutive years, more than 45 percent of candidates who sat for biology in the sub-County scored low grades of D and E and only 5.9 percent scored above B+. The study results show that laboratories, chemicals, models, local specimen, and charts were inadequate in a majority of schools. The inadequacy of these equipment limited frequency of doing experiments. Poor quality of materials neglects the changes in the syllabus disadvantaging students and negatively influencing their attitude towards biology.

2.6 Financial resources and quality of education in schools

Researches indicate that the level of educational finances, allocation and utilization is closely associated with educational attainment of learners. Changes in educational finances have diverse impacts on the educational attainments of leaners. This is so because educational programmes, activities and operations of any educational system or institution are entirely dependent of the adequacy of funds available. Educational finances are thus crucial factor in improving quality of education (Baker B. D., 2016). Government funding, household spending and external financial aids such as the one by the World Bank and other global institutions are the main conventional sources of educational funds.

A growing body of evidence shows that increased spending on education leads to better student outcomes. According to a study by Baker (2017) in the US when student capitation of grade 12 students was raised by 10 percent the chances of high school graduation improved by 7 percent for all students and by 10 percent

for those from poor households. Increasing financial resources enable schools to improve on quality of staff; purchase adequate teaching and learning materials and acquire more physical facilities, all which greatly influence the learning outcomes.

Public protection policies including free or subsidized school meals, cash transfer, and affirmative actions have been used in many systems to mitigate the economic hardships faced by people of low economic status. According to a study by Vieira and Arends-Kuenning (2019) in Brazil an affirmative policy for targeted groups increased their enrollment into the most prestigious and competitive academic programmes in the Brazilian federal universities. The target groups were mainly those, whose parents had low levels of educational attainment, public high school students and the blacks. The affirmative action considered the entry points of the disadvantaged student to the aforementioned academic programmes. The programme improved the enrollment for the blacks, the public high school students and those of parents with low level education by 9.8, 10.7 and 14.9 percent points respectively. The hustles associated with children from poor families such as lack of learning stationery and foregoing of lunch meals among others are a hindrance to academic excellence. With such hardships one is likely not able to attain an academic grade for the prestigious or dream career study programme. Poor students also are more likely not afford to attend quality schools of academic excellence with support programmes like remedial sessions and the very best and adequate resources.

Meanwhile a cash transfer programme, Bolsa Familia, in Brazil had a strong impact on school enrolment for children from the poorest households (Buchstab, 2021). The programme worked by providing poor households with cash transfer on condition that their children had achieved the minimum set school attendance rate of 85 percent. The economic constraints hindered parents from sending their children to school and so the cash transfer was to boost their income in order for them to enroll their children. The study established that the probability of a programme beneficially male child being enrolled in school was 0.97 while that of a non-beneficially male child was 0.91. For the girls the probability of a beneficially being enrolled in school was 0.92 compared to that of a non-beneficially of 0.89. The opportunity cost of schooling for the poor households instead of engaging in incoming generating activities is high. This is because when the children are in school they will not assist in family work like tilling the land, harvesting grains, fishing or sitting the young children to free the mother for work. As a result the family income is reduced and this discourages the parents from sending their children to school.

A study by Garcia and Hill (2010) in Colombia established that conditional cash transfer programme ‘familias en accion’ led to improvement in test scores and reduction in grade stagnation. The programme targeted the poor households living in small townships. To qualify into the cash transfer programme the family was required to have enrolled their children aged between 7 and 17 years and attained a school attendance rate of 80 percent of schooling time. The benefiting family

received US$6 for every child in primary school and US$12 for every child in secondary school. Upon the evaluation, the programme reduced the chances of class stagnation for children aged between 7 and 12 years by 3 percent points. Test scores in mathematics and language for grade five children improved by 0.4 and 0.47 of a standard deviation respectively. The cash subsidies increased the income for the families reducing the children's pressure to engage in labour allowing them to have adequate time to attend school, do assignments and revise for examinations. When the family income is boosted it is easier to purchase items like books among others that make home environment conducive for study outside school. The cash transfer also increased food security. With adequate food, particularly cereals and proteins, the children will not suffer malnutrition normally associated with low cognitive achievement.

Elsewhere in Mali a study by Sessou and Henning (2019) established that unconditional cash transfer programme increased enrollment for girls in primary school by 8 percent points and 6 percent point in lower secondary. The programme was introduced in 2014 by the Malian government. It involved giving monthly cash transfer of US$ 20 to each of the poorest households in the rural villages; training organized by NGOs and nutrition food packages for expectant mothers and children below five years of age. Some parents used the money from the programme in educating their children. The cash incentivized the families to send their children to school as it lessened their financial burden of meeting the cost of education.

According to a survey report by the World Bank (2019) of a financial project in Nicaragua that aimed at improving pupils' retention rate and strengthen school managerial capacity had stunning results. The project reduced dropout and repetition rates leading to improved pupils' retention. The finances were used in developing; printing and distributing instructional materials, in-service training of teachers, and providing pupils from poor families with uniform; and stationeries. The finances were also used in buying desks and chairs, and repair of school physical facilities. Instructional materials enrich the delivery of content and enhance retention of the concept learnt. The in-service training serves to better the pedagogies to make the teachers more effective in curriculum implementation. The additional furniture and maintenance of the facilities create a more conducive and inviting learning environment that captures the learners' interest for schooling.

In another study by Amos and Koda (2018) in Tanzania showed that school income generating projects had the potential to improve the academic performance of students. The study revealed that a majority of Catholic sponsored schools in Moshi Diocese that had invested in income generating activities, performed better in in National examinations compared to other school without such projects. According to the study the fund generated from the projects was used to motivate teachers and students, provide balanced diet, organize remedial classes, and to purchase instructional materials. Well-nourished children have better cognitive development hence can have better retention capacity.

Motivated learners have the enthusiasm to learn and can concentrate in class for a longer span. Adequate instructional materials enriched teacher-learner interaction.

A randomized evaluation of a project by an NGO that distributed free uniform to primary school children in Western Kenya in the year 2003 reported impressing results. Five years into the project the girls who had received free uniform were 17 percent less likely to drop out of school, they were 20 percent less likely to have been married off, and were 17 percent less likely to get teenage pregnancies (Neal, 2017). And in Ghana, scholarships awarded to bright students who could not afford secondary education resulted in higher educational attainment. A large percentage (68%) of those under scholarship programme completed secondary school compared to 42 percent of those without scholarship (Duflo, Kremer, & Dupas, 2019)

A study by Keiichi and Wokadala (2014) in Eastern Uganda to establish the influence of the introduction of free lower secondary education established that it led to a jump in enrollment from 208,861 in 2006 to 291,797 in 2008. For the poor families poverty decrease the demand for education as the families may not afford to pay for its costs and the associated expenses. There are also high opportunity costs of schooling for the poor students including working to help the family put food on the table and attending to the old and family members.

On the other hand extra levies by the schools can hinder the government efforts of making education affordable even to the poor. According to a study by Miako

(2012) in Nyandarua North sub-County charging of lunch levy and money for remedial classes lead to decrease in secondary school enrollments. The study found that the enrollment of form two cohorts of 2008 in public day and public boarding secondary schools decreased by 0.7 and 12.1 percent respectively when they transited to form three in 2009. The said enrollments decreased by 2.5 and 4.5 percent respectively as they transited to form four in 2010. The study revealed that the schools charged as high as KES 6,000 for lunch levy and KES 4,800 for the remedial teaching of which some parents could not afford leading to dropout or transfer from boarding to day secondary schools.

The introduction of full funded senior high school for all and free lunch meals for day scholars in 2017 by the Ghanaian government led to a significant increase in enrollment of girls (Abudul-Rahaman, 2020). The funds from the government were used to meet the costs of examination, co-curriculum fees, sports, library charges and entertainment among others which many students from poor families would otherwise not have afforded. The inability to meet the private cost of education is a hindrance in access to education.

A study by Adan and Orodho (2015) in Mandera West sub-Couty, Kenya established that the introduction of free secondary education led to increase in enrollment for the period 2008-2013. A majority of schools also recorded improvement in the KCSE examinations. The two positive impacts were attributed to the fact that with free secondary education students were able to

study without interruptions of being sent home for school fees. The schools were also able to acquire the necessary teaching and learning materials. Before the introduction of free secondary, the fees payment was at average of 41.5 percent which was not adequate for the schools to carry out their operations efficiently and effectively. For example schools were unable to purchase instructional materials which made it difficult for teachers to prepare for lessons and explaining of abstract concepts. A majority of principals had to send student home to collect levies to be used to run the schools. This resulted in many students missing lessons and some dropping out of school.

On the other hand reduction in educational funding has negative impacts on the educational outcomes. This is because when little financial resources are allocated to learning institutions, putting up adequate classes, dormitories, laboratories, libraries and other facilities may be a great challenge which can put the learners at a disadvantage and abort their learning opportunities. According to a study by Jackson, Wiggar and Xiong (2018) the Great Recession in US forced the government to cut down the educational spending per-student in national public-school. The study estimated that a decrease of $1000 in per child spending due to recession led to a decline in test scores by 3.6 percent of a standard deviation. Meanwhile a reduction of $1000 per child spending reduced the probability of joining a college by 3.9 percent points of a standard deviation. The impact of this large and sustained fall in education funding was large class-sizes, lower tests cores and drop in enrollments rates to colleges. During this period the

schools resulted to hiring fewer and cheaper staff due to reduced salaries and benefits that could not attract more experienced and qualified teachers. This is because teachers' compensation levels play a role in determining who comes to the profession, who remains and for how long (OECD, 2005). There was also reduction in the purchase of textbooks and putting up of new buildings.

Meanwhile according to Ratcliffe (2017) the financial crisis after the budget cuts lead to drop in educational performance of British schools. Almost all the schools reported decline in test scores. The cash-strapped schools had to reduce the number of teachers and dropping of some subjects. Students were also required to buy their own learning materials-books and other stationery. Reduction of teachers led to large classes and heavy workloads. Learners with special needs were receiving less support as teachers and their assistants in this area were also reduced. Lack of finances to service printers and photocopies after breaking down and the shortage of printing papers made the teachers work difficult as they could not print learning materials for the students.

Although several countries in the developing world have abolished school fees, the cost of uniform; transport; meals; and cost of schooling stationery are still a burdensome to poor families (World Bank, 2004). Further the indirect costs of schooling such as child labour, and the expenditure on other items such as water and fuel bills, add to the already constrained family appropriations. In a study by Kapur (2018) in India poor households were finding it difficult to send their children to school owing to their inability to meet the transport cost. Many

students from poor households and who struggled to walk for long distances to school spend so much time on the way. With their much time spent walking to and from school they had little or no time to complete homework and assignments as well as revising for exams. Many of these students failed to be promoted to the next grade due to low academic scores. Some student opted to drop out of school. Money stresses can greatly impede cognitive functioning as financial burdens bring in cognitive pressure that disrupts attention and reduces effort. Stresses consume mental energy, leaving little for other functions.

According to a survey report by UNSECO institute for statistics (2018) in Yemen economic hardships have pushed 30 and 22 percent of primary and lower secondary children out of school respectively. The dropout rates were at 16 and 11 percent in primary and lower secondary. In addition to dropout, grade stagnation is a common phenomenon. The completion rate at primary school is as low as 71.6 percent. The financial insecurity has forced many children into child labour to support their families. More than 10 percent of children aged 7-14 years combined working and schooling. Child labour, malnutrition and stunted growth lead to poor academic performance, repetition and dropout which work against completion rate. Poor parents deprioritize the education of girls and instead encourage early marriage as a way to reduce the family size that they have to support. Lack of school fees, uniform and writing materials is a barrier to school enrollment and retention. When poverty pushes poor students to engage in part time or full-time jobs, their educational dreams become a mirage. Such students

often arrive to school late; are unable to function at full mental capacity and find it hard to participate in class, they also struggle to leave school before time.

In another study by Korir (2018) in Kipkelion sub-County, parental type of occupation had significant influence on academic performance of the children. For the period 2007-2012 in the sub-County only 23.9 percent of candidates scored grade C+ and above and only 5.03percent scored grades for direct entry into public universities in Kenya. A majority (88.6%) of children came from rural areas and the main source of income for 86.7 percent of parents was from small-scale farming. The monthly income of 78.8 percent of parents was less than KES 5,000. From the analysis the study found that a majority of the students who scored grade C and below were parents earning whose monthly income was less than KES 5,000. On the other hand a majority of student who scored grade C+ and above were from parents whose monthly income was between KES 10,000 and KES 15,000. Parents with medium to high monthly income can adequately meet educational needs of their children including purchasing revision materials. The income from farming and business is unreliable; fluctuates with seasons and thus parents may be unable to plan, budget and pay for the education of their children adequately and on time.

A study by Mutegi (2015) in Tharaka Nithi County, Kenya established that enrollment of children in secondary education was determined by the monthly income levels of the parents. On average the families spent KES 29,863 and Ksh

31,323 for a girl and a boy respectively in day secondary school and KES 79,763 and KES 76,483 respectively in boarding schools. The more the unit cost per child the less likely the families were to enroll their children as a majority of them were peasant farmers with monthly income of at most KES 5,000. Students in day secondary school were on average travelling for 12 kilometers to school. The transport cost of education increased with increase in distance from home to school. Those living near the school would simply walk or ride to school, but for those from far away the parents were forced to provide their children with money for transport. The study established that students who lived away from school were more likely to drop out of school owing to increased cost of transport. Walking for long distances, arriving to school late, can easily make one to lose hope in schooling and can contemplate dropping out of school.

According to a study by Kayonda, Lombo, Lombo and Viviar (2021) economic reasons were greatly blamed for the 3.5 million children of primary school age in DRC who were out of school. Many parents were poor and were unable to meet the cost of educating their children. Another reason was the inability by the government to pay teachers reasonably as the teacher salaries were grossly insufficient. The teachers are usually demotivated and some have left the profession. Teacher absenteeism and lateness attributed by lack of motivation is comparably high and which in turn they translate to the students. The end result is lack of confidence, motivation and inspiration among the learners culminating into poor academic performance, repetition and dropout.

A study by Assue and Guel (2021) linked the low education attainment of children in the informal settlements in the outskirts of city of Bouake in Ivory Coast to vulnerability of households. The schooling of the children was characterized by irregular attendance, repetition and dropout, and poor academic scores. Most parents were lowly educated and were working in the low-paying employments such as security guards, and industrial manual work. The families had difficult of access to electricity, clean water, health facilities and socio-educational facilities. The size of siblings was big owing to the polygamy nature of the families. The low-income of the families was severely inadequate to cater for the large family sizes. Feeding the sibling was a more pressing need and educating children was not a priority. The home environment was not conducive for learning due to lack of electricity, overcrowding, noise of younger siblings, and the temptations to work to assist the parents.

The cost of stationery required to study some subjects can be a hindrance of accessing a broad curriculum. In other words cost of stationery can limit the batch of students taking in a specific subject. According to a survey by the Child Poverty Action Group (2014) in the United Kingdom, although the schools have a wider curriculum, it was not available to all the students. Students from poor households were not studying some subjects owing to the cost of the required stationeries. Photography, art, textile, design technology and food technology were some of the subjects that required extra and expensive materials to study. For instance those studying photography were required to buy a camera film and

be ready to meet the cost of printing. The survey found that 27 percent of the students who were on free school meals could not study the subjects of their choice owing to the high cost of stationeries. Students from poor households who were taking the high cost subjects reported lower grades and associated this to lack of relevant stationeries.

An unexpected shock on family's income can have an enormous influence on the educational accomplishment of the children. According to a study by Abdelmadjid (2013) in Algeria the increase in food price led to rise in grade repetition and dropout rates. The study found that when the rate of food price inflation increased from 3.5 to 4.5 percent in the years 2007 and 2008, the repetition rate increased from 11.95 to 13.57 percent while dropout rate increased from 5.61 to 7.48 in the same period. In developing nations like Algeria expenses on food consumes the larger part of the family budget and as such inflation on costs of food has serious negative impacts on educational needs. The study found that 52 percent of learners in Algeria were from poor families that struggled to have all their children in school. Many of these learners would arrive to school late and tired after walking for long distances having not taken breakfast and would go without lunch many a times. Additionally many of them could not afford the cost of learning materials nor appropriate clothing for the cold weather. A learner who is tired and hungry and shivering because of cold cannot concentrate or participate fully in class. Besides poor feeding affects cognitive development of the brain and this has a great deal on academic performance.

