DETERMINANTS OF STUDENTS' ACADEMIC ACHIEVEMENT IN PUBLIC SECONDARY SCHOOLS IN MACHAKOS COUNTY, KENYA

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DECLARATION

This research project is my original work and has not been presented for any award of a Master's Degree in any other university (Institution)

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DEDICATION

I dedicate this research project to my parents, Moses Kamuiru and Christine Wanjiku, and my son Raphael Baraka for encouraging me to pursue higher education. I also thank them for inspiring me to write this project.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

EFA	Education for All
FPE	Free Primary Education
FDSE	Free Day Secondary Education
KCPE	Kenya Certificate of Primary Education
KCSE	Kenya Certificate of Secondary Education
MDGs	Millennium Development Goals
SDGs	Sustainable Development Goals
MoEST	Ministry of Education, Science and Technology
NACOSTI	National Commission of Science, Technology and Innovation
OECD	Organization for Economic Cooperation and Development
UN	United Nations
UNESCO	United Nations Educational Scientific and Cultural Organization
UNICEF	United Nations Children Education Fund
SSA	Sub - Saharan Africa
TSC	Teachers Service Commission
BOM	Board of Management
PTA	Parents Teachers Association

ABSTRACT

Students' academic achievement is one of the indicators of quality education. This study aimed to establish the determinants of students' academic achievements in public secondary schools in Machakos County. Establishing whether students' entry behaviour, the learning environment, the student's teacher ratio, and the teacher's years of experience play an essential role in students' academic achievements. The researcher adopted a descriptive survey research design, and the target population for the study was 369 principals, 4,267 teachers, and 115,132 students. The researcher used purposive and stratified sampling techniques to extract the actual sample size for the study. The sample size was 37 principals, 390 teachers, and 397 students. The researcher used questionnaires to collect data from the teachers, students, and principals. The reliability of the research tools was determined using the test-retest method. Supervisors appraised the validity of the instruments to ascertain and clarify that the test instruments would measure what they were intended to measure. The researcher analyzed Qualitative data by organizing them thematically according to the objectives and labelled the themes for distinction. Quantitative data was analyzed with the help of Statistical Package of Social Sciences (SPSS) Version 28, applying descriptive statistics of mean, mode, standard deviation, frequency tally, and percentages from the research findings. The researcher used inferential statistics of ANOVA and made inferences from the analysis. Results showed that; there is no statistically significant relationship between students' entry-level and academic achievement ($p = .863$). There is a statistically significant relationship between the learning environment and student's academic achievement ($p = .000$). There is no statistically significant relationship between the student-teacher ratio and students' academic achievement ($p = .597$). There is a statistically significant relationship between teacher experience and students' performance ($p = .000$). The study recommends that; the principals collaborate with other stakeholders to ensure a conducive learning environment for effective learning. Moreover, the government should provide the necessary learning resources and ensure that secondary schools' infrastructure is well-equipped. In conjunction with TSC, the ministry of education should improve the frequency of organizing workshops/seminars and in-service training for teachers.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

UNESCO (2015) aims to safeguard inclusive and equitable quality education to promote lifelong learning opportunities for all by 2030. Current education dynamics focus on inclusion, gender equality, and equity. They are aiming at eliminating gender disparities and creating equitable access to education at all levels. The main objective of the approach is to encourage effective learning outcomes.

The global society has been stressing Sustainable Development Goals (SDGs) after Millennium Development Goals (MDGs) in 2015. Formerly concern geared to providing education in the primary. However, after 2015, the global society initiated a move to realize quality education at the secondary level fully. 21st Century (UNESCO, 2015) Evaluating children's mastery of the content taught and skills application is vital for in-quality education, and assessing children's mastery of the skills taught; and the relevance of the skills acquired for the 21st Century is critical (UNESCO, 2015).

Developed countries like USA and Japan have a large pool of highly skilled human resources. They have been able to exploit their local natural resources and have been able to identify and negotiate for other countries' resources. Secondary school education is a fundamental ingredient for economic development. In the United States, it has been more important than increased capital in accounting for worker productivity and the country’s economic growth (Smith, 2003).

Determinants of learners’ performance have been a major discussion for the decision makers, educational stakeholders, and educators. Many studies have been conducted

by many scholars among them Siegfried and Fels (1979) who have purposed to investigate the issue of the provision of quality education in public secondary schools. The results of the research have shown that efforts by learners, earlier attended schools' tutors, and motivation of oneself as components of importance as far as the performance of the learner's in academics. A study by Siegfried (1979), conducted in San Francisco, USA, identified that a learner's natural ability in education is the paramount component in the learning process. The research studies did not consider the surroundings where teaching and learning take place and their influence on learners' academic performance. Therefore, it can be underscored that one cannot be in a position to easily demarcate the learning environment and the natural ability of the learner in the learning process.

At South Carolina State University, Karemera (2003) conducted research in the School of Business and established that learners' academic performance was important and related to the learning environment and the nature of the service gained. Further asserted that exposure to in-service training opportunities for the teachers was strongly linked with good performance amongst the learners' academic performance.

The preference for education in Pakistan is growing slowly, and there are many challenges and difficulties in education development. There are many factors contributing to student performance, which include students' learning skills, insufficient teachers, unavailability of learning materials, untrained teachers, poor learning environment, inadequate classrooms, and weak school management. The schools with adequate facilities; students have better academic performance. Identification of various factors and their interpretation is possible to increase student performance (Sultana H, 2013).

According to Basque and Dore (1998) in their study in Malaysia, they concluded that the learning and teaching environment is supposed to implement six functions: inform, communicate, collaborate, produce, scaffold, and manage. They added that conceptually speaking; the learning environment refers to the whole range of components and activities within which learning happens.

The learning process associated with the poor environment in developing countries has been quantified as a major factor causing poor academic performance to be registered in public secondary schools, especially in African plate, (Browne et al., 1991). How the learning and teaching aids and other resources including human resources are provided in the learning public secondary schools has been identified as a factor contributing to differences in performance. The research showed a general assumption that the utilization of teaching and learning aids and resources leads to good academic performance in both continuous and National examinations.

According to UNICEF (2011), the situation of children in the world states that teenage children in Sub-Saharan Africa are disadvantaged in accessing quality education that would enable them access further education in tertiary colleges and universities. This has also limited adolescents from accessing jobs in the labor market.

The persistent poor performance of secondary school students in public examinations such as the Senior School Certificate Examinations (SSCE) in Oyo State, Nigeria has made the developments of secondary education in the State a difficult task. Parents, guardians, and other stakeholders in the education industry have variously commented on the performances of secondary school students (Adepoju, 2002).

In South Africa, Grade 12 learners have continued to perform badly in the National Examinations. The North-Western Province had pass rates of 54%, 52.1%, and 58%

in the years 1998, 1999, and 2000, respectively. Some of the causes include a lack of parental guidance and supervision, overcrowded classrooms, and a lack of positive role models. It thus represents a great challenge to all South Africans therefore the need to gain a better picture of the causes and solutions to the problems (Ogunbanjo, 2001).

Many learners admitted to primary and secondary learning institutions have been on a continuous upward trend due to the need for education, (UNESCO,2015). To achieve and attain the high demand for education in both primary and secondary levels. The governments in developing countries can enhance this goal by subsidizing education at both levels in form of Free Primary Education funding and Free Day Secondary Education funding, (Gura, 2015). The Kenyan constitution, 2010 clearly defines basic education as education comprising primary education and secondary education. It further emphasized that basic education is a fundamental human right for every child in Kenya. Most important in the process of providing education is the ability to evaluate the type and quality of education products produced at the end of every graduating cohort.

Kenya's vision for 2030 envisages a globally competitive and prosperous nation with a high quality of life by the year 2030 (Republic of Kenya, 2010). Vision 2030 is founded on economic, social, and political pillars focusing on adding value to products and services. The social pillar of vision 2030 touches on education whose aim is to produce globally competitive quality education, training, and research for sustainable development (Republic of Kenya, 2010). The education policy is therefore emphasizing the right to universal education; Education for All (EFA), and the need to enhance the rapid development of skilled human resources (Republic of Kenya,

2010). Given this, there is a concerted effort to ensure access, equality, quality, and relevance in education, a concern to all stakeholders of education (Republic of Kenya, 2013).

The Basic Education Act (2013) provides for the right of every child to free basic education. It further provides for the right of every child in a public school to equal standards of education. This literature at hand indicates strongly two aspects, that availing quality education and subsidizing education in public secondary education is a serious challenge. This has led to inadequate facilities, and human resources in public secondary schools such as trained teachers as well as delayed provision of funds in public secondary schools, (Getange et al., 2014).

Most of the studies have indicated that most third-world countries have increased access to secondary education. The United Nations' efforts towards education and the contribution of the Millennium Development Goals have advocated and emphasized the need to achieve universal primary education by 2015. And because of numerous challenges, this has yet to be achieved (Getange, Onkeo & Orodho,2014; Orodho, 2013 et al). Amongst the obstacles include the increased need for education through policies such as the mismatch of free secondary education with quality education required for the learners. Increased enrollment in education has resulted from policies such as free education, which has yet to match with improved quality. Currently, only 60% of the aged children access the required skills to necessitate them to access tertiary education (Orodho et al, 2013; United Nations, 2013).

The tremendously increasing admission of learners in public secondary schools has aggravated challenges in the learning process facilities, overcrowding classrooms, a high number of learners compared to teachers, and inadequate textbooks, amongst

other learning resources, which influence the learners (Mukudi, 2004). These are not the necessary conditions for an effective learning environment, and they negatively affect the quality of education in public secondary schools. The government has a significant role in expanding its commitment towards enacting the children's Act Cap 586 of 2001, which stressed and urged the effort to make primary education compulsory and universally available for all learners. Equally, vital resources are required (Republic of Kenya, 2005). Education is an essential pillar of human development that opens up immense opportunities and gives people a better life. However, many students in public schools in Machakos County need to perform better in examinations, and a score below the mean score of a C+ limits university entry. The education performance analysis and statistics from 2011 to 2014 indicate that many learners registered low grades in the KCSE for each candidate ranking (Soft Kenya, 2016).

The performance of the Kenya Certificate of Secondary Education has been low over the years. Further analysis indicates that the relevance of education to meet the nation's demands and needs has been an issue of concern to the quality of education offered in a country. Curriculum overload, the inadequacy of teaching resources, teaching methodologies and approaches employed by teachers, ineffective learning and evaluation supervision, and inadequate motivation of the teachers adversely lead to the poor academic quality of education (Sava & Orodho, 2014). There has been an expansion in demand for secondary education; the sub-sector funding needs to be improved to fulfill the social pillar of vision 2030 flagship projects. A need arises to construct more classrooms and to equip secondary schools with an expansion of rehabilitative centers to have centers of excellence. There was a need to assess students' entry behavior, students'- teacher ratio, teacher experience, and learning

environment in schools as critical determinants of academic achievements in public secondary schools in Machakos County.

1.2 Problem Statement

In the Kenya National Examination Council KCSE results for 2018-2020, Machakos county has had an overall performance below the government's expected mean of 5.00 (C-), a replica of most schools in the County. There is a need for better academic performance in secondary schools in Machakos County. As per the report from the County Director of Education (CDE) office, there has been an outcry due to the dismal performance of students in national examinations in secondary schools. The public secondary schools in Machakos County have performed poorly in KCSE over the years, as shown in Table 1.1.

Table 1.1: Machakos Sub-Counties Mean Scores

	2018	**2019**	**2020**
Kangundo	3.080	3.40	3.320
Kalama	2.99	3.266	3.481
Machakos	3.24	3.48	3.628
Mwala	3.600	4.00	4.019
Athi River	4.00	4.10	4.230
Yatta	3.840	4.070	4.240
Matungulu	3.78	4.32	4.24
Masinga	3.847	4.319	4.25
Kathiani	3.517	3.850	4.329
Mean Score for the yr	**3.544**	**3.8607**	**3.971**

Sources: The County Director of Education, Machakos County.

The continuous trend in poor students' academic performance concerns educational stakeholders, as few students attain quality grades. Concerns are raised regarding

factors contributing to good or poor students' academic performance previously registered in public secondary schools in Machakos County. This study was carried out to find out the cause of the marked poor performance attributed to low entry marks, poor learning environment and high students -teacher ratio and the level of teachers' experience. Machakos county borders Kiambu, Nairobi, and Makueni county and faces stiff competition in performance. Nairobi and Kiambu yearly records high performance as Machakos county lags. Thus, the need to investigate the determinants of students' academic achievement in public secondary schools in Machakos county.

1.3 Purpose of the study

This study aimed to establish the determinants of students' academic achievements in public secondary schools in Machakos County.

1.4 Objectives of the study

The following objectives guided the study.

(i)To investigate the extent to which entry behaviour influences student's academic achievements in public secondary schools in Machakos County.

(ii)To establish the association between the learning environment and student's academic achievements in public secondary schools in Machakos County.

(iii)To examine the relationship between students' - teacher ratio and student's academic achievements in public secondary schools in Machakos County.

(iv)To determine the relationship between teachers' years of experience and student's academic achievements in public secondary schools in Machakos county.

1.5 Research questions

The following research questions guided the study.

1. What is the extent to which entry behavior influence students' academic achievements in public secondary schools in Machakos County?

2) What is the association between the learning environment and student's academic achievements in public secondary schools in Machakos County?

3) What is the relationship between students-teacher ratio and students' academic achievements in public secondary schools in Machakos County?

4) What is the relationship between teacher's years of experience and students' academic achievements in public secondary schools in Machakos County?

1.6 Justification of the study

Students' academic achievements have been a concern for many stakeholders, especially parents, and the government. Most public secondary schools require adequate resources for effectiveness in education. The learning environment has been posing a challenge to the learning process. Education stakeholders need to understand the condition of the school environment to plan where resources are needed. Teachers are integral to students' academic achievements and are directly involved in the learning process. Analyzing the student-teacher ratio will be crucial in planning for the number of teachers required. Moreover, information on the teacher's experience and professional development requirements must be considered when planning for future administrative positions. The need for efficiency in education especially in the planning of human capital and equity in education in public

secondary schools, stresses the need to investigate the various determinants that affect student academic achievement in public secondary schools.

1.7 Significance of the study

The study is significant and timely for the government, parents, and other stakeholders in the education sector who spend a considerable number of resources on education. Below-average achievements in student examinations have led to many cases of student wastage, making it impossible for learners to access various universities and pursue most courses equipping them with the knowledge needed in the labour market. The effect spills over to the labour market, where the students fail job placement due to their performance. The findings of this study may be of benefit to relevant education stakeholders. The heads of learning institutions may utilize this study's findings to strategize how they would better the academic performance of their learners. Principals may use the study's findings to establish ways of improving students' achievements. The study's findings benefit the Ministry of Education as literature on the students' teacher ratio helps them plan the number of teachers required in the county.

Moreover, the findings indicate that the situation of the learning environment brought to the limelight, which might assist the Ministry of Education in planning the learning resources required by different schools in the county. In filling administrative positions of the principals and deputy principals, the study's findings might assist the government in planning the years of teachers' experience required and the professional development courses required to prepare future administrators. The parents might benefit from the study's findings and learn the need to cooperate with the school administrators in providing a conducive learning environment, which positively influences academic achievement. The learners also benefit from the

study's findings in understanding the need to adequately use the allocated resources to achieve better results. The determinants influencing students' achievements may be documented as a reference point for other researchers. The study adds new knowledge since the researcher sourced data on the effects of the student's teacher ratio, teachers' years of experience, and student's entry behavior and the learning environment on academic achievement. Recommending in-service training and mentorship programs for more experienced teachers with less experienced teachers. Emphasising more on provision of conducive learning environment to improve academic achievements.