Tiredness from walking long distances, lack of food, and poor academic performance are recipe for dropout.

2.7 Summary of the reviewed literature

The explored literature lays a lot of emphasis on provision of adequate educational resources for quality education. Studies show that teacher shortage results in large class-sizes and heavy workload that lead to poor academic performance (OECD, 2016; Ronfeldt, Loeb, & Wyckoff, 2012), however the influence of staffing levels on enrollment and completion rates in their studies was inadequate. Staff qualification was identified to have a lot of influence on grade stagnation and dropout (Marchetta & Dilly, 2019; UNICEF, 2019). The literature on physical facilities has brought out the aspects of number of facilities, the size and status and how they influence educational outcomes. Inadequate facilities lead to overcrowded classes where students have difficulties in writing and concentrating. The teachers also lack flexible space for effective instruction-all which translate to poor academic performance and subsequently stagnation of grades. A replica study is necessary to bring forth definitive evidence on enrollment as it was not fully investigated. Availability of school water and sanitation has the potential to improve on enrollments (Adukia, Sanitation and Education, 2014; Hamza, 2016; Ochieng, 2013). The studies did not investigate the influence of school water and sanitation on completion rates. Goatlhobogwe (2015) observed that the batch of student in a given subject is informed by the adequacy of the teaching and learning materials available. Imbovah, Mackatiani,

Getange and Bogonko (2018) found that the available teaching and learning resources predicted the students' completion rate by 9.4 percent points. Meanwhile Bal-Gezigin (2014) observed that availability of teaching and learning resources was a crucial predictor of test scores. The studies did not investigate their influence on grade repetition and dropout cases of students.

Most of the reviewed literature on educational finances concentrated on government finances, household costs of education and their influence on enrollment and dropout. Introduction of free education by the government leads to increased enrollment (Abudul-Rahaman, 2020; Adan & Orodho, 2015; Keiichi & Wokadala, 2014). The economic status of the households predicts the probability of enrollment (Mutegi R. G., 2015; Kayonda, Lombo, Lombo, & Viviar, 2021) and the likelihood of dropping out of school (Abdelmadjid, 2013; Assue & Guel, 2021). These studies did not focus on academic performance or completion rates.

2.8 Theoretical frame work

The theory that is relevant and was employed to guide this study is the Education production function theory. Education production function theory was first used in the Coleman report in the US to analyze the role of school resources in determining achievement (Coleman J. S., 1966). Since then the limits, controls and ranges that describe it have extensively been developed by its proponents such as (Bowles, 1969; Hanushek, 1979; Levin; Katzman, 1971; Monk, 1989; Henderson & Berla, 1994; Angrist & Lavy, 1999; Okagaki, 2001). While vast majority of studies measure output by use of test-scores, a few have considered

other measures such as enrollment rates and dropout rate, repetition rates, and completion rates (OECD, 2007; UNESCO, 2005; World Bank , 2008). Similarly the school inputs used in simple analysis includes measures such as teacher staffing levels, basic school infrastructure, instructional materials and educational funds. Other studies have also included objective measures outside of education such as family size and occupation of parents. Due to the varied nature of the educational inputs there is no common ground on which inputs certainly influence particular set of learning outcomes (Percel & Menaghan, 1994). For this reason, different studies employing this theory using data from a variety of sources have found conflicting results (Krueger, 1999).

Education production function theory is a useful guide to educational decision makers when allocating educational resources recognizing that educational output of a learning institution is not just academic excellence. The range of the varied outputs allows the educational stakeholder to precisely measure the economic efficiency of an institution. The data on economic efficiency provides a useful baseline to the educational planners in projecting the quantity and appropriateness of educational inputs. The data is also useful to government and other financiers for budgeting purposes.

An education production function can be defined as follows:

Q =f (x_a…..x_m, x_n…….x_p, x_q……x_z), Where

Q represents a set of learning outcomes such as academic performance, completion rate, enrolment rates, dropout rate and grade stagnation;

$\mathbf{x_a \ldots x_m}$ represents educational resources within learning institutions which include the staffing levels, physical facilities, teaching and learning materials, and financial expenditure;

$\mathbf{x_n \ldots\ldots x_p}$ represents variables that define the situations and circumstances influencing the process of teaching and learning outside the school such as educational level of parents, the occupation of parents, and family income levels;

$\mathbf{x_q \ldots\ldots x_z}$ represents variables that gauge the entry behaviour of the learner including what the learner had previously learnt, learning ability, and the socio-cultural influences.

According to Education production function theory education is equivalent of an industry that which when supplied with raw materials (educational resources) it transforms (process of teaching and learning) them in to final products (educational outcomes). The quantity and quality of the raw materials and the efficiency and effectiveness of the process determines the quantity and quality of the final products. In other words if an education system or institution is provided with adequate quality resources then with efficient and effective teaching and learning process desirable quality educational outcomes will be realized. Otherwise with inadequate poor quality educational resources and with inefficient and ineffective process the end product will be undesirable and of low quality.

However education production theory is criticized for its failure to measure all the educational outputs and also for not accounting for the endogeneity of the outputs and inputs seriously-all which undermine the integrity of efficiency measures as per the estimated costs or production frontiers. These gaps have been identified by (Hanushek, 1979, 1986; Clein, 2007; Pritchett & Filmer 1999). One such critic, for instance, is how education production function theory can account for the political process under which the education system operates. Political process influences education through budgetary as well as policies on social goals such as racial integration, mainstreaming of special education and or use of foreign language for instruction. Nevertheless education production function theory has strong positive aspects that outweigh its weaknesses. Education production function theory was therefore deemed appropriate to this study as it provides a more practical approach in evaluating quality of education by examining the educational inputs versus the learning outcomes.

2.9 Conceptual framework for the study

Conceptual framework diagrammatically illustrates the link between variables of a study. The link between variables is conceptualized as shown in figure 2.1

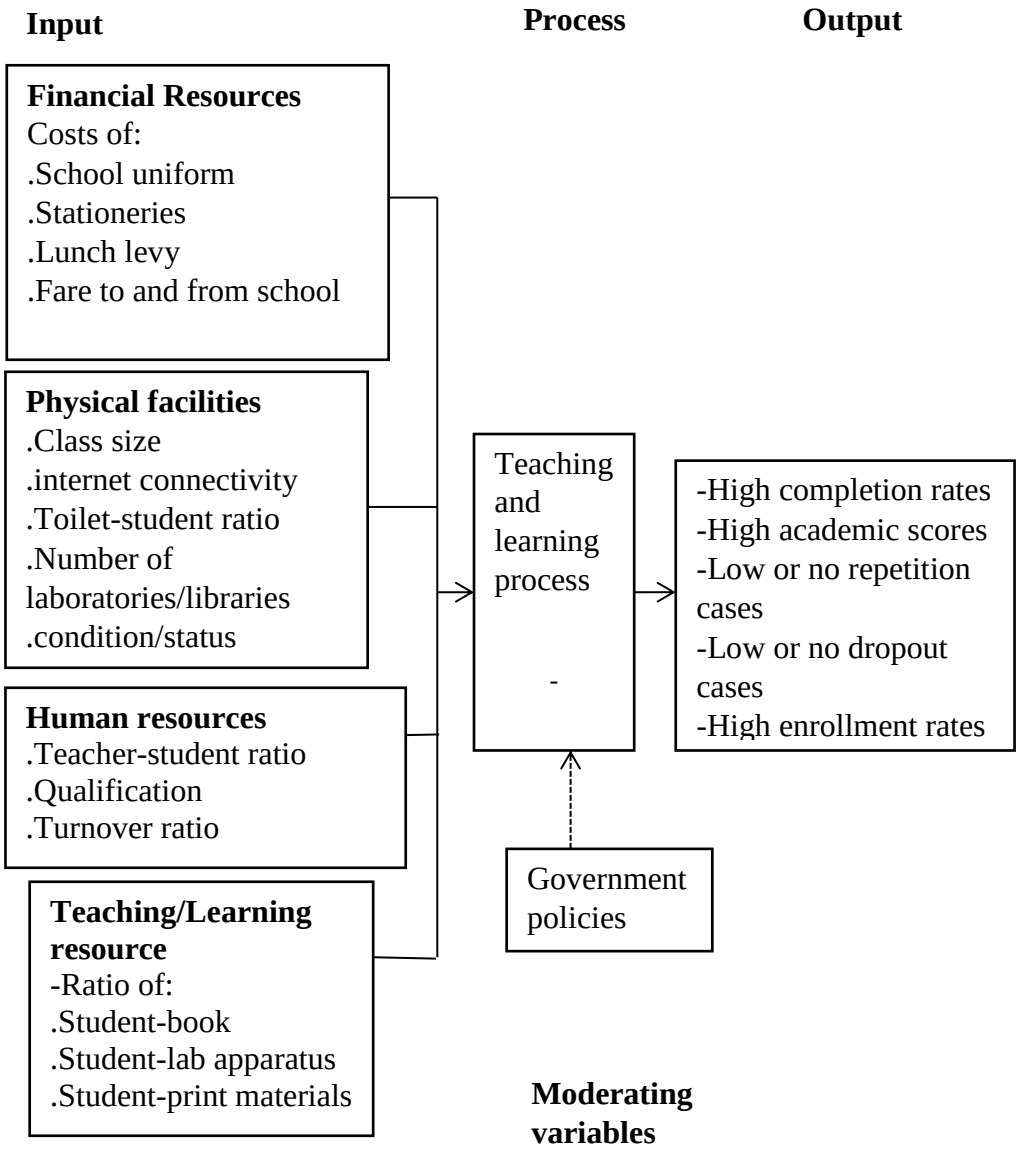

Figure 2.1: Schematic relationship between variables of the study

Figure 2.1 depicts the link between variables affecting quality of education. Financial resources, facilities, human resources, and teaching/learning materials are the educational inputs which are the independent variables of the study. The level of output is depended upon the various aspects of the inputs. These aspects include availability, adequacy levels, relevance and their condition or status. The quality of education is measured by student's academic performance, completion rates, repetition rates, enrolment rates and dropout rates. The overall picture is that schools that are well endowed with educational resources have higher rates of completion and enrolment, better academic performance, while dropout and repetition rates are reduced. In other words schools that have adequate and relevant educational resources and which are in good condition or competent in case of teachers have the capacity to provide quality education. In these schools the learners have comprehensive learning environment that guarantee them quality educational outcomes. The environment allows teachers to have manageable workloads, have the necessary teaching materials, adequately prepare for the lesson, and use appropriate and varied methods to deliver the content. Teaching materials are timely acquired, and the syllabus is covered in time allowing adequate time for revision.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section presents research design, target population, sample size and sampling procedures, research instruments, validity and reliability of instruments, data collection procedures, data analysis techniques, and ethical considerations.

3.2 Research design

Research design refers to the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Kothari, 2004). It is thus the blue print that guides data collection and analysis in research. The worth of a given research design is depended upon the resolve for choosing it as the most applicable blueprint for dealing with the research problem (Merriam, 1998). The study used correlational research design. The correlational research design was used in this research study as the resolve was to investigate the relationships between educational resources and quality of education. According to Creswell (2012), in correlational research design the researcher is interested in the extent to which two variables (or more) co- vary, that is where changes in one variable are reflected in changes in the other. However when using this design the researcher should not attempt to control or manipulate the variables. Instead the researcher takes measures of the variables as they naturally occur in their real world;

compute the correlation coefficient, such as the Pearson's, to establish the statistical relationship between them. The design is cost effective as it allows the researcher to collect much more data and is less time consuming. Its methodology and statistical analysis are easy to implement. It also allows the determination of the strength of the relationship between variables in their realistic settings which can really help in predicting causal relationships. The design was thus deemed appropriate in analyzing the influence of educational resources on quality of education in public day secondary schools in Embu County.

3.3 Target population

Target population refers to the entire group of people, events or things of interest that the researcher wishes to investigate (Sekaran & Bougie , 2010). The target population is obtained by refining the general population to be left with individuals with specific attributes of interest and relevance (Creswell J. W., 2003). The target population for this study included the 192 principals, 1743 teachers and 35124 students from all the 192 public secondary schools (Office the County director of education, Embu County, 2019).

3.4 Sampling technique and sample size

A sample is the number of items or respondents selected as a representative of the total population in a field of study and the process of selecting the respondents is known as sampling (Kothari, 2004). Schools were stratified into the five sub-Counties of Embu County: Embu East, Embu North, Embu West, Mbeere North

and Mbeere South. The researcher used purposeful sampling in the selection of schools and students in order to improve the rigour of the study and trustworthiness of the data and results. Public day secondary schools were purposefully sampled followed by another purposeful sampling of form four students. The need for purposeful sampling of public day secondary schools and the form four students was to reduce the margin of error and to obtain specific data points of niche demographics. It was also to help the researcher to identify the extreme perspectives that are present in each population group and to justify generalization from the sample as well. Form fours were considered information rich cases as they had more years in school than other students and hence they would yield insights and in-depth understanding on issues of central importance to the purpose of the study.

The sample size for the students was computed using the formula by Cochran (1963, 1975).

$n = \frac{z^2 \mathrm{pq}}{d^2}$ Where,

n is the desired sample size,

z is the standard normal deviation set at 1.96 which corresponds to 95 percent confidence level,

p is the proportion in the target population to have a specific attribute,

q is 1-p, and,

d is the absolute precision set at 0.05

The setting of Z-value at 1.96 was informed by the central limit theorem that the average value of the attribute of samples is equal to the true population in a normal distribution.

Upon substitution;

$n = \frac{1.96^2\ (0.5)(0.5)}{0.05^2}$ = 384 students.

The sample sizes of the principals, teachers and students from each sub-County is presented in Table 3.1

Table 3.1: Sample sizes of principals, teachers and students

Sub County	**Principals**			**Teachers**			**Students**		
	N	**n**	**n-s**	**N**	**n**	**n-s**	**N**	**n**	**n-s**
Embu East	34	7	1	218	22	3	848	75	11
Embu West	25	5	1	198	20	4	792	70	14
Embu North	23	5	1	172	17	4	838	74	15
Mbeere North	43	9	1	186	19	2	916	81	9
Mbeere South	45	9	1	202	20	2	956	84	9
Total	**170**		**35**	**976**		**97**	**4347**		**384**

Key: **N**=Sub-County population, **n**= sample size, **n-s**=respondents per school

Table 3.1 shows that 20 percent of the day secondary schools from each Sub-County were selected to give a sample of 35 schools. In the views of McMillan and Schumacher (2001) sample sizes of 20 percent is representative enough. The principals of these schools were automatically selected to be the respondents drawn from population of 170 principals. Ten percent of teachers from each Sub-County were selected to give a sample of 97 teachers. According to Bullen (2014) a good maximum sample size is 10 percent as long as it does not exceed 1000. The number of sampled teachers per Sub-County was divided by the number of sampled schools in that sub-County to get the number of teachers per school. The sub-County sample of students was obtained by dividing the sub County students' population by County students' population and then multiplied the quotient by County students' sample determined using the Cochran formula. The number of respondent students per school was obtained by dividing the sub-County students' sample by the number of sampled schools in that sub-County. The total sample size for the study totaled to 516 individuals consisting of 35 principals, 97 teachers and 384 students.

3.5 Research instruments

The data for the study was garnered using questionnaires, interview schedule and observation checklist. According to Mills, Durepos and Wiebe (2012) studies that use different research instruments are considered to be of higher quality. This is because by triangulating data from different instruments, the raw biases that arise from the use of a single instrument are eliminated. Data from different research

instruments also provide the researcher with an overly integrative cognition of the phenomenon and also increase the confidence in the results of the study.