1.8 Scope of the Study

The researcher conducted her study in public secondary schools in Machakos county. The participating schools were sampled from mixed boys' and girls' schools and boys' and girls' schools. The study participants were secondary school principals, teachers, and learners. The study was conducted within the sub-counties in Machakos county.

1.9 Limitations of the Study

The study relied on the principals and teachers rating themselves on the issues of the questionnaires. Some respondents may have overrated themselves because, as Webster, Iannucci and Romney (2002) established, respondents focus on positive traits. The researcher looked for contradictory data among responses to overcome the limitation. The researcher also faced some restrictions from the principals and teachers who needed more time to respond to questionnaires due to their busy schedules. The researcher mitigated the limitation by administering the research tools during break times. Some respondents were unwilling to fill out questionnaires for fear of exposing the situation in their schools. The researcher mitigated the limitation by assuring the respondents that the information given would be confidential and only

used for research. The researcher assured the respondents that the data collected would only be used for research purposes.

1.10 Delimitation of the Study

The study was delimited to students' entry behaviour, learning environment, student-teacher ratio, and teacher experience as the key determinants of students' academic achievement in public secondary schools. The study targeted respondents from the selected population of public secondary schools in Machakos County. The study focused on principals, teachers employed by the Teachers Service Commission and board of management, and the students in Form Three and Form Four.

1.11 Assumptions of the Study

The study was based on the following assumptions

i) The respondents would give concise and accurate information on determinants of students' achievements in public secondary schools.

ii) Most of the respondents would cooperate and provide reliable responses.

1.12 Theoretical Framework

This study was based on the Systems Theory of Management to justify the quality of operations in an organization. The work of Ludwing von Bertalanffy (1969) recognized the need for any organization to interact with its external environment, unlike what was proposed by classical school theorists like Max Weber, F. Taylor, and Fayol, who viewed the organization as a closed system. To him, for the survival of an organization, like the way a living organism survives, it should operate in an open system and not a closed system. His contributions have made system concepts become recognized worldwide as an approach to be adopted by organizations for their efficiency and effectiveness in dynamic and changing environments. This theory

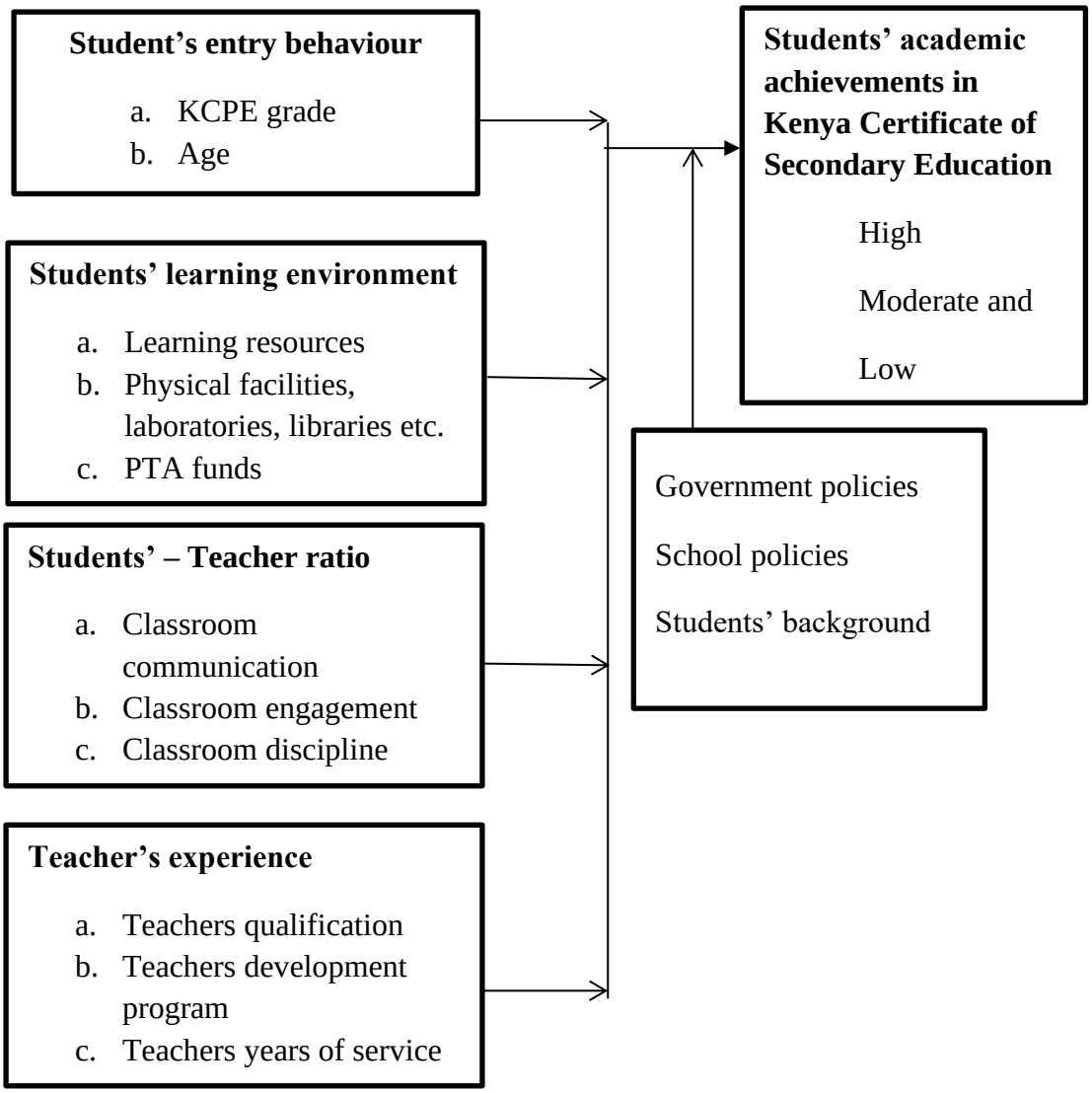
identifies a firm as a societal unit comprising persons who unanimously officially do tasks through their organizational environment to source resources and plough the same resources back to the organization to run their affairs successfully. In addition, the system theory holds that a firm not only relies on its environment but also is part of the entire system in which it is found and forms its part. Considering the education set-up, it is difficult to comprehend since it comprises some other subsystems operating at different levels; various factors dictate policymaking at the school level. The school Board of Management, head teacher, teachers, and parents make decisions and give opinions on the school's management. Schools are open systems that respond to external and internal influences to achieve their objectives.

The theory also puts forward the concept that a system is a collection of parts unified to accomplish an overall goal. A school system has inputs, processes, outputs, and outcomes, which in the long run, produce feedback. Inputs include students, teachers, textbooks, and other physical resources. These inputs go through planning, organization, and control to meet the organization's goals. Outputs are results obtained after inputs are processed. One of the most desirable outputs in studying a system consisting of inputs, educational processes, and outputs is students' academic achievement, a major quality index of output. One of the major problems in developing countries is educational wastage resulting from poor students' academic achievement in national examinations. School as a system requires the input of the students, teachers, parents, and the government. The government allocates resources required by secondary schools. In terms of providing physical facilities such as classrooms, libraries, laboratories, and equipment required in the schools, the government also provides financial resources required for tuition, personnel, compensations, and contingencies. The parent provides financial resources required

by students in terms of school fees. The community also provides the moral and financial support required. The students undergo the learning process, which requires effective teachers and adequate resources and one of the major outputs of the school system is the student's academic achievement, Which the community responds to by either supporting or criticizing.

1.13 Conceptual Framework

Figure 1.1 The conceptual framework of determinants of students' achievements in public secondary schools.



(Researcher, 2022)

Figure 1.1 The Conceptual Framework

The conceptual framework shows the students' entry behaviour, student-teacher ratio, teacher experience, and learning environment. The independent variables are; students' entry behaviour, students'-teacher ratio, teachers' years of experience and learning environment. The dependent variable is Students' achievements in Kenya Certificate of Secondary Education.

1.14 Operational Definition of Terms.

Students' achievements -mean score attained in 2018, 2019 and 2020 examinations.

Entry behaviour – the grade attained in Kenya Certificate of Primary Education (KCPE) as a secondary school entry grade.

Students, -teacher ratio - the number of students in a class that one teacher attends to.

Teacher years of experience- the exposure and the areas of competence a teacher has encountered in the career.

Learning environment- the physical, social and economic resources found in the surroundings which influence the learner's academic performance during the entire learning process.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter summarizes information from existing literature on various determinants of students' academic achievements to gain more insight into the topic of study. The chapter reviews the literature on students' entry behavior, learning environment, student-teacher ratio, and teacher's year of experience as determinants of students' academic achievements.

2.2 Entry behavior on students' academic achievements.

The study was conducted to determine the influence of entry behavior on academic achievement in Nigeria. The study aimed at filling the gap in knowledge utilizing both the students' entry performance in Kenya Certificate of Primary Education and based on gender and age at Kenya Certificate of Primary Education and form four, which other studies have not done.

Amburo (2011) conducted a study in Kenya and asserted a significant coefficient correlation of 0.452 relating to the learner's performance in Kenya and found a coefficient correlation of 0.452 between Kenya Certificate of Primary Education and Kenya Certificate of Secondary Education to confidence levels of 0.05. The study noted differences between the academic performance of learners registered in the Kenya Certificate of Primary Education and the Kenya Certificate of Secondary Education due to the weight of each examination done in the two levels of learning. On the other hand, Mensch and Llyod (1997) conducted a study in Kenya. They found a very strong relationship between the selection examinations and the end of the course examinations as 0.538 for the male learners and 0.647 for the female learners,

in that the same resources were used during teaching and learning. The study outcome posed concerns about using the Kenya Certificate of Primary Education, a reliable predictor of Kenya Certificate of Secondary Education performance for both male and female learners. This study aims at filling this knowledge gap in Machakos County.

In Ghana, a study was carried out by Adetunde and Akensina (2008) to investigate the learners' entry behavior on factors influencing the levels of girls' education. The girls' workloads, the physical distance covered between the learning institution and home place, their parent's education level, and their social and economic state impacted learners' academic performance in public secondary schools. In Africa, Barthes, Nair, and Malpede (2000) conducted a study to find the correlation between female learners in primary academic performance registered in sciences, vocational and technical subjects to their secondary school academic performance. Moreover, found that performance in primary was a vital determinant of academic performance in secondary school for both male and female pupils. Aligning with the findings of (Fredrick Aloo Ndege et al.,2019) A case study of Migori County. The study sampled twenty-one African states, contributing very wide and reliable information. Among Africa's low-income earning nations, Kenya is one registering less than $976 in 2008 per capita and is well discussed (World Bank, 2010). According to the World Bank (2012), 10% is the rate of social return of secondary education, while for the case of private is 16.0%. Comparing the rates of returns, it is clear that the rates are higher than those of middle-income countries. The utilization of the rates of return could be more reliable since it employs the return estimates that factor in civil servants. There are challenges for the public sector wages that do not reflect market wages considering some countries in Africa, like Kenya, with a Human development index of 0.539; other low-income countries amongst them, Rwanda0.460, and Malawi with

0.493 (UNDP, 2010). Life expectancy is taken into consideration by Human Development indexes but not fertility, gender disparities, school enrolment, poverty, and fluctuations.

Entry behavior of students was established by Nakhanu (2009) as a factor affecting syllabus coverage. She further observed that students who entered Form One with low KCPE Education marks were found to be slow learners and thus had delayed coverage of the syllabus. This view agrees with that of Hallahan and Kauffman (1982), who observed that a child with learning disabilities needs individual tutoring in one or more areas of disability. Whether or not a resource teacher is available determines how much of this instruction is assumed by the regular class teacher.

Low entry behavior was identified as a challenge experienced by head teachers in their attempt to provide quality education (Mobegi, 2007). Nakhanu (2009), Mobegi (2007), and Hallahan and Kauffman (1982) agree that entry behavior can affect the quality of education provided for students. These findings further agree with those of Mwebi (2012), who established that high-entry behavior leads to the provision of quality education.

In Uganda, Kasirye (2009) conducted a study investigating factors influencing the learner's academic performance and asserted that learners who are enrolled in secondary schools at a tender age tend to register good performance than the aged learners. A retest test was conducted with the two sets of learners where the learner aged between 13-14 registered good academic performance compared to those above 14.

In Ghana, Sekyere, Sekyere, and Akpalu (2013) conducted a study investigating the influence of learners' entry behavior and overall academic performance. The study

reviewed that students with high mean grades register the highest grades in their final examination at the end of the course. The study also sought insight into gender concerning the age-entry behavior of the learners. It was established that there was no relationship between academic performance and gender.

Almeida and Myburgh (2019) conducted a study investigating predictors of pre-university academic performance. The study reviewed that the academic performance at the pre-university is most significant as it determines the academic performance at the university. In the study, the researcher suggested that a learner who scored good grades at the pre-university level performed excellently compared to their friends who performed poorly at the pre-university level. Many other researchers strongly supported this recommendation. Chathuranga (2016) and Hodara and Lewis (2017) pointed out that average performance in secondary schools determines the academic performance at the university examinations irrespective of whether the learner comes from a rural or urban set-up. This finding of Hodara and Lewis did not agree with other research studies, which had asserted that the relationship between the learner's entry behavior differed from those students from rural areas and those from urban centers in university examinations compared to secondary schools' performance. In line with the study by Geiser and Santelices (2007), it was asserted that performance results at the secondary level are reliable in predicting college and university performance. These research findings agreed with Birch and Rienties' (2013) findings, just like Vidal Rodeiro and Zanini's (2015) findings, which showed that 'A' grades at A-level schools enhanced the probability of achieving better university examination results. These findings were strongly supported by Kurlaender, Kramer, and Jackson (2008), which contradicted the view by Saupe and Eimers (2010). Indeed, Kurlaender et al. (2008), asserted that primary academic performance could be used as a predictor

for college and university performance. The utilization of high school grades to determine college performance is augured on the philosophy that the best predictor of future behavior is past behavior. (Roşeanu & Drugaş, 2011; Zwick, 2012; Shehry & Youssif, 2017). Unfortunately, various stakeholders who involve university professors and decision-makers in education have realized that this finding and recommendation is false and add that there is a significant relationship between entry behavior grades and learners' academic performance at the university level. Hence, this calls for other academicians and researchers to study this scenario further. Thus, the need for current research.

2.3 Learning environment on learners' academic achievements

Guthrie and Jones (2012) stress the importance of having an appropriate personnel plan and adequate physical facilities to support the educational effort. An environment that is not conducive to learning can lead to poor performance. The lack of basic facilities like laboratories compromises the teaching of science subjects. Topics meant to be covered practically might be covered theoretically (Mayama, 2012). Providing adequate learning facilities at all levels, including equipment and learning resources, enhance the quality and relevance of imparted skills of learners (Grubb, 2009).

Earthman (2002) conducted a study in the USA and found that good resources support educational endeavours. Such secondary schools have enough facilities, including classrooms that create a humble and conducive environment for learning, computer laboratories, enough textbooks, equipped library. Resources such as projectors, software, and videos are other teaching and learning materials needed to ensure effective learning. Research findings have indicated that good lighting, clean air, and clean, safe, and conducive surroundings ensure a conducive learning environment,

leading to the learners' good academic performance. (Cash, 1993; Earthman & Lemasters, 1996; Lemasters, 1997; Lackney, 1999; and Schneider, 2002). Inadequate classrooms that do not match the learners' population lead to poor academic performance, and adequate resources such as computers help enhance the student's academic performance. (Crosnoe et al., 2004; Eamon, 2005). On the contrary, the need for more teaching and physical learning resources demotivates the learning activities of the learners.