There were two different questionnaires, one for the teachers and the other one for the students. The questionnaire for teachers was used to solicit data with regard to human resource staffing levels, availability and sufficiency of physical facilities and teaching and learning materials. The questionnaire for the students obtained data on human resource staffing levels and adequacy of financial resources with regard to affordability of educational costs including transport, uniform, lunch levy, and stationery.

According to Luenendonk (2019) an interview schedule is actually a list of set of questions prepared before meeting the interviewee to serve as a guide for the researcher in collecting data about a given state of affairs. The objective of the researcher is to obtain data by asking questions, and also digging more information through probing the feedback from the interviewee. In the views of Phellas, Bloch and Seale (2011), the return rate ad amount of responses from an interview schedule are usually high as interviews are time bound; the data collected is more accurate as the questions are well thought out focusing on the heart of the matter. The follow-up probing and clarification gives the researcher an in-depth insight into the various aspect of the phenomenon (ibid). Interview schedule was used to solicit information from the principals. Through asking questions and probing the answers from the principals the researcher was able to collect in-depth information on staffing levels, physical facilities and finances.

The data on finances was with respect to sources of school funds, challenges in obtaining funds, adequacy in terms of the overall running of the school and in acquisition of teaching/learning materials and physical facilities.

According to Merriam (1998), observed data is very useful for triangulation as a way of validating the findings. The data is obtained using an observation checklist. An observation checklist can be considered to be an appropriate data sheet preplanned by the researcher for recording the observed information. An observation checklist provides vicarious and undeniable information as the events or items are observed and recorded in their usual happening or state. Data on the condition of physical facilities as determined by the type of structure; organization, and cleanliness were recorded on the observation checklist.

3.6 Validity of instruments

According to Zohrab (2013), validity is concerned with the authenticity of the research findings and whether the research itself assesses what it is presumed to assess. Messick (1989) refers to validity as the immensity with which empirical evidence and theoretical rationales contribute to the satisfactory and relevance of expositions and actions. It is the degree to which any measurement approach or instrument succeeds in describing or quantifying what it is designed to measure (Weiner, 2007). The strength of the conclusion of a study depends on the quality of the research instruments used to collect the data (Fraenkel & Wallen, 2003). As a way of checking on the validity of the instruments, the researcher carried out an

exhaustive literature review to extract the relevant items of the instruments. The research instruments were then subjected to the two supervisors of the study who have the expertise in the areas of educational planning for review to improve on the content validity. Their recommendations were used to modify the instruments; questions that were not clear were revised and the ambiguous ones removed. Any complicated wording of the items was made simple for easy understanding by the respondents.

3.7 Reliability of instruments

In research reliability focuses on the precision, genuineness and replicability of the findings (Nunan, 1999). According to Weiner (2007), reliability is the soundness of an assessment criterion in producing identical results with subsequent application. Thus a research process requires that the study or the research instrument produce replica results upon use with different respondents by applying same methodology under similar conditions. The reliability of the instruments was determined by carrying out a pilot study. According to Connelly (2008) sample size in piloting should be 10 percent of the actual sample size. Four public day secondary schools, one from each sub-county, were randomly selected for piloting but which were not to be included in the actual study. Principals in the four schools were automatically included in the pilot study while 9 form four students per school were randomly selected to fill the questionnaire. Ten teachers from the four schools were randomly sampled in the ratio [3:3:2:2] to fill the questionnaire. After 21 days the researcher collected another set of data from the

same respondents in the four schools. According to Kamta (2016) the time lapse between test-retest when determining reliability of research instruments should be not less than 15 days but rather should be between 15 and 30 days. And since young children and old people can easily forget this time interval should be shortened. However no category of respondents for this study was in the stated bracket. The two sets of data from the pilot study were carefully fed into the SPSS to test for their correlations. This was done using the Pearson's correlation coefficient product moment by use of Cronbach- alpha statistics.

$$r = \frac{N\left(\sum xy\right) - \sum(x)\sum(y)}{\sqrt{\left(N\sum x^2 - \left(\sum x\right)^2\right)\left(N\sum y^2 - \left(\sum y\right)^2\right)}}$$

Where;

$\sum x$ is the sum of scores in the first administration,

$\sum y$ is the sum of scores in the second administration

$\sum x^2$ is sum of the squared scores in the first administration

$\sum y^2$ is sum of the squared scores in the second administration

$\sum xy$ is the sum of the product of the paired first and second administration scores

N is the number of the paired first and second administration scores and r is the coefficient of reliability. The results are presented in Table 3.2

Table 3.2: Reliability statistics

	Cronbach- alpha statistics	Number of items
Data from teachers	0.81	30
Data from students	0.77	21
Data from principals	0.79	19

The tests yielded correlation coefficients of 0.79, 0.81, and 0.77 for the interview schedule, teachers' questionnaire and students' questionnaire respectively. According to Bhattacherjee (2012) a correlation coefficient above 0.7 indicates that an instrument is reliable for collecting data in social science studies. Bachir (2017) opines that correlation coefficient below 0.6 is unacceptable, that of between 0.6 and 0.7 is the lower limit of acceptability, between 0.7 and 0.8 is acceptable while that of above 0.8 is very good. The study research instruments were thus perceived dependable in obtaining infallible outcomes.

3.8 Data collection procedures

The process started with the acquisition of introductory letter from the University of Nairobi that was used in the application of research permit from NACOSTI. The permit and the letter were both presented to the Embu County director of education for further permission to carry out data collection in the County. Introduction letters were written to the principals of the selected schools with

copies of research permit and authorization letters attached. The researcher pre-visited the sampled schools for introduction and to make arrangements on how to carry out the interviews schedules and administer the questionnaires. During the pre-visit a request was made to be given one teacher who could assist in getting the teachers and students ready on the day of data collection to save on time. The assisting teacher was briefed on how to administer the questionnaires. In the actual data collection the researcher with the help of the assisting teacher administered the questionnaires to the teachers and waited to collect them after they were filled. The students, questionnaires were administered with the help of the assisting teacher and again collected them upon filling by the students. Access to and observations of the status of the class rooms, laboratories, libraries and the playground was done with the help of the assisting teacher. Recording was done on the site. The process was concluded by conducting a face-to-face interview with the school principal, registered the appreciation for the good gesture before leaving the school.

3.9 Data analysis techniques

Data analysis techniques entail the computation of frequency distribution of data together with their percentages along with searching for the patterns of the relationships that exist among the data groups. The data was analyzed both qualitatively and quantitatively as per each research objective. The data was first edited to detect errors and omissions and correcting where possible. This was followed by coding the responses by assigning them numerals in order to limit the

number of categories and classes. Quantitative data was analyzed descriptively using the frequency tables and their percentages. For the qualitative data, after coding and after putting data into categories of common attributes as per the research objectives, analysis of the contents was informed by the meaning and the opinions of the respondents. Some of the narrative responses from the interview were transcribed and presented in raw form as narrated to capture the actions and feelings of the respondents concerning the availability of educational resources in their schools.

The independent variables, namely; the staffing levels, physical facilities, teaching and learning resources and finances, were correlated with dependent variables; namely academic performance, enrollment, completion, dropout and repetition rates. This was followed by regression analysis in order to establish the influence of educational resources on quality of education in public day secondary schools in Embu County.

3.10 Ethical considerations

The researcher considered the necessary ethical issues and procedures in the course of conducting the research. The researcher obtained the research permit from the NACOSTI and the approval to conduct research from the Embu County director of education offices. The researcher then visited the sampled schools, requested permission to collect data from the principals. In the pre-visit the researcher asked to be allowed to explain the purpose of the study to the

respondents in order to obtain their consent. In the pre-visit and during data collection the researcher developed rapport with respondents to encourage voluntary participation and disclosing of information. On the day of the actual data collection the respondent teachers and students were not required to indicate their names on the instruments to protect their privacy and identity. In the formulation of the questionnaires the researcher avoided the use of discriminatory and offensive language. Anonymity of the respondent principals was done by using arbitrary values to code the interview session with each of them. High level of objectivity was also maintained during interviews with principals.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION OF THE FINDINGS AND DISCUSSIONS

4.1 Introduction

The chapter focuses on data presentation, analysis, interpretations and discussion of the findings of the study. The findings are presented in relation to the objectives of the study. The data is depicted in frequency tables and percentages followed by textual analysis and interpretation. The chapter begins with the rate of return of research instruments followed by the respondents' demographic profile and the presentation of data on educational resources from the public day secondary schools.

4.2 Instruments return rate

Instrument return rate refers to the proportion of the data collecting instruments that are returned after administration to the respondents. Data from the teachers and the students was obtained by use of questionnaires while an interview schedule was used to solicit information from the principals. The condition of the school infrastructure was recorded in the observation checklist. A total of 97 questionnaires for the teachers and 384 questionnaires for the students were administered. The researcher set to interview 35 principals. Instruments return rates are summarized in table 4.1

Table 4.1: Instruments return rate

Respondents	Research tool	Sample size	Realized	percentage
Teachers	Questionnaire	97	92	94.8
students	Questionnaire	384	352	91.7
Principals	Interview	35	26	74.3
Total		**516**	**470**	**91.1**

As depicted in Table 4.1 the average rate of return of the data collecting instruments was 91.1 percent. The response rate was high because the researcher had pre-visited all the sampled schools prior to data collection to get the consent of the respondents and establish rapport. The researcher then delivered the questionnaires in person to the selected schools and explained the purpose of the survey. Mellahi and Harris (2016) opine that though there is no rule of thumb on the admissible response rate, the higher the proportion the better for the validity of the study. A return rate of research instruments of at least 70 percent is both favourable and attainable for data analysis (Australian Vice-Chancellors' Committee & Graduate Careers Council of Australia, 2001). The overall response rate of 91.1 percent was thus assuasive and considered sufficient in view of data analysis.

4.3 Demographic profile of the respondents

The demographic data of the respondents included the gender, the age, the level of education and work experience for the teachers and principals.

4.3.1 Gender of the respondents

Both the teachers and students were requested to indicate their gender in the questionnaire. The gender of the principals was solicited during the interviews. The results are depicted in table 4. 2

Table 4.2: Gender profile of the respondents

Gender	principals		teachers		students	
	frequency	%	Frequency	**%**	frequency	**%**
Males	17	65.4	54	58.7	180	51
Females	9	34.6	38	41.3	172	49
Total	**26**	**100**	**92**	**100**	**352**	**100**

The results on gender as presented in Table 4.2 the majority of principals (65.4%) as well as the teachers (58.7%) were males. The results show that there is gender disparity in the headship of schools as day secondary school can be headed by either gender. The gender distribution for the students is more or less the same.

4.3.2. Age categories of the respondents

Analyzing, interpreting and understanding the age of the respondents is imperative in increasing the confidence in the findings of the research. Both teachers and students were asked to indicate their age categories and from the interview schedule the researcher obtained the age categories of the principals. The results are indicated in the table 4.3a and table 4.3b

Table 4.3a: Age categories of principals and teachers

Age (years)	Teachers		Principals	
	Frequency	Percentage	Frequency	Percentage
Less than 25	23	25	0	0
25-30	20	21.7	0	0
31-40	16	17.4	0	0
41-50	18	19.6	10	38.5
51-60	15	16.3	16	61.5
Total	**92**	**100**	**26**	**100**

From table 4.3a, a majority of teachers (53.3%) were over 30 years of age. The respondent teachers were therefore mature and capable of making proper decisions and hence the data obtained was reliable. A majority of principals (61.5%) were over 50 years of age. This can be justified by the fact that to get to the position of principal a teacher is subjected to a number of interviews to move from one job group to another. In other words the system favors those who are

older in the profession. This suggests that the principals have been in the teaching service for long and hence have acquired adequate experience in the system necessary to be in school management.

Table 4.3b: Age categories of students

Age category	frequency	Percentage
Below 17 years	18	5
17-18 years	202	57.4
19-20 years	111	31.5
Above 20 years	21	6
Total	**352**	**100**

From Table 4.3b, 57.4% were in the right age for their grade and a total of 37.5 percent of students were overage which is relatively high. Overage students suggest possibilities of class repetition, dropout, and re-enrollment after dropping out or late enrollment-all which indicates low quality of education.

4.3.3 Teachers and principals levels of education

The knowledge, attitudes and ability to understanding some social phenomenon may be greatly influenced by the level of education of an individual. It was thus prudent to find out the level of education of respondents to the study. The teachers were asked to indicate their highest level of education while the question to the principals was ‘what is your highest level of education?’ The data obtained is tabulated in table 4.4.

Table 4.4: Educational qualification of principals and teachers

Educational qualification	Teachers Frequency	Percentage	Principals Frequency	percentage
Certificate	5	5.4	0	0
Diploma	7	7.6	3	11.5
Degree	77	83.7	19	73.1
Masters	3	3.3	4	15.4
Total	**92**	**100**	**26**	**100**

Table 4.4 shows that majority (83.7%) of teachers were holders of a bachelor's degree. The minimum requirement to teach in a secondary school in Kenya is a diploma (TSC Act, 2012), and therefore teachers of public day secondary schools in Embu County possess the right qualification to teach. As for the principals 73.1 percent possessed a bachelor's degree. The TSC policy on appointment and deployment of institutional administrators advocates tat secondary school principals should possess a master degree (TSC, 2017). With only 15.4 percent possessing a master degree majorities being in the age category of 51-60 years then young teachers need to re-enroll for further studies in readiness for leadership positions.

4.4 Analysis of the study variables

This section details the data collected for each of the four variables under investigation with a view to elucidate on quality of education in public day

secondary schools in Embu County. The data is analyzed as per the four research objectives with a focus on their influence on students' academic grades; completion rate; drop-out rate; repetition rate; and enrolment rates.

4.4.1 Influence of human resource staffing levels on quality of education

In accordance to objective one the study sought to examine the influence of staffing levels on quality of education in day secondary schools in Embu County. This was with respect to student academic grades, enrollment rates, completion rates, dropouts and repetition rates.

4.4.1.1 Staffing levels

The study sought to establish if the public day secondary schools in Embu were understaffed, overstaffed or had just the right number of teachers. This was to be ascertained from the teacher turn over, workload and the employment status. The principals were asked if their schools were understaffed, overstaffed or had just the right number of teachers and their responses are reflected in Table 4.5

Table 4.5: Staffing level based on CBE

Staffing level	Frequency	percentage
Understaffed	23	88.5
Just enough	3	11.5
Total	**26**	**100**

The results in Table 4.5 depicts that most of the public day secondary schools in Embu County (88.5%) are understaffed; this means they had less number of teachers as per the curriculum based establishment. The researcher further sought to establish the pupil-qualified teacher ratio in order to confirm the responses by the principals. The question posed to the principals was "what is the average pupil-teacher ratio in your schools?" The responses are presented in table 4.6

Table 4.6: Pupil-qualified teacher ratio

Pupil-teacher ratio	frequency	percentage
Less than 30:1	2	7.7
31:1-40:1	5	19.2
41:1-50:1	9	34.6
51:1-60:1	7	27
More than 60:1	3	11.5
Total	**26**	**100**

As depicted in Table 4.6 a majority of schools (73.1%) have a pupil-teacher ratio of more than 40:1. The Education Act Cap 211 which was repealed by the Basic Education Act, 2013 requires that there shall be a maximum of 50 pupils per class in Primary school and a maximum of 40 pupils per class in secondary school and a maximum of 30 students per class in teachers college or intermediate college (Republic of Kenya, 2013). The findings suggest that public day secondary schools in Embu County were understaffed. When asked how the pupil-teacher

ratio had impacted on teaching and learning and the overall operations in their school, they had the following to say:

From the interview session code IS-6 the principal said "*I have a serious shortage of teachers; my school is double streamed and I am supposed to have 19 TSC teachers as per the CBE but currently I have 12 TSC teachers. As a school we have engaged 4 teachers on BOM terms and we still need more. Actually as I am talking to you some of the school programmes like guidance and counseling and are currently on hold."* In another interview session code IS-23 the principal had this to say "*we are actually feeling the heat of the 100 percent transition policy; this year we started the third stream class in form 1 but the school has 15 TSC teachers, a number that is not adequate even for a two streamed school. Without BOM teachers the problem would be worse."* The results concurs with the results of a similar study by Musyoka, Cheloti and Maithya (2018) in in Kathiani sub-County where the principals interviewed strongly disagreed with the statement that schools were sufficiently staffed as per the CBE.

Further the teachers were requested to indicate the number of colleague teachers who had joined or left the school for whatever reason in the previous three years. The results are tabulated in Table 4.7

Table 4.7: Turnover of teachers

Number of teachers	Who have joined		Who have left	
	frequency	percent	frequency	percent
None	11	12	14	15.2
1-10	19	20.6	31	33.7
11-20	9	9.8	8	8.7
Total	**39**	**42.4**	**53**	**57.6**

According to Table 4.7, a higher percentage (57.6%) of teachers had left the schools compared to the percentage (42.4%) of teachers who had joined the schools in a span of three years. The resultant effect is shortage of teachers in those schools. The results are supported by responses from the interview with the principals. A principal in interview session code IS-19 said "*I had a very hardworking teacher of English who was promoted to deputize in a school in a neighbouring County at the beginning of this term. The term is almost coming to an end and she has not been replaced."* In another interview session code IS-5 the principal reported "*Right now I have a very needy case because one of my science teachers was interdicted. I have requested a teacher from a neighbouring school to come and assist in preparation of end term exam practical."* From the interview session code IS-16 the principal said *"last year one of my teachers moved to the public service and in June this year one teacher retired. So far only the one who retired has been replaced."*

If the number of teachers who leave a school does not balance with the number of teachers that join the school, understaffing or overstaffing can arise.

To verify this assertion of understaffing the teachers were asked to indicate their weekly load and the data is reflected in table 4.8

Table 4.8: Teachers weekly load

Weekly load	Frequency	Percentage
Below 18	1	1.1
18-22	11	12
23-27	29	31.5
28-32	49	53.3
Above 32	2	2.2
Total	**92**	**100**

From Table 4.8, a majority of teachers (55.5%) had a weekly load of 28 lessons or more. This implies that based on the minimum workload of 27 as per the CBE (TSC, 2017), the workloads were manageable. However from the interviews, the principals indicated that they had engaged teachers on BOM terms which probably had brought the workload to manageable levels. It was thus prudent to obtain data on the employment status of teachers to find out if really there were teachers on BOM terms. The data is as depicted in Table 4.9

Table 4.9: Employment status of teachers

Employment status	Frequency	Percentage
Permanent and pensionable	63	68.5
B.O.M employee	25	27.2
Others	4	4.3
Total	**92**	**100**

Table 4.9 shows that more than 27 percent of teachers were not employees of the teacher service commission. A majority of these teachers were employed by the schools board of management. The results confirm that schools engaged teachers on BOM terms to lessen crisis of teacher shortage. The findings are consistent with the work of Mabeya (2019) in Uasin-Gishu County, Kenya which established that the trend in teacher attrition was on the rise creating teacher shortage in the County. Teachers were leaving the profession for greener pastures, ask for transfer or left the service on early retirement. As a result schools engaged teachers on BOM terms to alleviate the shortage.

With regard to staffing levels the number of personnel would be of no meaning if they lacked the skills necessary to do their job tasks. The researcher sought to establish if teachers were trained in the subjects they were handling. This was ascertained through number of subjects outside ones area of specialization. The teachers were asked to indicate the number of subjects that they were teaching which they were not trained. The data is indicated in Table 4.10

Table 4.10: Number of teachers who were handling subjects outside their area of specialization

Number of subject not trained in	Frequency	Percentage
0	76	82.6
1	14	15.2
2	2	2.2
Total	**92**	**100**

From Table 4.10, 17.4 percent of teachers were teaching subjects that they had not trained in. The results suggest that schools had employed unqualified teachers to fill gaps in teacher shortage. Unqualified teachers may teach the wrong content, they may be unable to handle large class-sizes, and they may be unable to vary the teaching methods to take care of the diverse needs of different learners.

The foregoing results on staffing levels ascertain that day secondary schools in Embu County are understaffed based on the CBE. Therefore it was prudent for the researcher to find out how student-teacher ratio correlates with quality of education as informed by ratio of quality grades, completion rate, enrollment rate, repetition rate and dropout rate of students. Pearson correlation analyses were computed and the results are shown in Table 4.11. This was followed by regression analysis to determine if the relationships between student-teacher ratio and variables of quality education were statistically significant as presented in Table 4.12

Table 4.11: Correlations between students-teacher ratio and indicators of quality education

		Y	X1	X2	X3	X4	x5
Student-teacher ratio-Y	Pearson Correlation	1	. 527	.416	.625	.021	301
	Sig. (2-tailed)		.321	.102	.413	.518	.327
	N	26	26	26	26	26	26
Ratio of q grades–X1	Pearson Correlation	.527	1	.052	-.041	-.023	.024
	Sig. (2-tailed)	.321		.864	.624	.703	.781
	N	26	26	26	26	26	26
Enrollment ratio-X2	Pearson Correlation				-.032	-.017	-.016
	Sig. (2-tailed)	.416	.052	1	.647	.614	.075
	N	.102	.864				
				26	26	26	26
		26	26				
Completion ratio-X3	Pearson Correlation	.625	-.041	-.032	1	-.315	
	Sig. (2-tailed)	.413	.624	.647		.684	.642
	N						.142
		26	26	26	26	26	
							26
Dropout ratio-X4	Pearson Correlation	.021	-.023	-.017	-.315		021
	Sig. (2-tailed)	.518	.703	.614	.684	1	.713
	N						
		26	26	26	26		26
						26	
Repetition ratio –X5	Pearson Correlation	-.301	.024	-.016	.642	.021	1
	Sig. (2-tailed)	.327	.781	.075	.142	.713	
	N						
		26	26	26	26	26	26

*. Correlation is significant at the 0.05 level (2-tailed).

Key: Student-teacher ratio-Y, Ratio of Quality grades-X1, Enrolment rate-X2, Completion rate-X3, Dropout rate-X4, Repetition rate-X5

The results in Table 4.11 indicate positive correlations between student-teacher ratio and ratio of quality grades [r =.527, p =.321], enrollment rate [r =.416, p =.102], and completion rate [r =.625, p =.413]. This suggests that increase in staffing levels in a school lead to more students who attain quality grades and

improvement in enrollment and completion rates. The negative correlation student-teacher ratio and repetition rate [r =-.301, p =.327] suggests that improving the student-teacher ratio lead to reduction in repetition rate. Correlation between student-teacher ratio and dropout rate of students was found to be negative and very weak [r = -.021, P=.518].

Education production function for the influence of teacher staffing levels on quality of education.

Often teacher staffing levels as the educational input is captured mainly through pupil-teacher ratio. The pupil teacher ratio is affirmed through qualification of teachers, employment status and teacher turnover. Quality of education as the output was captured in terms of ratio of quality grades, completion rates, enrolment rate, drop out and repetition rates. The education production function that relates the independent and the dependent variables is of the form;

$Q_i = F(rj, qj, tj, ej)$

Where;

Q-represents quality of education

i- represent the i^{th} indicator of quality of education

r- represents pupil-teacher ratio

q-represents qualification of teachers

t-represents turnover of teachers

e-represents employment status of teachers

j-represents the j^{th} school

Staffing level was regressed against the indicators of quality of education to enable making of inferences. The coefficients of regressions are as in Table 4.12

Table 4.12: Coefficients of regressions

Tests of Between-Subjects Effects						
Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Ratio of quality grades	.778[a]	1	.778	.878	.051
	Enrolment rate	.820[b]	1	.820	4.243	.042
	Completion rate	.544[c]	1	.544	.099	.003
	Dropout rate	.735[d]	1	.735	.785	.038
	Repetition rate	.716[e]	1	.716	.240	.025
Intercept	Ratio of quality grades	30.470	1	30.470	341.040	.000
	Enrolment rate	34.905	1	34.905	180.677	.000
	Completion rate	46.097	1	46.097	8.436	.005
	Dropout rate	93.165	1	93.165	540.374	.000
	Repetition rate	110.085	1	110.085	1667.760	.000
Student-teacher ratio	Ratio of quality grades	.778	1	.778	.878	.051
	Enrolment rate	.820	1	.820	4.243	.042
	Completion rate	.544	1	.544	.099	.003
	Dropout rate	.735	1	.735	.785	.038
	Repetition rate	.716	1	.716	.240	.025
Error	Ratio of quality grades	8.041	24	.089		
	Enrolment rate	17.387	24	.193		
	Completion rate	491.761	24	5.464		
	Dropout rate	15.517	24	.172		
	Repetition rate	5.941	24	.066		
Total	Ratio of quality grades	119.000	26			
	Enrolment rate	167.000	26			
	Completion rate	676.000	26			
	Dropout rate	308.000	26			
	Repetition rate	382.000	26			

Corrected Total	Ratio of quality grades	8.120	25
	Enrolment rate	18.207	25
	Completion rate	492.304	25
	Dropout rate	15.652	25
	Repetition rate	5.957	25

a. R Squared = .893 (Adjusted R Squared = .881)
b. R Squared = .645 (Adjusted R Squared = .656)
c. R Squared = .701 (Adjusted R Squared = .692)
d. R Squared = .669 (Adjusted R Squared = 655)
e. R Squared = .532 (Adjusted R Squared = .521)

Table 4.12 shows the hypothesized predictor (student-teacher ratio) for quality of education (ratio of quality grades, enrolment rate, completion rate, dropout rate and repetition rate) in public day secondary schools in Embu County. The value R^2 squared gives the value of independent variables that accounts for the dependent variables. A value of R^2 =.893 suggests that the independent variable (student-teacher ratio) attributes or accounts for 89.3 percent of the value of dependent variable (ratio of quality grades). The four p-values out of five are less than $\alpha = 0.05$. Completion rate has the least p-value of 0.003<.05. The p-values communicate that the relationships are statistically significant.

4.5 Influence of adequacy of physical facilities on quality of education

The second objective of the study was to determine the influence of adequacy of Physical facilities on quality of education in day secondary schools in Embu County. The physical facilities that the study considered included classrooms,

toilets, science laboratories, libraries, electricity, internets, and water and their influence on academic grades, dropout rate, repeater rate, completion rates and enrolment rate.

4.5.1 Class size

Number of class rooms determines the class-size and consequently the level of interaction between the teacher and students and between the students themselves. The study sought to find out the class sizes in the public day secondary schools in Embu County. The teachers were asked to indicate the average class size in their schools and the responses are shown in Table 4.13

Table 4.13: Class sizes

Class size	Frequency	percentage
Below 40	5	5.4
40-49	31	33.7
50-59	46	50
60-69	10	10.9
Total	**92**	**100**

As depicted in Table 4.13, more than 50 percent of teachers indicated that their classrooms had 50 students or more with 10.9 percent indicating class sizes of 60-69 students. The standard class-size is 40 students in a classroom that measures 12 by 8 meters (MoEST, 2014). This means that each student should have a class space of 2.4 square meters. It follows therefore that in a majority of schools the

student- class space was less than 2.4 square meters. In 10.9 percent of schools it was less than 1.6 square meters. The results indicate large class-sizes in a majority of schools. These findings were affirmed by some comments from the principals during the interview sessions. From interview session code IS-23 the principal commented as follows "*As for now our capacity to take more students is limited by the number of classrooms, our classes are full to capacity if I take you there you would understand what I mean.*" In another interview session code IS-04 the principal responded by saying "*this year we received 61 form ones who could not be accommodated in one class, the primary school section just across the field gave us a classroom and that is where one of the form one classes is being taught from."* From interview session code IS-024 the principal had this to say "*well for now we are teaching the form ones from the dining hall because all of them cannot fit in one class. For the time being the student will continue to eat from outside as we look for a solution*."

This shows that in a majority of schools the students are overcrowded. The findings mirror the work of Jepchirchir (2019) who found that secondary schools in Uashin Gishu County had shortage of adequate classrooms to accommodate all the students which resulted to large and overcrowded classes. Large class size means that a learner receives less individualized instructional time with the teacher (O'Neil, 2012). Individualized instruction in learning is crucial in that a student who may fail to understand gets the opportunity of being assisted. And

also in large class sizes there are more disruptions which many a time gets the students off the task (Woods, 2015).

4.5.2 Adequacy of school laboratories and libraries

School laboratories are basic facilities in the teaching and learning of sciences. The libraries offer safe storage for learning materials and provide a quiet place where students can go to do private studies and assignments. Teachers can as well prepare lessons and conduct classes in the library besides other functions. The teachers were asked to indicate the number of school laboratories and libraries in their school. Their responses are shown in Table 4.14

Table 4.14: Number of school laboratories and libraries

No of facilities	Laboratory		Library	
	f	%	f	%
0	0	0	88	95.7
1	84	91.3	4	4.3
2	8	8.7	0	0
Total	**92**	**100**	**92**	**100**

As depicted in Table 4.14 all teachers indicated that their school had a school laboratory with 8.7 percent indicating that they had two laboratories. Only 4.3 percent of teachers indicated that they had a school library. To ascertain the adequacy of the laboratories the research sought the data on the school number of

class streams versus the number of laboratories. The data is presented in Table 4.15

Table 4.15: Number of laboratories versus number of class streams

Number of laboratories	Number of school class streams per school					
Available in school	1		2		3	
	f	%	f	%	f	%
1	27	29.3	57	62	0	0
2	0	0	6	6.5	2	2.2

According to Table 4.15, a majority (62%) percent of double streamed schools had only one school laboratory catering for three sciences; physics, chemistry and biology. If each class in a double steamed school is to be taught at least one practical double lesson in the three sciences in a week then this would require a total of 24 double lessons. Considering that a day has 9 lessons, one laboratory can only accommodate 4 double lessons in a day. This would translate to 20 lessons available for practical in a two streamed school. It therefore follows that 62 percent of two streamed schools had inadequate laboratories. When asked how schools manage to teach the three sciences with only one laboratory, the principals give the following responses:

"*We created a tenth lesson so as to accommodate a total of 24 double lessons in the laboratory. We know very well this is against the ministerial guideline but what else are we supposed to do?"* (Interview session code IS-9)

"*What saves us here is the way we combine the elective subjects such that in form 3 and 4 no students takes 3 sciences. Its only chemistry that is compulsory and then a student has to take another one science either physics or biology. That is how we survive."* (Interview session code IS-18)

"*We have a small room where we used to keep materials during the construction of that dining hall; we have placed a few benches there and we now use it for physics practical. Biology and chemistry are very demanding in terms of resources as compared to physics."* (Interview session code IS-22)

These responses affirmed that the laboratory facilities are inadequate in public day secondary schools in Embu County. The result mirrors the work of Daba and Anbesaw (2016) in Afar region of Ethiopia who also found that besides the laboratories being inadequate the rooms that had been converted in to laboratories were not conducive for learning. The rooms lacked the very common laboratory facilities like water and functional sinks. As a result teachers were unable to perform most of the practical work with students as prescribed in the syllabus. When students are not taught science practical sessions in the laboratories, they are not likely to understand scientific concepts taught theoretically. As opined by Kamba, Libata and Usman (2019) when learners are taught through

experimentation they get inspired and get the motivation to learn as well. On the other when students are not exposed to experiments their level of understanding is usually very low. Moreover they are unable to comprehend abstract and complex scientific concepts as well.