Schools with adequate learning facilities lead to good teaching and performance among learners. Schneider (2002) found that resources directly impact schools' teaching and learning processes. Likewise, Reche et al. (2012), asserted that reading materials help the learners to follow the teacher's way of implementing the syllabus, and this helps the learners comprehend the content taught by the teacher during the lessons. Many schools with poor academic performance allocate little money to buy the required teaching and learning materials. The lack of other essential materials like science and computer laboratories influences the teaching of sciences. Therefore, the school management and administration must ensure the libraries are well endowed with textbooks and other reference materials. The laboratories have to be well-equipped with apparatus and chemicals for practical.

Inadequate physical resources directly impact the student's academic performance, creating an unconducive learning environment and a working environment for the teachers. In addition, this leads to poor concentration in the classroom by learners during lessons. This poor environment also creates a stressful situation for both learners and teachers. It also lowers self-esteem for teachers and learners. Njagi (2013) found that 70 percent of the learners admitted to county secondary schools'

education per annum connect their academic performance to inadequate resources. Moreover, evidence has shown that ineffective administrative and leadership styles, teachers' absenteeism, and learners' absenteeism significantly contribute to academic performance in county secondary schools. In addition, students' indiscipline also contributes to poor academic performance (Kimani, Kara, Njagi, 2013; Nyagosia, 2011; Wamulla, 2013).

School learning surrounding environment in an educational set up activities can be explained as different locales, ways of life, and components from which learners learn. The learning environment comprises the way learners intermingle and relate with each other in a school setup. In addition, an educational environment suitable for favourable learning includes a natural ecosystem, putting learners together with proper arrangement of tables and chairs or desks and orderly sitting ways and technological aspects, including video and audiovisual. The characteristics and qualities of the environment in which the learning activities take place if widely determined by several factors, such as government policies, the culture of learning institutions, and financial ability.

Aspects forming the school learning environment involve the physical environment, psychological environment, and academic environment, and they all influence the entire students' academic performance, especially in learning a second language (Lizzio et al., 2002). Some educational specialists draw a distinct environment of learning, positive and negative. The social and physical learning environment constitutes a conducive environment. Enough sunlight, orderly sitting arrangement, podium, white or blackboards in classrooms, and digital resources contribute to a conducive learning environment.

As Balog (2018) highlighted, the learning environment comprises learning and teaching resources, curriculum, instruction, physical learning space, and technical tools. The physical environment comprises a collection of physical items that aid the teaching process, and the human environment comprises teachers and learners. Educational researchers have concluded that the traditional learning environment in the classroom can be replaced by learning all aspects as a whole. "Study labs and exploratory centres" (Dhanapala, 2021). Classroom interaction has been enhanced by the language communicative aspect. Changing to a student-centred learning environment from a teacher-centred environment in an educational setting has helped in communication skills and also assisted in identifying the pivotal duty of teacher-student and student-student interaction to facilitate communication from broader perspectives. Researchers, for example, Ellis (1991), Larson-Freeman and Long (1991), and Swain (2000) have coined aspects such as input, output, and comprehensible input -all of which help to pilot interaction in the second language learning classroom. As well as improving classroom interaction, the impact of the learning environment is significant.

Learning activities include arranging learners into discussion groups, working with each other, classroom presentations, and carrying out activities requiring resources and a conducive physical environment. Adequate classrooms for the movement of teachers and learners, adequate desks for organized groups, and enough presentation resources are some factors dictating the suitable learning environment. In addition, resources such as technical facilities and classrooms help enhance effective learning. For an effective learning process to take place, learners need to have a maximum and effective learning environment. Many scholars have credited the learning environment as an aspect facilitating prosperity in education for better academic performance.

Scholars like Ashton (2001) and Umar (2017) have emphasized the importance of caring for the learning environment and providing learning resources. Kilei (2012) found that adequate learning resources and materials in the teaching and learning surrounding are vital aspects that affect teaching and learning. In order to achieve success through quality education, the effectiveness of teachers and learners in a classroom, together with the availability of resources, are important factors determining the effective learning environment.

Guthrie (2006) stresses the importance of having adequate learning resources, especially physical facilities, to support the educational effort. An environment that is not conducive to learning can lead to poor performance (Juma, 2011), which links performance in examination to the state of teaching and learning resources in the school. The lack of basic facilities like a laboratory compromises the teaching of science subjects. Topics meant to be covered practically might be covered theoretically (Guthrie, 2006). Provision of adequate learning facilities at all levels, including equipment and learning resources, enhance the quality and relevance of imparted skills of learners (Guthrie, 2006).

In Tanzania HakiElimu (2013) studied the impacts of the school environment and students' academic performance. The study showed that student academic performance is affected by the school environment, such as the owner of the school, the government-owned schools, private schools, and community-owned schools. The school's situation, such as the town or reserve, forms part of the school environment and affects teaching and learning.

A study by Epstein (2001) showed that learners with parents and other important guardians tend to do well in academic performance in school. The advantages

associated with parent involvement in education include test scores, high grades, good attitude and aspects, and long terms of education. Gagne (1997) concluded that the educational environment for the learner involves facilities like school structures, building equipment, teaching materials, peer groups, and other personals factored into the learner development.

Booth et al. (2005), highlighted that facilities and equipment, time resources, and sports and practical education form a participative environment in a school. Eric (2005), an environment that enables academic prosperity, shows that the school environment has a wide range of learners' learning and developmental growth ranging from social, ethical, and emotional development. When learners realize that the environment around them is enabling and caring, they are not likely to get involved in drug and substance abuse, indiscipline, and hostility to the set rules by the administration. The study shows that enabling institutions register positive results by enhancing learners' aspects of linking belonging or society. The environment of learning institutions must be enabling and positive to enable the learners to endure the life of learning in a school. The enabling and favourable school environment cannot be ignored at all costs. (Hoy et al., 1991).). Kraft et al. (2013), conducted a study to establish the impact of the communication between a teacher and a learner's family as a way of learner involvement. They investigated the efficiency of communication between the teacher, parent, and learner. They found out the causal impact of teacher communication utilizing a randomized field experiment in which 6th and 9th-grade learners were to receive a daily phone call home and text message during a mandatory severe school program. They assert that prompt family-teacher communication enhanced the students' involvement in the learners' academic progress. The learners enhanced home assignments by 40%, 25% on-task behaviour, and 15% in-class

participation. Mauka (2015) studied parents' participation and its impacts on academic performance in Korogwe District Council in Tanga region in Tanzania Mainland. The research by Mauka employed the sequential mixed methods design, and it employed interviews and questionnaire tools to obtain data to inform the audience. Mauka, in her study, asserted that most of the parents with a low level of education were less responsible for their children's education and hence the low performance of their children in academics. In addition, the research outcomes showed that parents earning little income could not avail the necessary basic needs for the family. He argued the need for the government at the local level through wards to advise the parents to get involved and come close to their children's academic progress by working hand in hand with the school administration. He recommends that parents ensure balanced home duties and their children's academics.

Kimaro (1970) conducted a study to investigate the effect of an ecological perspective on parental involvement on secondary school pupils' academic performance". Research participants included two (2) teachers and five (5) parents. The outcome from the teachers indicated that some parents were not wholly involved in their children's education, and some learners needed to be more serious in doing home assignments assigned by their teachers.

In addition, Kimaro found that the blame was placed on the teachers rather than the parents, which is why there needs to be better academic performance. The fact that the parents have paid the total school fees claims that it is the teachers' role to monitor the learners' learning process. Kimaro suggested that parents unable to help their children should engage in other means of helping them. He also recommended that the

teachers should play the role of advising the parents to help their learners in their learning process.

In their research study, Hindman et al. (2011), carried on Family involvement and educator outreach in Head Start: Nature, extent, and contributions to early literacy skills. This exploratory study aimed at establishing the paucity of empirical research regarding the type of educator outreach and family involvement in Head Start and their contributions to children's development of the academic and social foundations of literacy. The sampled Participants involved 3,100 children and families enrolled in the Head Start Family and Child Experiences Survey (FACES) study, their classroom teachers (n = 286), and their centre directors (n = 222). The research outcomes indicated that families time to time involved in the learning and schooling of learners and that Head Start educators regularly reached out to families. Family participation and educator outreach were selectively linked with children's decoding, vocabulary, and positive approaches to learning. This study showed how families and teachers bridge the home-school gap in Head Start preschool programs and thus enhancing children's early literacy skills.