4.5.3 Availability of electricity and internet connectivity in schools

For any institution that is expected to offer quality education in the current world, the role of electricity and internet connectivity cannot be over emphasized. The study sought to find out if these two facilities were available in schools. In the questionnaire the teachers were asked to indicate if their school was connected to the national power grid and or if internet connectivity was available. The responses from teachers are shown in Table 4.16

Table 4.16: Availability of electricity and internet in schools

Facility	Available		Not available	
	Frequency	Percent	Frequency	Percent
Electricity	92	100	0	0
Internet	3	3.3	89	96.7

According to Table 4.16, electricity was available in all school but only 3.3 percent of teachers indicated that their school had internet connectivity. The study by Alam and Kaneko (2019) in Bangladesh established that schools can utilize electricity to improve on quality of education. This included extending study hours early in the morning and at night. Jackoski (2013) also observed that water

can be pumped from wells and rivers using electricity. This lessen the students the burden of fetching water in school and at home allowing them more time to study. As such with all day secondary schools connected to power grid in Embu County it implies that they have the capacity to improve quality of education.

4.5.4 Ratio of school toilets to students

The study sought to find out the ratio of toilets to students. The data was solicited from the teachers by asking them to indicate the ratio of toilets to students. Their responses are tabulated in Table 4.17

Table 4.17: Ratio of toilets to students

Toilet to student ratio	Frequency	percentage
Greater than 1:10	27	29.3
1:10-1:20	14	15.2
1:21-1:30	43	46.7
1:31-1:40	8	8.7
Total	**92**	**100**

According to Table 4.17, only 8.7 percent of teachers indicated that the ratio of toilets to students was less than 1:30. The results indicate that the schools had conformed to the recommended ratio of toilets to students (1:25 for girls and 1:30 for boys). The findings show that the number of toilets in public day secondary schools was adequate. The results are inconsistent with the findings of a study by Gatua (2015) in Nairobi west region who established that schools had not met the

recommended ratio of school toilets to students. The researcher was also interested in establishing if the school toilets had lockable doors for the privacy of the user. The responses from the students are presented in Table 4.18

Table 4.18: Availability of lockable doors of the toilets

Toilet doors available	f	%
Yes	323	91.7
No	17	4.8
No response	12	3.5
Total	352	100

According to Table 4.18, 91.7 percent of students indicated that school toilet had lockable doors. Availability of proper toilets is crucial for student enrollment and retention of female teachers (Adukia, 2014; Hamza, 2016).

Availability of water within the vicinity of the school toilets was also of interest to the researcher. The students were asked to indicate if there was water available in the toilet or near the pit latrines. The responses are as shown in Table 4.19

Table 4.19: Water availability within sanitation area

Water availability within the sanitation area	Frequency	Percentage
Available	139	39.5
Not available	198	56.2
Missing in the system	15	4.3
Total	**352**	**100**

As depicted in Table 4.19, most students (56.2%) indicated that there was no water available within the sanitation area. Lack of water within the sanitation area can discourage some students from the usage of the facilities which can be a cause of stress if their bowels or bladders are not emptied.

4.5.5 State of physical structures

The state or the condition of a physical facility determines its usability. The researcher recorded the state of selected facilities in the observation check-list and the data is reflected in Table 4.20

Table 4.20: State of the physical facilities

Facility	State/condition	Frequency	%
	Structure type		
Classrooms	a) Permanent	19	86.4
	b) Semi-permanent	3	13.6
Toilets	a) Flush toilets	2	9.1
	b) Pit latrines	20	90.9
	Organization		
School play	a) Reflect diverse co-curriculum	4	18.2
ground	b) Lacks pitches, fields	9	40.9
	c) Grass not maintained	14	63.6
Laboratory	a) Chemicals kept in lockable cabinets	18	81.8
	b) Clean benches	16	72.7

	c) Stools well arranged	9	40.9
	d) Clean sinks	12	54.5
Library	a) Specifically built with purpose	1	25.0
	b) Classroom/store used as a library	3	75.0
	c) Books arranged in shelves	1	25.0
Dining hall	a) Presence of a functional dining hall	13	59.1
	b) Clean and functional table/benches	15	48.0
	c) Secure lockable doors and windows	16	72.7

As depicted in Table 4.20 a majority of schools (86.4%) had permanent classes, 90.9 percent were using pit latrines, and only 18.2 percent of schools had play fields that reflected diverse co-curriculum. In 81.8 percent of schools laboratory chemicals were well stored in lockable cabinets, 72.7 percent had clean benches, and 54.5 percent had clean sinks. Only 25 percent of schools with libraries had a library designed and built with the intended purpose, the rest were either classrooms or old stores set aside to serve as libraries. A good percentage (40.9%) of schools had no functional dining hall. And even with the available ones more than 50 percent of them had no functional furniture while 27.3 percent of them lacked lockable doors and windows. Well-built, planned and organized school physical facilities improve on learners' enrolment, attendance, school completion and academic achievement (RoK, 2005; Bank of Latin America, 2016).

4.5.6 Correlation and regression analysis on the influence of adequacy of physical facilities on quality of education.

Class-size, ratio of school toilets to students, internet connectivity, adequacy of laboratories and libraries were correlated with the various indicators of quality education. The indicators of quality considered were students' ratio of quality grades, enrolment rate, completion rate, and repetition and dropout rates. The correlations are shown in Table 4.21

Table 4.21: Correlations between physical facilities and indicators of quality education

		Y1	Y2	Y3	Y4	Y5	X1	X2	X3	X4	X5
Y1	Pearson Correlation	1	.320	.509	.637	-.067	-.712	-.702	-.717	.734	.836
	Sig. (2-tailed)		.113	.930	.459	.527	.631	.547	.151	.713	.414
	N	92	92	92	92	92	92	92	92	92	92
Y2	Pearson Correlation	.320	1	-.029	.244	.105	.773	.813	.750	-.825	-.759
	Sig. (2-tailed)	.113		.320	.183	.321	.154	.345	.622	.652	.316
	N	92	92	92	92	92	92	92	92	92	92
Y3	Pearson Correlation	.509	-.029	1	.197	.140	.811	.826	.722	-.016	-.004
	Sig. (2-tailed)	.930	.320		.872	.184	.936	.803	.841	.294	.914
	N	92	92	92	92	92	92	92	92	92	92
Y4	Pearson Correlation	.637	.244	.197	1	.197	.655	.791	.871	-.739	-.881
	Sig. (2-tailed)	.459	.183	.873		.873	.141	.500	.691	.573	.152
	N	92	92	92	92	92	92	92	92	92	92
Y5	Pearson Correlation	-.067	.105	.140	.369	1	.704	.884	.904	-.801	-.803
	Sig. (2-tailed)	.527	.321	.184	.000		.143	.423	.204	.617	.678
	N	92	92	92	92	92	92	92	92	92	92
X1	Pearson Correlation	-.712	.773	.811	.655	.704	1	.216	.154	-.047	.652
	Sig. (2-tailed)	.631	.154	.936	.141	.143		.807	.312	.104	.176
	N	92	92	92	92	92	92	92	92	92	92
X2	Pearson Correlation	-.702	.813	.826	.791	.884	.216	1	.399	.312	.071
	Sig. (2-tailed)	.547	.345	.803	.500	.423	.807		.671	.726	.715
	N	92	92	92	92	92	92	92	92	92	92
X3	Pearson Correlation	-.717	.750	.722	.871	.904	.154	.399	1	.142	-.302
	Sig. (2-tailed)	.151	.622	.841	.691	.204	.312	.671		.694	.135
	N	92	92	92	92	92	92	92	92	92	92
X4	Pearson Correlation	.734	-.825	-.016	.-739	-.801	-.047	.312	.142	1	.181
	Sig. (2-tailed)	.713	.652	.294	.573	.617	.104	.726	.694		.555
	N	92	92	92	92	92	92	92	92	92	92
X5	Pearson Correlation	.836	-.759	-.004	-.881	-.803	.652	.071	-.302	.181	1
	Sig. (2-tailed)	.414	.316	.914	.152	.678	.176	.715	.135	.555	
	N	92	92	92	92	92	92	92	92	92	92

**. Correlation is significant at the 0.01 level (2-tailed).

Key: Independent variables: Y1-class size, Y2-ratio of toilets to students, Y3- internet Connectivity, Y4-availability of library, Y5- adequacy of laboratories

Dependent variables: X1-Ratio of quality grades, X2- Completion rate, X3- enrollment rate, X4-dropout rate, X5-repetition rate

According to Table 4.21 the school physical facilities have strong correlations with the various aspects of quality education implying that their relationships are strong. The strongest correlation is between adequacy of school laboratory and enrolment rate [r=.904, p=.204]. This suggests that schools that have adequate school laboratories have a higher enrolment rate and vice versa.

Education production function for influence of adequacy of physical facilities on quality of education.

When school physical environment is considered as educational inputs then variables such as adequacy of laboratories, classes, libraries, toilets, electricity, internet and playground are employed to represent the input. Quality education as an output in education production function considered ratio of quality grades, completion rates, enrolment rate, drop out and repetition rates as the variables that indicate quality. The education production function that relates the input and output is of the form;

$Q_i = f(A_j, B_j, A_j, C_j, D_j, E_j, G_j, H_j)$

Where;

Q- represents quality of education

i -represents the i^{th} indicator of quality

A-represents laboratories

B- represents classes

C-represents libraries

D-represents toilets

E-represents electricity

G-represents internet

H-represents playground

j- represents the j^{th} school

In order to establish if the relationships were statistically significant, general linear model multivariate regression analysis were run and the coefficients of regressions are tabulated in Table 4.22.

Table 4.22: Coefficients of regressions

Tests of Between-Subjects Effects

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Rate of quality grades	.787[a]	5	.157	.629	.038
	Completion rate	13.133[b]	5	2.627	1.303	.046
	Enrolment rate	10.116[c]	5	2.023	.735	.060
	Dropout rate	10517.755[d]	5	2103.551	.186	.029
	Repetition rate	.278[e]	5	.056	.173	.017
Intercept	Ratio of quality grades	4.718	1	4.718	18.857	.000
	Completion rate	35.531	1	35.531	17.628	.000
	Enrolment rate	27.492	1	27.492	9.981	.002

	Dropout rate	121.831	1	121.831	.011	.048
	Repetition rate	16.563	1	16.563	51.626	.000
Class-size	Ratio of quality grades	.630	1	.630	2.518	.016
	Completion rate	.160	1	.160	.079	.009
	Enrolment rate	.377	1	.377	.137	.012
	Dropout rate	987.383	1	987.383	.087	.069
	Repetition rate	.070	1	.070	.219	.041
Ratio of toilets to students	Ratio of quality grades	.013	1	.013	.054	.027
	Completion rate	1.729	1	1.729	.858	.057
	Enrolment rate	1.481	1	1.481	.538	.001
	Dropout rate	6.857	1	6.857	.001	.038
	Repetition rate	.078	1	.078	.244	.022
Adequacy of laboratories	Ratio of quality grades	.049	1	.049	.196	.059
	Completion rate	5.255	1	5.255	2.607	.010
	Enrolment rate	1.805	1	1.805	.655	.021
	Dropout rate	9069.009	1	9069.009	.801	.033
	Repetition rate	.001	1	.001	.003	.046
Adequacy of Library	Ratio of quality grades	.028	1	.028	.113	.038
	Completion rate	.693	1	.693	.344	.059
	Enrolment rate	.079	1	.079	.029	.026
	Dropout rate	19.999	1	19.999	.002	.007
	Repetition rate	.059	1	.059	.183	.010
Connectivity to internet	Ratio of quality grades	.049	1	.049	.195	.020
	Completion rate	5.283	1	5.283	2.621	.009
	Enrolment rate	1.826	1	1.826	.663	.018
	Dropout rate	9069.153	1	9069.153	.801	.073
	Repetition rate	.001	1	.001	.003	.050
Error	Ratio of quality grades	21.517	86	.250		
	Completion rate	173.345	86	2.016		
	Enrolment rate	236.874	86	2.754		
	Dropout rate	973977.322	86	11325.318		
	Repetition rate	27.592	86	.321		

Total	Ratio of quality grades	206.000	92
	Completion rate	910.000	92
	Enrolment rate	827.000	92
	Dropout rate	998203.000	92
	Repetition rate	774.000	92
Corrected Total	Ratio of quality grades	22.304	91
	Completion rate	186.478	91
	Enrolment rate	246.989	91
	Dropout rate	984495.076	91
	Repetition rate	27.870	91

a. R Squared = .735 (Adjusted R Squared = .728)
b. R Squared = .770 (Adjusted R Squared = .746)
c. R Squared = .841 (Adjusted R Squared = .835)
d. R Squared = .811 (Adjusted R Squared = .799)
e. R Squared = .760 (Adjusted R Squared = .748)

From Table 4.22, the R^2 squared values are greater than 0.7 revealing that the independent variables account for more than 70 percent of the dependent variables. The highest R^2 squared value of 0.841 suggests that 84.1 percent of the value of enrolment rate is attributed by the independent variables. A comparison of the significant values revealed that the independent variables were significant at $\alpha = .05$, specifically the ratio of school toilets to students with respect to enrolment ratio was the most significant, $p = 0.001$. This indicates that when the number of school toilets is increased more students enroll in that school and vice versa. The implication of the p-values $< \alpha = .05$ is that the relationships between adequacy of physical facilities and quality of education is statistically significant.

4.6 Influence of adequacy of teaching/learning resources on quality of education

The third objective of the study was to determine the influence of adequacy of teaching and learning resources on quality of education in public day secondary schools in Embu County. Teaching and learning resources are usually tailored to the subject and the content of what is being taught as well as the age of the learner. Teaching and learning materials of whichever type play an important role in the learning of students. They also complement meaningful infill to lesson planning and the presentation of instructions. The teaching and learning resources that were considered included textbooks; laboratory apparatus, chemicals and consumables; teaching models; revision materials; and ICT devices, and their influence on ratio of quality grades, repetition rate, dropout rate, completion rate and enrolment rate.

4.6.1 Adequacy of teaching and learning resources

Teaching and learning resources are the tools which the teacher utilizes in preparing the lesson and delivering the learning content. They also help the teacher to actively engage the learners to make the teaching and learning process more interactive. The teachers were asked to indicate the adequacy of teaching and learning resources in their school. The responses are shown in Table 4.23

Table 4.23: Adequacy of teaching and learning resources

Teaching/learning resources	Available and adequate		Available but inadequate		Not available	
	f	%	f	%	f	%
Texts books	92	100	0	0.0	0	0.0
Laboratory apparatus	12	13.0	80	87.0	0	0.0
Laboratory chemicals & consumables	0	0.0	92	100	0	0.0
Teaching models	0	0.0	62	67.4	30	32.6
Revision materials	14	15.2	71	77.2	7	7.6
ICT devices	0	0.0	10	10.9	82	89.1
Newspapers& magazines	0	0.0	21	22.8	71	77.2

From Table 4.23, all teachers indicated that text books were available and adequate in their school. This confirms the government commitments in achieving a textbook ratio of 1:1 for quality education under the free education programme. All the teachers indicated that laboratory chemicals and consumables were available but inadequate while 87 percent of them indicated that laboratory apparatus were available but inadequate. The results concur with the findings of a study by Owino, Osman and Yungungu (2014) in Nyakach sub-County, Kenya which established that laboratories chemicals and local specimen were inadequate

in a majority of schools. Their inadequacy limited the frequency of doing experiments and attributed to the poor performance in Biology.

As for the teaching models, 67.4 percent of teachers indicated that teaching models were available but inadequate which conforms to the results of a study by Mbugua (2011) who found that 52.4 percent of schools in Kenya lack adequate models for teaching. On revision materials, 77.2 percent of teachers indicated that these materials were available but inadequate. With regard to the ICT devices only10.9 percent of teachers indicated that ICT devices were available but inadequate in their schools. This clearly shows that a majority of schools lack the capacity to integrate ICT in education.

For the newspapers and magazines 77.2 percent of teachers indicated that they were not available.

4.6.2 Correlation analysis on the influence of adequacy of teaching and learning resources on quality of education.

The study sought to determine the influence of adequacy of teaching and learning resources on quality of education in Embu County. Teaching and learning resources were correlated with the various aspect of quality education. The correlations are shown in Table 4.24.

Table 4.24: Correlations between T/L resources and indicators of quality education

		Y1	Y2	Y3	Y4	Y5	X1	X2	X3	X4	X5
Y1	Pearson Correlation	1	.055	.067	.029	.017	.093	.063	.059	-.087	-.040
	Sig. (2-tailed		.589	.287	.044	.613	.378	.548	.577	.411	.705
	N	92	92	92	92	92	92	92	92	92	92
Y2	Pearson Correlation	.055	1	-.102	.027	-.065	.064	.208	.209	-.056	-.026
	Sig. (2-tailed	.589		.774	.479	.173	.547	.146	.045	.596	.231
	N	92	92	92	92	92	92	92	92	92	92
Y3	Pearson Correlation	.067	-.102	1	-.107	.114	.151	.048	.078	-.098	-.090
	Sig. (2-tailed	.287	.774		.198	.400	152	.647	.462	.354	.396
	N	92	92	92	92	92	92	92	92	92	92
Y4	Pearson Correlation	.029	.027	-.107	1	.063	.006	.036	.012	-.013	-.069
	. (2-tailed	.044	.479	.198		.396	.953	.731	.907	.283	.107
	N	92	92	92	92	92	92	92	92	92	92
Y5	Pearson Correlation	.017	-.065	.114	.063	1	.005	.026	.088	-.192	.018
	Sig. (2-tailed	.613	.173	.400	.396		.599	.806	.402	.067	.679
	N	92	92	92	92	92	92	92	92	92	92
X1	Pearson Correlation	.093	.064	.151	.006	.005	1	.022	.067	.188	.093
	Sig. (2-tailed	.378	.547	.152	.953	.599		.832	.524	.073	143
	N	92	92	92	92	92	92	92	92	92	92
X2	Pearson Correlation	.063	.208	.048	.036	.026	.022	1	.081	.004	.102
	Sig. (2-tailed	.548	.146	.647	.731	.806	.832		.067	.705	.713
	N	92	92	92	92	92	92	92	92	92	92
X3	Pearson Correlation	.059	.209	.078	.012	.088	.067	.081	1	.024	.117
	Sig. (2-tailed	.577	.045	.462	.907	.402	.524	.442		.817	.821
	N	92	92	92	92	92	92	92	92	92	92
X4	Pearson Correlation	-.087	-.056	-.098	-.013	-.192	.188	.004	.024	1	.023
	Sig. (2-tailed	.411	.596	.354	.283	.067	.073	.705	.817		.333
	N	92	92	92	92	92	92	92	92	92	92
X5	Pearson Correlation	-.040	-.026	-.090	.-069	-.018	.093	.102	.117	.023	1
	Sig. (2-tailed	.705	.231	.396	.107	.679	.143	.713	.821	.333	
	N	92	92	92	92	92	92	92	92	92	92

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Key: Independent variables: Y1- Ratio of textbook to students, Y2-laboratory apparatus, Y3-models, Y4-ICTs, Y5-revision materials

Dependent variables: X1-ratio of quality grades, X2-completion rate, X3-enrolment rate, X4-dropout rate, X5-repetition rate

As depicted in Table 4.24 the correlations between the independent and dependent variables are generally very weak. The weakest correlation is between revision materials and academic grades [r=.005, p=.599]. Comparatively the strongest correlation is between availability of laboratory apparatus and enrollment [r=.209, p =.045].

Education production function for influence of adequacy of teaching and learning resources on quality of education

Adequacy of teaching and learning resources as educational inputs in education production function took into account of the text books, ICT-devices, laboratory apparatus, revision materials and teaching models. The mathematical representation was of the form;

$Q_i = F(T_j, I_j, A_j, R_j, M_j)$ where,

Q-represents quality as the outcome

i- represents the i^{th} quality indicator

T-represents ratio of text books

I-reepresents ICT devices

A-represents laboratory apparatus

R-represents revision materials

M -represents teaching models

j–represents the j^{th} school

The statistical significance of the relationships between these variables and indicators of quality education was determined by use of regression analysis. The coefficients of regressions are shown in Table 4.25

Table 4.25: Coefficients of regressions

Tests of Between-Subjects Effects

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Ratio of quality grades	1.121[a]	5	.224	1.129	.351
	Completion rate	52.823[b]	5	10.565	2.067	.077
	Enrolment rate	2.8906	5	577972.703	7063018.892	.000
	Dropout rate	2.171[d]	5	.434	6.277	.000
	Repetition rate	.890[e]	5	.178	1.241	.297
Intercept	Ratio of quality grades	1.669	1	1.669	8.401	.005
	Completion rate	.005	1	.005	.001	.974
	Enrolment rate	.080	1	.080	.980	.325
	Dropout rate	.081	1	.081	1.173	.282
	Repetition rate	1.533	1	1.533	10.694	.042
Ratio of textbook to students	Ratio of quality grades	.100	1	.100	.503	.480
	Completion rate	3.872	1	3.872	.758	.386
	Enrolment rate	2.809	1	2.809	34.330	.060
	Dropout rate	.348	1	.348	5.035	.077
	Repetition rate	.123	1	.123	.860	.356
Adequacy of laboratory apparatus	Ratio of quality grades	.415	1	.415	2.087	.152
	Completion rate	52.077	1	52.077	10.191	.072
	Enrolment rate	.315	1	.315	3.844	.053
	Dropout rate	1.147	1	1.147	16.581	.120
	Repetition rate	.045	1	.045	.317	.575
Teaching models	Ratio of quality grades	.491	1	.491	2.470	.120
	Completion rate	.013	1	.013	.003	.960

	Enrolment rate	824143.740	1	824143.740	1.0077	.080
	Dropout rate	.001	1	.001	.016	.899
	Repetition rate	.624	1	.624	4.354	.040
ICT equipment for teaching and learning	Ratio of quality grades	.017	1	.017	.085	.772
	Completion rate	.008	1	.008	.001	.969
	Enrolment rate	.237	1	.237	2.900	.092
	Dropout rate	.000	1	.000	.006	.938
	Repetition rate	.006	1	.006	.040	.842
Adequacy of revision materials	Ratio of quality grades	.660	1	.660	3.322	.072
	Completion rate	.002	1	.002	.000	.983
	Enrolment rate	.028	1	.028	.343	.560
	Dropout rate	5.0135	1	5.0135	.001	.979
	Repetition rate	.632	1	.632	4.410	.139
Error	Ratio of quality grades	17.085	86	.199		
	Completion rate	439.481	86	5.110		
	Enrolment rate	7.037	86	.082		
	Dropout rate	5.949	86	.069		
	Repetition rate	12.328	86	.143		
Total	Ratio of quality grades	167.000	92			
	Completion rate	676.000	92			
	Enrolment rate	2994125.000	92			
	Adequacy of students' chairs	119.000	92			
	Repetition rate	140.000	92			
Corrected Total	Ratio of quality grades	18.207	91			
	Completion rate	492.304	91			
	Enrolment rate	2889870.554	91			
	Dropout rate	8.120	91			
	Repetition rate	13.217	91			

a. R Squared = .062 (Adjusted R Squared = .007)

b. R Squared = .017 (Adjusted R Squared = .055)

c. R Squared = .009 (Adjusted R Squared = .009)

d. R Squared = .026 (Adjusted R Squared = .012)
e. R Squared = .067 (Adjusted R Squared = .013)

From Table 4.25, the R^2 squared values are close to zero which implies that the independent variable do not really attribute to the value of the dependent variables. The highest R^2squared value of .067 suggests that the independent variable accounts for only 6.7 percent of the value of the dependent variable. The least R^2 squared of 0.009 suggests that the independent variable attributes for only 0.9 percent of the dependent variable.

Considering the significant values, the independent variables have p-values > α = 0.05. The p-values > 0.05 show that the relationships between the adequacy of teaching and learning materials and the aspects of quality of education are statistically insignificant. The findings mirror the results of a study by Cristia, Czerwonko and Garafalo (2014) in Peru where a programme that increased computers and internet access to schools did not reduce repetition and dropout rates neither improve on enrolment rates. Their study reported that almost all the time was spent in learning the ICT skills but did not translate to its application in improving the quality of teacher- learner interaction and in syllabus coverage. There was also no clearly defined successful ICT model by then. This is in contrast to results of a study by Gaotlhobogwe (2015) in Bostwana that established that shortage of learning tools, equipment and machinery led to decline of student enrolment in design and technology in junior secondary schools.

4.7. Influence of financial resources on quality of education

The fourth objective of the study was to establish the influence of financial resources on quality of education in day secondary schools in Embu County. The aspects of financial resources that were considered included but not limited to sources of school funds, school lunch levy, fare to and from school, cost of school uniform, cost of stationeries, and their influence on rates of dropout, repetition, and that of completion.

4.7.1 Sources of school funds

Through the interviews with the principals the study sought to find out the various sources of school funds. The data was solicited from the school principals by asking them about the various sources of the school funds and their responses were presented in Table 4.26

Table 4.26: Sources of school funds

Sources of school funds	Frequency	Percentage
FDSE funds	26	100
Lunch levy	26	100
CDF bursaries	26	100
School income generating projects	3	11.5

As depicted in Table 4.26, all the principals indicated that they relied on FDSE, lunch levy, and CDF bursaries. The results show that the government is the main financier of public day secondary education. The study sought to find out if there

were challenges encountered in obtaining school funds and the responses from the principals are tabulated in Table 4.27

Table 4.27: Challenges in obtaining the school funds

Source of funds	Challenges	Frequency	percentage
FDSE	Late and untimely disbursement	26	100
Lunch levy	Non- payment	4	15.4
	Delayed payments	22	84.6
Bursaries	Too little	15	68.2
	Unreliable	12	54.5

From Table 4.27, all the principals reported that the challenges of FDSE funds was late and untimely disbursement. For the lunch levies 84.6 percent of the principals reported that the biggest challenge was delay in payments. According to 68.2 percent of the principals the bursary allocations were too little. Further according to 54.5 percent of principals bursaries were unreliable for budgeting. The results correlates with that of the study by Koriyow (2017) in Wajir County which established that the challenge faced by 62.5 percent of principals in obtaining FDSE was late and untimely disbursement of funds by the government.

4.7.2 Lunch levy

In Kenya school meals is not part of student capitation and so the parents are expected to pay for the meals of their children in school. The schools rely on money from the parents to provide students with lunch meals. Thus school

principals find it difficult to sustain students in school and provide them with meals if parents fail to pay for it and on time. A hungry learner cannot concentrate nor participate during the lesson. The study sought to find out the total amount paid by students as lunch levy in a year. The responses from the students are shown in Table 4.28

Table 4.28: The amounts charged as school lunch levy

Lunch levy in a year in Kenya shillings	Frequency	Percentage
Less than 10,000	191	54.4
10,000-15,000	161	45.6
Total	**352**	**100**

From Table 4.28, 54.4 percent of students indicated that the lunch levy charged by their schools in a year was less than KES10, 000 while 45.6 percent of students indicated that their schools charged between KES10, 000 and KES 15,000. The results mirror the work of Miako (2012) who established that schools in Nyandarua North Sub-County were charging KES 6000 as lunch levy.

4.7.3 Cost of school uniform

Uniform includes the trouser (for boys), skirt (for girls), shirt, sweater, socks, shoes, and tie. School uniform serves to promote self-confidence, the feeling of belonging and pride. It is such factors that enhance the learner's wellbeing. The study sought to establish the average cost of school uniform. Students were asked to indicate the cost of full uniform and their responses are presented in Table 4.29

Table 4.29: cost of school uniform

Amount in KES	Frequency	Percentage
Less than 5,000	71	20.3
5,000 - 7,500	252	71.6
More than 7,500	17	4.7
Missing in the system	12	3.4
Total	**352**	**100**

From Table 4.29, 71.6 percent of students indicated that they spend between KES5, 000 and KES 7,500 on uniform. The findings differ slightly with those of a study by Mutegi (2015) in Tharaka Sub-County, Kenya who established that the average cost of school uniform was KES5, 094 for girls and KES4, 035 for the boys. The difference in cost for the two studies can be attributed to time factor as the two studies were done five years apart. In other words the cost of living has increased in those five years.

4.7.4 Cost of stationery

The life of a student cannot be complete without stationery. Without access to fundamental stationery a student cannot be able to study. In other words stationery is an integral and basic component of learning for a student. This is because students require stationery to take notes, draw, write examinations and do the assignments or projects. The study sought to establish the amount spent by student on items that are not covered in their capitation including the pens, ruler,

pencils, mathematical set and table, calculator, dictionary, kamusi, bible, atlas, set books and the bag. The responses from the students are tabulated in Table 4.30

Table 4.30: Cost of stationery

Amount spent on stationeries in Kenya shillings	Frequency	Percentage
Less than 5,000	58	16.7
5,000 - 7,500	222	63.0
More than 7,500	72	20.3
Total	**352**	**100**

From Table 4.30, 63.0 percent of students indicated that they spent between KES 5,000 and KES 7,500 on stationeries. The results suggest that for smooth learning a student should have this amount for the very basic requirements without which can greatly hinder learning.

4.7.5 Fare to and from school

The means of commuting for day-scholars is fundamental to their security, punctuality and readiness for schooling. On the other hand it can, to a great extent, influence the school of choice. The study sought to find out the daily transport expenses to and from school by asking the students to indicate the amount spend on this. The data is presented in Table 4.31

Table 4.31: Amount spent on fare to and from school

Fare	Frequency	Percentage

Walk or ride to school	278	78.9
KES 50 and below	58	16.4
KES 51- KES 100	13	3.9
Above KES 100	3	0.8
Total	**352**	**100**

Table 4.31 depicts that a majority of students (78.9%) walk or ride to and from school. Again the findings mirror the work of Mutegi (2015) who established that most of students in day secondary schools in Tharaka sub-County, Kenya walked or cycled to school. Walking or cycling to school can be exhaustive especially if the school is far away from home. Further the study sought to find out the distances to school. The students were asked to indicate the approximate distance from home to school and the data is presented in Table 4.32

Table 4.32: Distance from home to school

Distance to the nearest Kilometer	Frequency	Percentage
1	58	16.6
2	81	22.9
3	154	43.6
More than 3	59	16.9
Total	**352**	**100**

From Table 4.32, a majority of students (60.5%) indicated that they cover a distance of 3 or more kilometers to school. This implies that a majority of the students commute for 6 kilometers or more every day to and from school.

Concerning these educational expenses by the students, the study sought to establish whether students were sent home for lack, non-payment or non-compliance with any. The students were asked to indicate if one had ever been sent home. The responses are shown in Table 4.33

Table 4.33: Students response on whether one has ever been sent home

Responses	Frequency	Percentage
Yes	241	68.5
No	111	31.5
Total	**352**	**100**

According to Table 4.33, 68.5 percent of student indicated that they had ever been sent home. Further the students were asked to list down the reasons for being sent home. The responses are indicated in Table 4.34

Table 4.34: Reasons for being sent home

Reason for being sent home	Frequency	Percentage
Lunch levies	103	29.2
Uniform	69	19.5
Lateness	90	25.5
Stationery	76	21.6
Others	25	7.0

From table 4.34, 29.2 percent of students have ever been sent home for lunch levies, 25.4 percent for being late, 21.7 percent for lack of stationery, and 19.6 percent for uniform. When a student is frequently sent home the learning time is reduced and gains less as compared to those whose learning is not disrupted. The study sought to find out the occupation of the parents and or guardians with an aim to gauge their ability of financing the education of their children. Students were asked to indicate the nature of occupation of their parents or guardian and their responses are presented in Table 4.35

Table 4.35: Occupations of parents

Nature of parent/guardian occupation	Frequency	Percentage
White color job	16	4.7
Casual lobour	91	25.8
Business	20	5.7
Subsistence farming	210	59.6
Others	15	4.2
Total	**352**	**100**

As depicted in Table 4.35, the main occupations of the parents/guardians were subsistence farming (59.6%) and casual labour (25.8%). The results conform to the findings of a study by Mutegi (2015) who established that majority of parents in Tharaka South sub-County were small-scale farmers. The results also concur

with that of a study by Korir (2018) in Kipkelion sub-County which established that a majority (78.8%) of parents were small scale farmers.