In his study, Taylor (2016) conducted a study aimed at establishing the relationship between the Communication between Educators and Parents through the use of descriptive survey research as the research design. The data collected represented responses of the parents (n = 42) and educators (n = 119) surveys, interviews (n = 10), and a focus group (n = 8) to uncover both educators' and parents' perceptions of parent-teacher effective communication in the surrounding of learning. The outcomes found that important concerns connected to the education trust collaborative partnerships, the inadequacy of accessibility, parent educational background

knowledge, continuous communication, and guides to blueprints of learning expectations. The outcomes also assert the essence of intervention, including a 4-session parent-educator training program designed to put into practice positive partnerships and to eradicate and bridge the existing communication gap. Stakeholders are groups or individuals with concerns about the success of firms in attaining their objectives and attaining the expected results as well as retaining their products, services, and outcomes over time. According to Darden et al. (2008), and Egunsola (2005), the effects of the home environment on the academic performance of secondary learners in Agriculture Science in Adamawa State, Nigeria, asserted how educational stakeholders, including parents, enhance the learning environment. The effects of the family educational environment are explained by the amount and the style of help that learners obtain from the family; that is determined by elements of the family context, like the changes in communication and affective relationships, attitudes toward values and expectations (Diaz, 2004).

Spillane et al. (2007), study asserted that government as the primary stakeholder duty now transforms from a significant player to a facilitator in education provision. The new task of the government gives a more enabling environment for the learners by providing the needed materials and resources to make the learners perform well in their studies. Greene (2013) in his study asserted that parents formulated an environment at home that promotes their children's learning process. Parents were supporters when they avail additional support to learners. Parents believe that when they aid learners in changing the school system to get fair treatment. They were also policymakers when they served on policy-making councils and committees in schools. When parents are actively involved in creating a learning environment for their children, truancy, pregnancy, and latecomers will also be reduced. As a result,

the learners will appreciate the value of education, which will enhance the good academic performance of the students.

Productive learning environments are crucial to student's academic, emotional, and social success in school. A conducive learning environment doesn't just happen on its own or by chance. They should be created through conscious procedures like interacting with students positively, exhibiting positive behaviors, etc. that would promote learning activities in the learning environment (Becton,2017).

2.4 The relationship of students' – teacher ratio on learners' academic achievements

UNESCO (2015) educational goals are to provide globally competitive quality education, training, and research. These are tailored to ensure illiteracy is reduced, access to education is increased, and to improve transition rates from primary to secondary education. The goals aim at a 100% transition rate. According to MoE (2015), over ten thousand secondary schools in Kenya has the minimal capability to accommodate learner for high school education and more coaching. MoE (National Strategic Plan between2018 -2022) in 2015, the 10655 secondary schools had a student population of 2.85 million and a teacher population of 85,435. By 2018 the student population in 11399 secondary schools rose to 2.9 million with 99,272 teachers. This reflected a teacher shortage of 58,291. Currently, the 10463 secondary schools, some having collapsed due to Covid-19 effects have a student population of 3.26 million with 105,234 teachers reflecting a teacher shortage of 72,179 as per the projections of the teachers' service commission.

Achievement in education is the educational result that shows the extent to which the specific goal of education has been achieved in a school environment. This is

normally illustrated in terms of students' scores and grades in test examinations or assignments. Maguson (2007) describes academic achievement as commonly measured by examination or continuous assessment but maintains that there is no general agreement on how academic achievement is best tested.

The issue of the teacher as a factor affecting students' academic performance has received much attention in the literature, and findings have been mixed and inconclusive (Ewetan & Ewetan,2015). Some literature revealed that several teacher variables, including years of teaching experience, educational attainment or academic qualifications, teacher development programs, availability of qualified teachers, and teacher-student ratio, affect students' learning outcomes (Ewetan & Ewetan, 2015).

Increased enrolments have made school systems expand their facilities to house more learners; hence this has yet to lead to a quality learning outcome. Though Developing Countries have improved the literacy percentage to impress the international fraternity, the quality of education provided has been a major concern due to overcrowded classrooms resulting from high enrolments. One of the major indicators of quality is the Pupil-Teacher ratio. The secondary school pupil-teacher ratio needs to catch up with the rapid enrolment increase. Therefore, providing quality education is the greatest challenge facing developing countries in attaining the international goals of Education for All (EFA) and the Sustainable Development Goals (SDGs). The pupil-teacher ratio in most developing countries is worrying. UNESCO (2015) estimated that over 84 percent of classrooms had over 40 pupils per teacher. The majority of the countries that have pupil-teacher ratios exceeding 40:1 are in Sub-Saharan Africa and Asia. Sub-Saharan Africa has the largest pupil-teacher ratio, with Congo having a Pupil Teacher ratio of 54:1, Mali at 55:1, Mozambique at 67:1,

Rwanda at 65:1, Ethiopia and Malawi hovering around 70:1, South Asian countries such as Afghanistan at 83:1, Cambodia 50:1, and Bangladesh 50:1. (UNESCO, Institute of Statistics, 2012). The high Pupil-Teacher Ratio in many developing countries results from large enrolments following the quest for universal basic education and the increasing teacher shortages. With such enrolments and fewer teachers, the available teachers need help to deal with overcrowded classes. These high enrolments have caused low efficiency in the schools, which is one of the main reasons for the poor quality of education offered in many secondary schools in developing countries (UNESCO, 2012)

To fulfill the international mandate, more and more developing countries in Sub-Saharan Africa, South, and East Asia, and Latin America are utilizing the services of less qualified teachers. In addition, countries such as Niger, Mali, Togo, India, and China have been recruiting contract teachers to cope with teacher shortages and the high Pupil Teacher ratio (UNESCO, 2012).

Though the correlation between class size and educational achievement has been a perplexing one, various scholars believe that minimum class sizes engender better student achievement (Glass & Smith, 1979) and that it aids learners in obtaining enough results. Proponents of small class sizes posit that it enables learners to get enough attention from teachers, which invariably leads to good academic achievement and does away with frustration. Bruhwiler and Blatchford (2011) believe that learners who were taught in smaller classes in their early elementary grades continue to have improved academic performance even if they are in congested classrooms in upper elementary or middle school.

Yusuf, Onifade, and Bello (2016) report that the sizes of classrooms could have negative impacts on the learners' general behaviour, attitude, and learning academic results. Large classroom sizes are known for increases in learners' disruptive behaviour and inattention, which duty teachers more and result in poor learner academic outcomes. This situation is indicated by inadequate teaching materials (per number of students) and does not allow teachers to give learners the individual attention they need for adequate learning. The state of affairs in learning institutions due to the high admission rates with enough facilities and insufficient training of teachers calls for concern. Congested classrooms and broken furniture are common indicators in our schools. Such non-conducive school surrounding robs both the teachers and students; and impact students' academic outcomes.

Smaller classes are always perceived as allowing teachers to focus more on the needs of individual students and reducing the amount of time needed to deal with disruptions. Smaller classes allow greater flexibility for innovation in the classroom and improve teacher morale and job satisfaction (Hattie 2009: OECD 2009). The ratio of teachers to students also dictates how resources are to be shared. Researchers have found that class reduction has narrowed the achievement gap as the cost of reform has hindered the implementation of smaller classes over the years (Adams, 2014). It has been noted that students learn better in smaller groups and can learn from each other, share knowledge, build better personal relationships with their peers and teachers, and stay enlightened. There are also differences in achievement variability between small and large classes.