4.7.6 Correlation and regression analysis on the influence of adequacy of financial resources on quality of education.

The study sought to examine the influence of adequacy of financial resources on quality of education in Embu County. The various financial aspects were correlated with the various aspect of quality education. The indicators of quality considered were ratio of quality grades, repetition ratio and dropout ratio. The correlations are tabulated in Table 4.36

Table 4.36: Correlations between adequacy of financial resources and quality of education

		Y1	Y2	Y3	Y4	X1	X2	X3
Fare to school-Y1	Pearson Correlation	1	-.127	.084	.043	.401	.583	-.612
	Sig. (2-tailed)		.683	.414	.711	.172	.822	.194
	N	352	352	352	352	352	352	352
Cost of uniform including the shoes-Y2	Pearson Correlation	-.127	1	.136	-.113	.619	.371	-.196
	Sig. (2-tailed)	.683		.755	.567	.954	.752	.579
	N	352	352	352	352	352	352	352
Amount of school levy charged per year-Y3	Pearson Correlation	.084	.136	1	-.018	.187	.614	-.173
	Sig. (2-tailed)	.414	.755		.746	.639	.814	.654
	N	352	352	352	352	352	352	352
Cost of stationery-Y4	Pearson Correlation	.043	-.113	-.018	1	.394	.032	-.009
	Sig. (2-tailed)	.711	.567	.746		.843	.417	.048
	N	352	352	352	352	352	352	352
Repetition ratio –X1	Pearson Correlation	.401	.619	.187	.394	1	.814	-.731
	Sig. (2-tailed)	.172	.954	.639	.843		.010	.007
	N	352	352	352	352	352	352	352
Dropout ratio –X2	Pearson Correlation	.583	.371	.614	.032	.814	1	-.722
	Sig. (2-tailed)	.822	.752	.814	.417	.010		.401
	N	352	352	352	352	352	352	352
Completion ratio -X3	Pearson Correlation	-.612	-.196	-.173	-.009	-.731	-.722	1
	Sig. (2-tailed)	.194	.579	.654	.048	.007	.401	
	N	352	352	352	352	352	352	352

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

From Table 4.36 the strongest positive correlation between repetition and dropout ratios [r=.814, p=.010] suggests that when the repetition ratio is high then there are high chances of students dropping out of school. The weakest correlation is between the cost of stationary and completion rate [r=-.009, p=.048] suggesting that there is almost no relationship.

Education production function for influence of adequacy of financial resources on quality of education.

The adequacy of educational financial resources was checked through affordability of students to buy school uniform, payment of lunch levy, purchase of stationeries such as writing materials, and affordability of fare to and from school. The relationship of these independent variables and quality indicators is of the form;

Qi = F(Uj, Vj, Sj, Tj) where;

Q-represents quality of education as the outcome

i-represents the i^{th} indicator of quality

U-represents cost of uniform

V-represents cost of school levy

S-represents cost of stationery

T-represents cost of transport to and from school

j-represents the j^{th} school

General linear model multivariate regression analysis was done to find the determinant of the independent variables on the dependent variables and to

determine if the relationships were statistically significant. The coefficients of the regressions are presented in Table 4.37

Table 4.37: Coefficients of regressions

Tests of Between-Subjects Effects

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Repetition ratio	.440[a]	3	.110	.538	.008
	Dropout ratio	.287[b]	3	.072	.796	.431
	Completion ratio	8875.857[c]	3	2218.964	.198	.039
Intercept	Repetition ratio	2.147	1	2.147	10.513	.002
	Dropout ratio	1.735	1	1.735	19.273	.000
	Completion ratio	62.755	1	62.755	.006	.094
Fare to school	Repetition ratio	.248	1	.248	1.214	.024
	Dropout ratio	.236	1	.236	2.625	.019
	Completion ratio	6396.756	1	6396.756	.570	.032
Cost of uniform including shoes	Repetition ratio	.015	1	.015	.072	.049
	Dropout ratio	.013	1	.013	.146	.003
	Completion ratio	71.181	1	71.181	.006	.037
Amount of school levy charged per year	Repetition ratio	.193	1	.193	.947	.033
	Dropout ratio	.007	1	.007	.080	.078
	Completion ratio	1370.944	1	1370.944	.122	.012
Cost of stationery	Repetition ratio	.248	1	.248	1.213	.004
	Dropout ratio	.237	1	.237	2.630	.000
	Completion ratio	6389.765	1	6389.765	.570	.052
Error	Repetition ratio	17.767	347	.204		
	Dropout ratio	7.833	347	.090		
	Completion ratio	975619.219	347	11214.014		
Total	Repetition ratio	167.000	352			
	Dropout ratio	119.000	352			
	Completion ratio	998203.000	352			

Corrected Total	Repetition ratio	18.207	351
	Dropout ratio	8.120	351
	Completion ratio	984495.076	351

a. R Squared = .641 (Adjusted R Squared = .621)
b. R Squared = .595 (Adjusted R Squared = .589)
c. R Squared = .688 (Adjusted R Squared = .691)

As shown in Table 4.37, The R^2 squared values lies between 0.5 and 1 indicating that the independent variables account for more than 50 percent of the value of the dependent variables. The highest R^2squared value of 0.688 implies that the independent variables account for 68.8 percent of the completion ratio. Almost all the significant values are less than $\alpha = 0.05$. The least p-value = $0.000 < \alpha = 0.05$ between cost of stationery and dropout ratio is the most significant. The relationships are thus statistically significant.

CHAPTER FIVE

SUMMARY OF THE STUDY, CONCLUSION, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

5.1 Introduction

This chapter presents the summary of the study; conclusions arrived at, recommendations of the study and the suggestions for further research.

5.2 Summary of the study

The purpose of this study was to analyze the influence of educational resources on the quality of education in public day secondary schools in Embu County. The following were objectives of the study; to examine the influence of human resource staffing levels on quality of education; to determine the influence of adequacy of physical facilities on quality of education; to determine the influence of adequacy of teaching and learning resources on quality of education; and to establish the influence of adequacy of financial resources on quality of education in public day secondary schools in Embu County

The literature review focused on the concept of quality with regard to the indicators and measure of quality, availability of educational resources and their influence on quality of education, the theoretical frame work and conceptual frame work. The study employed correlational research design as it intended to establish the relationships between educational resources and quality of education. The target population of the study included all the principals, teachers and

students in all public secondary schools in Embu County. Through stratified, purposeful, and random sampling 516 respondents were selected. The sample size for students was determined using Cochran's formula (1963, 1975) where 384 students were sampled. Twenty percent of principals and ten percent of teachers were randomly selected from each stratum giving samples of 97 and 35 respectively.

Data for the study was garnered using questionnaires, interview schedule and an observation checklist. The return rate of instruments was 91.1 percent and reliability of the instruments from a pilot study yielded coefficients of above 0.7. Data was analyzed both quantitatively and qualitatively. The quantitative data was analyzed inferentially while qualitative data was analyzed based on the meaning and opinions of the respondents. Some of the responses were presented in raw form.

5.3 Summary of the main findings of the study

The study established the influence of educational resources on quality of education in Embu County. The findings are summarized as per the research objectives.

The first objective sought to examine the influence of human resource staffing levels on quality of education in public day secondary schools in Embu County. The study revealed that public day secondary schools in Embu County were understaffed. A majority of principles (88.5%) asserted that their schools had less

teachers based on the curriculum based establishment. This was affirmed through the data on student-teacher ratio that indicated that 73.1 percent of schools had a ratio of more than 40:1. The employment status showed that 31.5 percent of teachers were not employees of the TSC. It was also revealed that 17.4 percent of teachers were not specialist in the subjects that they were teaching. The study established a correlation of 0.625 between student teacher ratio and completion rate. This suggests that when more teachers are recruited into a school the chances of students completing school within the stipulated time frame increases. The regression analysis showed that the relationships between human resource staffing levels and qualities of education were statistically significant at $\alpha = 0.05$ level of significance. Completion rate had the least p-value of 0.003 suggesting that it was the most significant.

The second objective was to determine the influence of adequacy of physical facilities on quality of education in public day secondary schools in Embu County. The findings showed that there were inadequate classrooms to accommodate all students as 60.9 percent of schools had class sizes of more than 50 students. This is higher than the ministerial guideline on class size of 45 students following the 100 percent transition policy. The laboratory facilities were inadequate as well as a majority (62%) of double streamed schools had one laboratory. Only 4 (4.3%) schools had a library out of which it was only in 1 (25%) school was the library designed and built for the purpose. In other schools classes or stores were set aside to function as libraries. Electric power was

available in all schools, but only 3.3 percent of the schools had access to internet. Schools had met the ministerial required ratio of toilet to students. According to 91.7 percent of students the toilets had lockable doors but only 39.5 percent indicated that there was water available within the sanitation area. Correlation analysis revealed a strong correlation of 0.904 between adequacy of school laboratories and enrolment rate. This suggests that schools with adequate laboratory facilities are able to enroll more students. The regression analysis showed that the relationship between school toilets to student's ratio and enrolment was the most significant with a p-value of 0.001.

The third objective sought to determine the influence of adequacy of teaching and learning resources on quality of education in public day secondary schools in Embu County. The findings show that only texts were available and adequate in all the schools. Laboratory chemicals and apparatus, teaching models, and revision materials were available but inadequate in all the schools while ICT devices, and newspapers & magazines were not available in 89.1 and 77.2 percent of schools respectively. The study revealed weak correlations between teaching and learning resources and qualities of education. From the regression analysis it was only the relationship between teaching models and repetition rate that was statistically significant. The rest of the relationships were statistically insignificant.

The fourth objective sought to establish the influence of adequacy of financial resources on quality of education in public day secondary schools in Embu

County. The findings revealed that government was the main financier of public secondary education through the FDSE. The main challenge faced by schools with regard to FDSE was late and untimely disbursement of funds. The other source of money to school was the so called lunch levy and a majority (54.4%) of schools charged less than 10, 000 annually. The study further revealed that a majority of students (71.5%) were spending between Ksh 5,000 and ksh 7,500 on school uniform and the same amount by a majority (63%) of students on stationery. A majority of students (79.1) walk to school and the major occupation of parents were small scale farming (59.7%) and casual labour (25.7%). The study established a correlation of 0.619 between cost of uniform and repetition rate. This suggests that when the cost of uniform increases the likelihood of student repeating increases. From the regression analysis the relationship between cost of stationery and dropout rate was the most significant with a p-value of 0.000.

5.4 Conclusions of the study

The study sought to examine the influence of educational resources on quality of education in public day secondary schools in Embu County. The conclusions were made pursuant to the objectives of the study.

The study revealed that public day secondary schools in Embu County were understaffed. A majority of schools had student-teacher ratio of more than 40:1 with more than 38 percent of schools having a ratio of more than 51:1. It was clear that schools employed teachers on B.O.M terms in their efforts to fill the gap

of teacher shortage. It also emerged that some of the teachers were teaching subjects outside their area of specialization. The study established statistically significant relationships between human resource staffing levels and qualities of education. The findings underscore the need by the government to employ more qualified teachers in her effort to provide quality secondary education.

The study found that the available physical facilities in public day secondary schools in Embu County were inadequate. It was observed that class-sizes were large; a majority of schools had converted stores and unused classes to function as library. The study also revealed that a majority of schools with more than one stream classes were operating on one laboratory facility. Internet was virtually unavailable as only 3.3 percent of schools had access to it. The study established that the relationship between school physical facilities and quality of education is statistically significant. The results show the need for the government to improve on the maintenance and improvement vote head to afford the schools to acquire adequate basic facilities for quality education.

The study found that with an exception of text books which were available and adequate in all the schools the other teaching and learning resources available were inadequate. The study observed that ICT devices and newspapers & magazines were almost totally unavailable as they were only available but not adequate in 10.9 and 22.8 percent of schools. The study established statistically insignificant relationships between teaching and learning resources and qualities of education.

The study found that the government was the main financier of day secondary education. The parents were expected to meet the costs of lunch levy, fare to school, school uniform, and stationery. The study also established that a majority of parents were in occupations of low socio-economic status mainly small scale farming and casual jobs. The inability to meet these expenses led to students being sent home. The study established a statistically significant relationship between adequacy of educational finances and qualities of education.

5.5 Recommendations

The recommendations were made on the basis of the strength of the findings, discussions and conclusions.

- As pertaining to staffing of schools the study found that teacher turnover was high and that there were more teachers leaving the profession than those who were joining the profession. The study recommends that the teacher employer assess and try to address the factors that lead to teachers leaving the profession. Check if there are gaps in administration, working conditions and also the terms of service. Concerning teachers handling subjects outside their areas of specialization, when engaging teachers on B.O.M terms schools need to ensure that the teacher has the right qualification.
- The study found the government was the main financial of public day secondary education and only 11.5 percent of schools had income

generating projects. This study recommends KEMI to consider offering entrepreneurship skills to school management. And with the said skills the management of each and every school should endeavour to come up with innovative ways of mobilizing additional finances to support their activities. This would subsequently give remissions to students from the very poor backgrounds and enable them attend school without interruptions of being sent home for non-payment of school levies.

- With just 3.3 percent of schools having access to the internet the study recommends that the government through the ministry of education carry out need assessment study and evaluate on the possible ways of connecting all the schools with the internet. This is because the future of any learning institutions without access to internet is blink as the world economies get more technologically driven.
- The teaching and learning resources were inadequate except for the text books. The study recommends that the government increases the tuition funds of the students' capitation to enable schools purchase adequate teaching/learning materials. On the same, just like in the case of text book to student ratio policy, the government should do the same for some teaching resources such as distributing computers to schools.
- The study found that students are usually sent home for either lack of stationery, uniform, non-payment of lunch levy or being late for school. The study recommends for introduction of termly stipend for uniform,

lunch levy and stationery to the very needy cases to enable their retention in school.

5.5 Suggestions for further research

- This research studied the influence of educational resources on ratio of quality grades, rates of grade repetition, completion, dropout and enrolment as indicators of quality education. However there are indicators of quality of education beyond the school years such as employability, occupation status and earnings among others. A further research will be most valuable if it embarks on a longitudinal study that includes indicators of quality of education beyond the school years to get a comprehensive link between educational resources and quality of education.
- The findings of this study need to be compared with similar studies in other Counties. More research is necessary for better understanding of the findings on the influence of educational resources on quality of education; the findings of similar studies might help to demonstrate a stronger relationship that allow for generalization of findings

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APPENDICES

APPENDIX 1: Transmittal Letter

Simon Muchira,

University of Nairobi,

Department of Educational Administration and Planning

P. O. Box 30197-Nairobi

The Principal,

……..day secondary school,

Dear Sir/ Madam,

RE: REQUEST TO COLLECT DATA FOR ACADEMIC RESEARCH

I am a post graduate student at the University of Nairobi. I am conducting a research on **the influence of Educational resources on quality of education in public day secondary schools in Embu County**. I kindly request the principal, teachers and form four students to be the respondents to this study. All the information that will be provided will be used for the study and not for any other purpose. I look forward to your cooperation.

Yours faithfully

Simon Muchira

APPENDIX II: Questionnaire for the Teachers

Part A: Demographic information.

1. Indicate your gender
    a. Male [ ]
    b. Female [ ]
2. Indicate your age category
    a. Below 25 [ ]
    b. 25-30 [ ]
    c. 31-40 [ ]
    d. 41-50 [ ]
    e. 51-60 [ ]
3. Indicate your highest level of education
    a. Certificate [ ]
    b. Diploma [ ]
    c. Degree [ ]
    d. Masters [ ]
    e. PhD [ ]
    f. Any other (specify)----------

Part c: information on human resources

4. Are you a trained teacher by profession?
    a. Yes [ ]

b. No [ ]

5. What is your employment status?

a. Permanent and pensionable

b. B.O.M employee

c. Others

6. How long have you been working as a teacher?

a. 0-5 [ ]

b. 6-10 [ ]

c. 11-15 [ ]

d. 16-20 [ ]

e. Above 20 [ ]

7. In the last 18 months did you participate in any kind of the following professional development activities, when did you attend the last one?