High-quality education has several merits, as higher levels of academic performance are associated with higher earnings and economic mobility, better health, lower

mortality rates, and greater participation in the leadership process in one's immediate and global community. Education is seen as a tool with great effects on both the national economy and personal financial income. Thus, education can be identified as a vital tool for the economic development of the nation. Similarly, the academic achievement of learners is the yardstick for checking the educational quality of a nation, according to Nwokocha and Amadike (2005). Improving the academic achievement and quality of basic education remains the pivot for global development and freedom. The government introduced Education Sector Reforms (ESR) and a National Plan of Action (2001-2015) for the improvement of the quality of education by promoting the states of various inputs like the revision of curricula, teacher training, and provision of good facilities in the public sector schools. Nevertheless, the availability of quality basic education to all learners is faced with numerous problems in most developing countries, including Nigeria (Mmbaga, 2002). In an attempt to put effective education in the right direction, various factors have been quantified as being responsible for the falling standard of education. Among such factors is the issue of the 'student-teacher ratio'.

In a study, Kezar (2006) indicated the learner-teacher ratio as a tool that can be employed to measure education system performance. So many meanings have been associated with the effects of the 21st-century learner-teacher ratio on learners' academic performance. Some involve classroom size as the major factor responsible for downward trends in education, many, especially at the elementary or high school level of Education in Nigeria. However, others see this as just but a coincidence factoring other factors as being responsible. Taft, Perkowski, and Martin (2011) assert a clear and strong correlation between classroom size, learner-teacher ratio, and learners' academic performance. In addition, learners learned mostly in small

classrooms. Further, these researchers established that the most advantage of minimizing the classroom took place in cases where the number of learners in the classroom did not exceed 20 students. Finally, they concluded that small classrooms were sophisticated in the fact that students' reactions, teachers' motivation, and the quality of the instructional environment. Similarly, Keil and Partell (1997) conducted a study and found that an enlarged number of learners' size increasing has a negative impact on learners' academic performance as it reduces learners' achievement. In the era of this 21st century, a reduced learner-teacher ratio may be of advantage to the learners more when instruction depends on the discussion by giving room for learners' participation in the classroom extensively. The vital quality and reasonable education to the growth and development of any society cannot be over-stressed. One may faultlessly conclude that the gap between developed and developing countries is in the difference in the quality of education given to them.

Nwokocha and Amadike (2005) found that the performance in academics of learners is the yardstick for testing educational substance in a given country. Therefore, it is of paramount importance to establish and test for the impacts on performance in the academic of the learners. Some of the factors of academic performance in line with many researchers include teaching methods (Ahmed & Abimbola, 2011; Kareem, 2015; Umar, 2011), utilization of teaching and learning materials (Adalikwu & Iorkpilgh, 2012), the personality of the student, self-confidence, family support, socio-economic background, the intellectual aptitude of the student, and previous instructional quality have been found to also impact learners' academic performance (Starr, 2002) just to highlight but a few. In various studies establishing the factors of students," academic performance, little or no work has been done to evaluate the relationship between the teacher-learner ratio on the student academic performance of

secondary school learners. Hence, the need to evaluate the relationship between the teacher-learner ratio on the public secondary school student's academic performance in Machakos, Kenya.

The teacher-student ratio, the training manual for learning institution managers and teachers (2015), highlighted that the National Policy on Education stresses the students' teachers at the primary and secondary level standing at a ratio of 1:35 for efficient learning at high school level standing at a ratio of (1.50) one to a maximum of fifteen at nursery level which the policy provides for 1:4~ ratio for post basic. Congested classroom; a classroom is taken to be congested when the number of learners per classroom is beyond the optimum level such that it causes difficulties in the learning process. The classroom is seen as the most vital location in any given learning institution. The learners take more of their time and resources, hopefully in an environment favourable for learning. The entire design of the classroom shows the priorities, philosophy, goals, personality, and teaching style of the student. A learner's learning behaviour is improved when the teacher takes time to create a classroom-enabling environment in which learners feel relaxed and free to relate with their teachers and their class mates. It is opposite to the expectations that in our community classrooms, one thing is very clear teaching in such a climate, where the number of students is beyond the acceptable maximum, appropriate teaching and learning are negatively affected and hence poor academic performance.

The research study conducted by Shah and Inamullah (2012) asserted that congested classrooms could have direct impacts on the learner's learning process. They not only impact learners' academic achievement but also the teachers had to encounter several problems such as behavioural problems, discipline, poor health, and poor performance

of learners, putting emphasis on teachers and increasing the drop-out rate of learners in the schools. Carlson (2000) in his study found that the best type of learning was not to take place when a high population of learners was congested in a classroom that is not spacious. He went around several learning institutions, but it was found that there was a serious challenge, particularly Unidad Davina School located in Florida, Santiago, and Taltas' Escuela Hogar. He further asserted that forty-plus learners were congested in the classroom, made for learners not exceeding 35 learners. They were arranged so close to one another that they were not able to work effectively. The impact of teacher-learner ratio on teaching and learning process. Ijaiya (1999) asserted that there was less relationship between the feeling of learners and teachers, indicating that congestion reduces the standards of teaching and learning indicators for achievement of planning for quality of all levels. A congested classroom is not only a challenge facing education in Pakistan, but it has now become a common challenge in the globe in our contemporary life.

Phillip (2011) conducted a study on the effect of the congested classroom on students' academic achievement in New York and prepared a report of his finding for the last ten years. He asserted that congested classrooms had been a problem affecting the whole world. In a classroom, the teacher is the main instrument for ensuring effective and quality teaching and learning activities. Such quality education is realized when the school has ensured an appropriate and supportive environment. Favourable teaching and learning environments enable the learner to participate effectively in the classroom.

Oguntoye (1983) carried out a research study on the learner-teacher ratio and found that the learner-teacher ratio hurt learners' academic performance. The correlation

between the learner-teacher correlation ratio and students' academic performance is a major controversy. The minimal teacher-learner ratio brings about more effective communication between the teacher and the learner. Madaio et al. (2022), found that there is an increasing trend where there is the existence of some classrooms with 100 or more learners in post-primary schools, leaving the teacher with a lot of work and hence unable to exercise patience and a positive attitude.

Fabunmi et al. (2007), carried out a study on the relationship between some factors like teacher, student's ratio, class size, student factors, and students' academic in the examination. These factors were discovered to be factors that have a direct impact on the learners' academic achievement in schools. Schools with overcrowded classrooms and a high teacher-student ratio registered low academic performance, while better academic performance is associated with the learning institutions with less and lower teacher-learner ratio. There are other several studies conducted, such as Ndayisaba (2017) agreed that there exists a strong correlation between the number of learners and the academic outcome. Ojoawo (2002), in one of his major among his findings, asserted that the number of learners in a classroom relates to the school's academic achievement in academics. Acosta et al. (2008), concluded that no important disparities are attached to test scores to compare densely populated classes and less populated class control groups in developmental English.

A study conducted by Acosta et al. (2008), found out that not always a small class is bad; Barrow et al. (2009), identified two of the challenges, which large classes pose, are first the provision of an opportunity for discussion or any kind of oral input to the written work is difficult; and second, the amount of making involved can dissuade

even the, not enthusiastic teacher from setting the amount of written work that he feels would benefit the students.

Coleman (2007) found out that for enthusiastic teachers, if classes are very large, it is important that, as far as possible, the learners should constantly be busy, and the tasks should function continuously without repeated intervention from the teacher. On the other hand, many parents, teachers, and students believe that small group classes are preferable to large ones. As Acosta et al. (2008), put it, there is, after all, an orthodox tradition to the proposition that small classes are needed for student achievement; in a review of early studies, Educational Research Service concluded that reducing class sizes in the primary grades to 22 or fewer appeared to have a beneficial effect on reading and mathematics" scores, more so when it comes to the pupils who are financially challenged. As a result, most advanced experiments have shown and made this recommendation. (Hanushek, 1995).

High PTR in 3rd world countries are attributed to high admission due to the desire for compulsory and universal primary education and the high rate of inadequate teaching staff. With the high challenge of reduced teachers and high enrollment of learners in the schools, the few available teachers encounter a serious drawback in their effort to teach overpopulated learners. The overpopulated learners in a class have led to less effective teaching and learning, which is a major factor for schools registering poor academic achievements. Majorly this affects most primary schools in the 3rd world countries. (UNESCO, 2006). High PTR because of overpopulated classrooms affects the quality of education in schools with inadequate resources.

A study conducted by Brewer, Gamoran, Ehrenberg, and Willms (2001) found that the pupil-teacher ratio can be applied in the whole world to establish human brought

to bear, both directly and indirectly, on learner learning. In the recent past, the discussion on PTR and inadequate teachers in public schools in 3rd world countries have caused much attention in both political and educational sectors. In a few decades, forces have been particularly raised addressing the challenge of inadequate teachers, the increased number of learners, and the increasing PTR. This has been highlighted to have a serious effect on the enhanced education that the learners acquire, and this has been severally addressed for quite some time in the past by many stakeholders in education and by political leaders. Verwimp (1999) conducted a study in Ethiopia and found a negative correlation between the quality of teaching and the learner-teacher ratio. A teacher in the classroom is a major instrument contributing to the enhanced and quality teaching and learning process. This education quality is enhanced in cases where the school has enabled a good environment in the classrooms, and the learners' participation is enhanced during the teaching and learning process. In Tanzania, the learner-pupil in primary schools was recorded to stand between 50 and 76 in 2010, in line with the Word Bank report (2012). The official Basic Education Statistics in Tanzania (2010) asserts that there has been a steady increase in pupil-teacher ratios in recent years, from 1:50 to 1:60 in 2011.

Benjamin (2005) found out that pupil-teacher ratios in some regions of Tanzania are: 1:71 to 1:79 in both rural and urban areas. The government had set a target by the year 2002 – 2006 that the teacher–pupil ratio should be maintained up to 1:40, although the achievement of this ratio is yet to be attained because of the existence of some primary schools' criteria of allocating teaching staff eight classes' seven teachers in reserves and nine teachers for eight classes in town set up schools. Several studies have associated learners' academic performance with the class size in a taught subject such as reading and mathematics, but studies on the effects of pupil-teacher ratio on

pupil performance have not reached definitive conclusions. Concerning this study, therefore, there is a need for a study in a locale to fill the gap and shed light as well as give an insight into the influence of pupil-teacher ratio on performance. The major focus of that study was on the importance of finding out the relationship between the learner-teacher ratios on Kenya Certificate of Primary Education performance in Machakos County.

Primary schools, defeating the purpose of FPE (Sifuna & Sawamura, 2008) In India, FPE led to the congestion of pupils in classrooms, making teaching and learning unfavourable. Physical facilities were overstretched, while teaching aids were inadequate. In contrast, a study carried out in Nigeria showed that enrolment in schools represented the largest component of investment in the effect of learner-teacher ratio on the academic performance in the final examination in primary school www.ijhssi.org 51 | Page

According to UNESCO (2006), although FPE was established way back in the 1948 Declaration of Human Rights, where article 26 states that education is compulsory and free, that is the 'elementary' education. With the third president of Kenya, Kibaki political, in 2003, the National Rainbow Coalition (NARC) and his government abolished most of the additional cost of education in primary what was referred to as the user charges in primary education, and was ready to support for the FPE by providing availing instructional materials, exercised books, cost of personal emolument teachers, and quality assurance services (Irin, 2006). This initiative led to a high population in primary school enrollment of about 1.3 million children in public primary schools in 2003, which introduced a Gross Enrolment Rate (GER) of 104 percent (RoK, 2005b). Among the nations that are members of the United Nations,

Kenya is one of the 189 member countries which have committed themselves to achieve the Millennium Development Goals (MDGs), whose second goal is to achieve Universal Primary Education (UPE). The set goal was to implement the goal by 2015; learners everywhere, both male and female, were able to successfully cover the entire syllabus and curriculum of primary school (RoK, 2005). Further, since the 1990s, the country has been encountering a serious problem of increasing pupil-teacher ratio (PTR) because of the ever-existing inadequate teachers in the country. The situation became worse with the introduction of FPE in 2003. The implementation of the FPE programme resulted in a 10% increase in enrolment in primary schools nationally (MOEST, 2006). A record 1.3 million learners enrolled in various primary schools all over the, raising the enrolment from 5.9 million in 2002 to 7.2 million in 2003 (MOEST, 2009). This sharp increase in enrolment rejuvenated into challenges of FPE in the state (Wamukuru, Kamau & Ocholla, 2006). For example, the number of learners exceeded the available human and physical facilities in the country while the (PTR) steadily increased from the recommended 40:1 to between 60:1 and 90:1 (MOEST, 2009). Student-teacher ratio recommendation for public primary schools in Kenya is 40:1 (TSC, 2006) as per the recommendations by UNESCO and other international standards. The recommendation has not been attained in Kenya.

2.5 Influence of teachers' year of experience on students' academic achievement

Research conducted by Papay and Kraft (2014) identified that teachers who have teaching experience of not less than three years as "novice teachers simply trying to survive in the classroom as they build key classroom management skills, learn the curriculum, and add to their instructional abilities." Some problems hinder teachers from getting teaching experience commensurate over various years of teaching in

classrooms. Such challenges involve but are not limited to inadequate teacher professional documents, poor grasp of curriculum and content knowledge, inadequate or appropriate mentorship programmes in learning institutions, poverty levels of learners, inadequate school resources/infrastructure, lack of teacher motivation, poor remuneration, and unreasonable and untimely teacher transfer. In the 3rd world nations, including Kenya, there are more constraints for teachers as they acquire experience than in established nations' economies, negatively affecting student academic performance.

According to OECD Report (2009), several newly employed teachers in Africa take their time and invest their effort heavily to promote students' academic achievement. A study by S.; et al. (1970), suggests that teachers take more time teaching while not minding about getting promoted. This effort helps promote the learners' academic performance. A study by Thuranira (2010) recommended that teaching for an extended period promoted the learner's academic performance and made a link between the learners and the teachers, thereby improving preparedness and performance.

The KNEC and MoE Audit Reports (2017) on the learners' academic performance at KCPE over the past years have indicated below-average performance to student indiscipline, among other factors. Determining the effects of teaching experience on KCPE performance in English subjects is paramount. On the other hand, many types of research have shown a link concerning learners' performance to teachers' experience; some published studies indicate that under some circumstances, experienced teachers do not promote learner academic performance. Boyd et al. (2008), Harris and Saass (2007), and Papay and Kraft (2014) in their study asserted

that students whose teachers with minimal teaching experience teach register poor academic results in their national examinations compared with students taught by teachers who have more experience or many years in the profession. However, teachers with teaching experience of more than 25 years are, in some circumstances, found not to be as effective as less experienced teachers. Rice (2010) indicated that several institutions recognize the experience as a factor in performing various tasks. Mahlios et al. (2010), asserted that teacher-teaching experience is utilized to quantify how to allocate tasks and promotions. The study agreed that teaching for a long time for teachers could lead to acquiring the required necessary skills, producing good results, and improving teachers' knowledge. Teaching experience is traditionally considered a system influencer for enhanced student academic performance in a school and has for a long time informed more human resource decisions on teacher payment, distribution, promotions, and transfers, including the extension of service contract terms beyond retirement age for long-serving certificated teachers in the education sector. Hariss and Sass (2008) indicated that the working experience in the teaching experience has a significant impact on students" academic performance in the English language. According to the study done by Strauss and Vogt (2001), they asserted that teaching experience is a vital factor that determines the learners' academic performance in national examinations. Komolafe (1989) and Ade-Ojo et al. (2022), found that teachers'" experience impacted the academic performance of the learners in the English language, adding that the more teachers are experienced and qualified, the more the expectations of their learners likely to perform excellently in their exams.

A study by Zhang et al. (2009), and Rockoff (2004) found that teachers' working experience greatly enhanced learners' academic performance in Mathematics and

language in conjunction with other determinants of the school. The study conducted by Burden (2005) concluded that there are three phases in the teaching career. Asserts that a teacher has three stages in his career