Activity	Participation		Duration since last activity (months)			
	Yes	No	Less than 6	6-12	13-18	Above 18
Workshop (e.g on subject content and methods)						
Seminars on emerging issues in education						
Qualification programmes (taking a master course)						

8. If you have not participated in any professional development activity, what has prevented you? (can select more than onereason)

a. Lack of pre-requisites

b. I could not afford-was too expensive

c. Lack employer support

d. Conflict with work schedule

e. Lack of interest

f. Any other …

9. Indicate the number of teachers who have transferred to or from your school in the last 3 years.

a. None [ ]

b. 1-3 [ ]

c. 4-5 [ ]

d. More than 5 [ ]

10. What is your weakly load?

a. Below 18 [ ]

b. 18-22 [ ]

c. 23-27 [ ]

d. 28-32 [ ]

e. Above 32 [ ]

11. How many subjects do you teach?

a. 1 [ ]

b. 2 [ ]

c. More than 2 [ ]

12. Is there a subject that you are currently teaching which you did not study in the pre-service training?

a. Yes [ ]

b. No [ ]

13. Apart from teaching indicate your other responsibilities in the school.

a. Administrative

b. Pastoral duties

c. Guiding and counselling

d. Patron of clubs and movements

e. Any other ---

Part B: Information on Physical facilities

14. Indicate the number of class streams in your school

a. 1 [ ]

b. 2 [ ]

c. 3 [ ]

d. More than 3 [ ]

15. What is the average number of students per class in your school?

a. 0-40 [ ]

b. 41-50 [ ]

c. 46-50 [ ]

d. 51-60 [ ]

e. Above 60 [ ]

16. Indicate the number of laboratories in your school

a. None [ ]

b. 1 [ ]

c. 2 [ ]

d. more than 2 [ ]

17. Indicate the number of libraries in your school

a. None [ ]

b. 1 [ ]

c. 2 [ ]

18. Indicate the availability of power (electricity) in the school

a. Available [ ]

b. Not available [ ]

19. Indicate the availability of internet in your school

c. Available [ ]

d. Not available [ ]

20. What is the ratio of school toilet units to students?

a. Greater than 1:10 [ ]

b. 1:10-1:20 [ ]

c. 1:21-1:30 [ ]

d. 1:31-1:40 [ ]

e. Less than 1:40 [ ]

21. Indicate the availability of running water inside the toilets or around the sanitation area

a. Available [ ]

b. Not available [ ]

Part D: Information on teaching and learning resources

22. Indicate the availability and adequacy of the following items in your school

Item	Available & adequate	Available but inadequate	Not available
Text books			
Laboratory apparatus			
Laboratory chemicals & consumables			
Models			
Revision materials			
ICT devices			
Newspapers and magazines			

23. In the absence of the item(s) in the question above how do you manage to teach without?

a. Improvise [ ]

b. Borrow (e.g from other schools) [ ]

c. Teach by lecture method[ ]

d. Leave the topic untaught [ ]

e. Any other (specify)----------

Part E: information on outcomes

24. What is the highest KCSE mean grade you achieved in your subject in the last three years in your subject in your current station?

a. C+ and above

b. C- to C

c. D to D+

d. E to D-

Are there students who have dropped out of school in the last one academic year?

a. Yes

b. No

If yes how many students in this school have dropped out in the last one academic year?

a. 1-3

b. 4-6

c. 7-10

d. More than 10

25. Which are the main reasons for dropping out of school?

a. Non-payment of school levies

b. Health related problems

c. Early pregnancy

d. Early marriage

e. Insecurity

f. Long distance to school

g. Bullying

h. Any other

26. Are there cases of grade stagnation in your school?

a. Yes

b. No

If yes how many repeaters do you have in your class this academic year?

a. 1-2

b. 3-4

c. 5

d. More than 5

27. What are the reasons for grade stagnation?

a. Low academic achievement

b. High absenteeism

c. Punishment for indiscipline

d. Failure to sit for exams

e. Others

28. How would describe the trend of school enrolment for the last four years?

a) Has been increasing

b) Has been decreasing

c) Has stagnated

d) I don’t know

APPENDIX III: Questionnaire for the Students

Part A: Biodata

29. Indicate your gender

a. Male [ ]

b. Female [ ]

30. your age category

a. below 17 years [ ]

b. 17-18 years [ ]

c. 19 -20 years [ ]

d. Above 20 years [ ]

Part B: Information on human resources

31. How many teachers have taught you in the following subjects since form one?

Subject	Number of teachers				
	1	2		3	More than 3
English					
Kiswahili					
Mathematics					

32. Have ever been without a teacher in a given subject for a period of a week or more for the last one school year?

a. Yes

b. No

If yes indicate what could have caused the absence of the teacher

a. Transfer

b. Sickness

c. Maternity leave

d. Any other

33. Is there a teacher who teaches two or more subjects in your class?

a. Yes [ ]

b. No [ ]

If yes indicate the subjects_____

Part C: Information on physical facilities

34. Indicate if running water is available inside or near the toilets/ pit latrines

a) Available

b) Not available

If not available where do you wash after visiting the toilet? …….

35. Do the toilets have lockable doors?

a) Yes

b) No

Part D: Information on financial resources

36. How much money (in Kenyan shillings) are you charged as lunch levy in a year?

a. None [ ]

b. Below 10,000 [ ]

c. 10,000- 15,000 [ ]

d. More than 15,000 [ ]

37. How much money (in Kenyan shillings) do you spend on a set of uniform including shoes?

a. At most 5,0000 [ ]

b. More than 5,000 but at most 7,500 [ ]

c. More than 7,500 [ ]

d. If more than 10,000 indicate the amount_____

38. How much money (in Kenyan shillings) do you spend on stationery in a year?

a. At most 3,0000 [ ]

b. 3,000 and more but less than 5,000 [ ]

c. 5,000 -7,500 [ ]

d. If more than 7,500 indicate the amount_____

39. How much money (in Kenyan shillings) do you spend on transport to and from school in a day?

a. I just walk to school [ ]

b. At most 50 [ ]

c. More than 50 but at most 100 [ ]

d. More than 100 [ ]

40. How far is the school from your home to the nearest kilometer?

a. 1 [ ]

b. 2 [ ]

c. 3 [ ]

d. More than three [ ]

41. Indicate any other items you pay for in school

_____

_____

_____

42. Have you ever been sent home?

a. Yes [ ]

b. No [ ]

43. If yes, what was the reason for being sent home?

a. Lunch levy [ ]

b. Uniform [ ]

c. Lateness [ ]

d. Stationary [ ]

e. Others [ ]

44. Indicate the occupation of your parent or guardian

a. White color job [ ]

b. Casual labour [ ]

c. Business [ ]

d. Subsistence farming [ ]

e. Large scale farming [ ]

f. Others [ ]

Part D: information on outcomes

45. Have you ever dropped out of school?

a. Yes

b. No

If yes why had you dropped out of school?

a. Lack of school levies

b. Low academic grade

c. Lack of educational materials (e.g stationary, uniform)

d. Lack of transport to and from school

e. Work to support my family

f. Peer pressure

g. Bullied in school

h. I didn't find value of schooling in my life

i. Drug abuse

j. Any other

46. How many years have you been in school since form 1?

a. 4 years

b. More than four years

If more than four years indicate what could have caused you to take this long?

a. I repeated a grade

b. I had dropped out of school

c. I was sick

47. What is the average grade that you scored in the first and second term this year?

a. A to A

b. B to B+

c. C+ to B-

d. C- to C

e. D+ and below

Thanks for your cooperation

APPENDIX IV: Principal's Interview

Good morning/afternoon sir/madam, my name is Simon; I am conducting an academic study on the influence of educational resources on quality of education in Embu County. I am going to ask some questions regarding this study and the information that I am collecting is for academic purpose only and will be treated with confidentiality.

Section A: Demographic information

1. Gender Male [ ], Female [ ]
2. Kindly tell me your age bracket
    a. 21-30 [ ],
    b. 31-40 [ ],
    c. 41-50 [ ],
    d. 51-60 [ ]
3. What is your highest level of education?
    a. Diploma [ ],
    b. Bachelor degree [ ],
    c. Master degree [ ],
    d. PhD [ ]
4. How long have you been a principal in this school?
    a. Less than 3 years

b. 3-5 years

c. More than 5 years

Section B: Information on staffing levels

5. How many trained teachers do you have and how many are employees of the teacher service commission? Tsc [ ], others [ ]

6. Would you say that the school is overstaffed or understaffed? If understaffed, how does the school cope with the teacher shortage?

7. How is the teacher turn-over rate in your school and how has it affected the teaching and learning process?

8. How often do your teachers attend professional development courses? Are there challenges?

Section C: Information on Physical facilities

9. What is the enrollment of the school, how many streams?
10. Tell me about the adequacy of the classrooms, laboratory and any other facility with regard to school population.
11. Which challenges do you encounter with regard to physical facilities and how do you manage those challenges?
12. To what extent is the school capacity to provide quality learning affected by physical facilities?

Section D: Information on finance

13. Which are the main sources of school funds? How adequate is the funds in the overall running of the school? What challenges do you encounter in obtaining school these funds?
14. What percent of FSE money has been disbursed so far and what percent is yet to be disbursed and how has this affected the running of the school?
15. How much is the lunch levy in your school? Are there cases of non-payment and how do you handle such cases?

Section E: Information on Outcomes

16. How do you compare the school enrolment now and four years ago? Why do you think that the enrolment has increased/decreased?
17. What is the average academic mean grade that the school has registered in the past three years?
18. What was the average completion rate of students in your school for the last four years
19. Are there cases of students repeating or dropping out of school? If yes what are main causes?
20. What is your vision of this school in the next four years?

Thanks for according me the time and cooperation.

APPENDIX V: Observation Check list

Classrooms

Structure type	a. permanent b. semi-permanent c. temporary
Wall type	a. stone b. timber c. iron sheet d. mud e. tent
Roof type	a. tiles b. iron sheets c. not roofed
Flooring type	a. cemented b. not cemented/dusty
Writing wall	a. black wall b. black board c. white board
Teacher's	a. available

table	b. not available
Students chairs	a. adequate b. inadequate
Students desks	a. adequate b. inadequate

Toilets

Structure type	a. Flush toilets b. Pit latrines
Flooring type	a. Cemented b. Not cemented/dusty
Number of Girls toilets	----------
Number of Boys toilets	----------
Number of Shared toilets	----------
Cleanliness of the toilets	a. Clean b. Quite dirty c. filthy
Condition of	a. lockable door

doors	b. not lockable c. door absent
Water facility for use after visiting toilet	a. available b. not available

School play ground

The organization of the school playing field reflect diverse co-curriculum	a. Yes b. No
The school has organized soccer field	a. Yes b. No
The school has organized netball coat	a. Yes b. No
The school has organized hand ball	a. Yes b. No
The school has organized volley ball pitch	a. Yes b. No
The school has organized basketball pitch	a. Yes b. No
The school has organized hockey field	a. Yes b. No

The school has a swimming pool	a. Yes b. No
The school has organized rugby field	a. Yes b. No

Laboratory

Number of school laboratory_____

Height of stools and benches	a. Appropriate b. Not appropriate
Space between seat/stools	a. Adequate b. Congested
Taps & sinks	a. Functional b. Non-functional
Safety & convenience to users	a. Safe b. Not safe

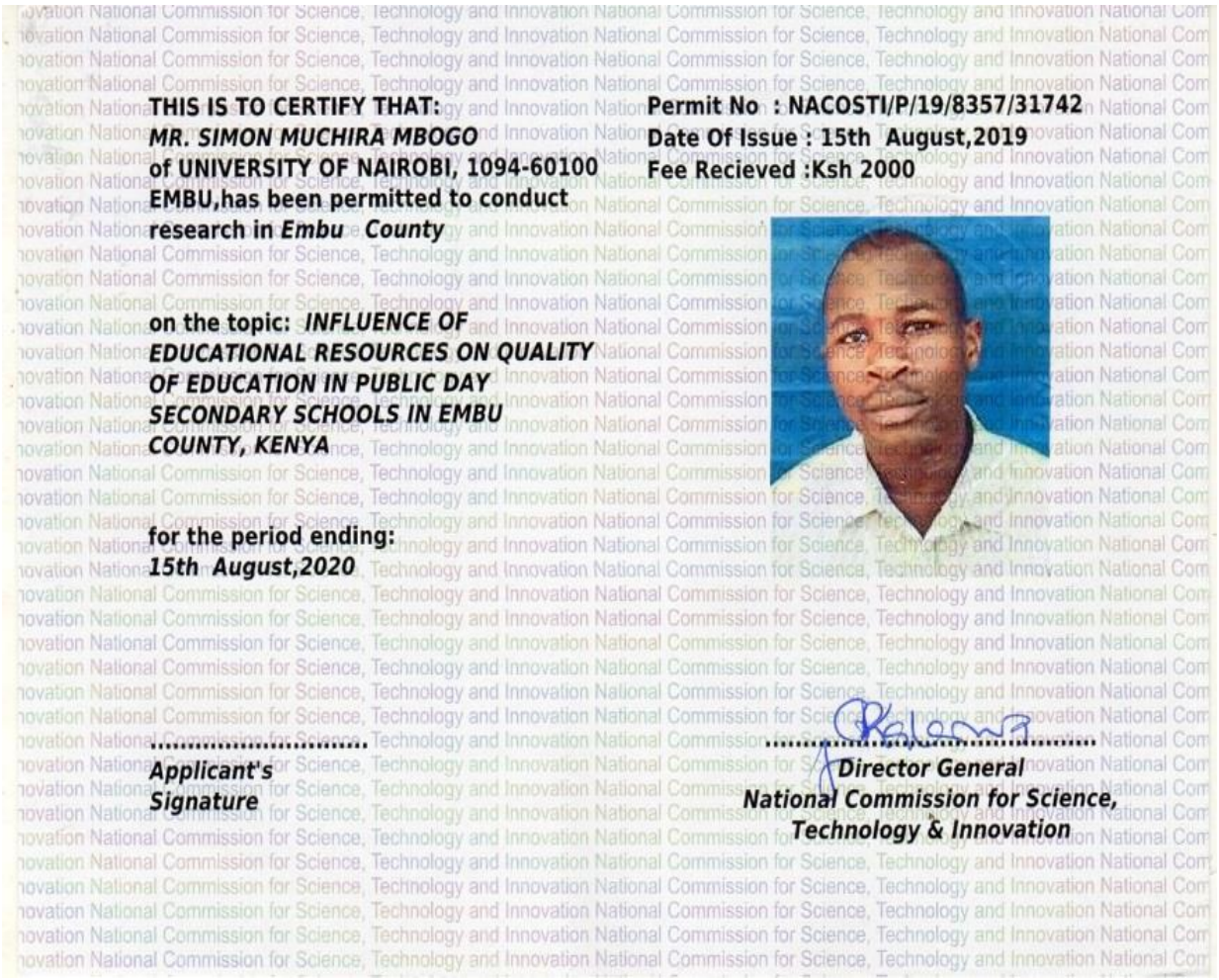
Availability of dedicated rooms or facilities for

Library / Secure book storage room	a. Yes b. No

Sports / other equipment storage	a. Yes b. No
Staff room	a. Yes b. No
Principal's office	a. Yes b. No
D/principal's office	a. Yes b. No

APPENDIX VI: The Map of Embu County

APPENDIX VII: Research Permit



THIS IS TO CERTIFY THAT:
MR. SIMON MUCHIRA MBOGO
of UNIVERSITY OF NAIROBI, 1094-60100
EMBU,has been permitted to conduct
research in *Embu County*

on the topic: *INFLUENCE OF EDUCATIONAL RESOURCES ON QUALITY OF EDUCATION IN PUBLIC DAY SECONDARY SCHOOLS IN EMBU COUNTY, KENYA*

for the period ending:
15th August,2020

Permit No : NACOSTI/P/19/8357/31742
Date Of Issue : 15th August,2019
Fee Recieved :Ksh 2000

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation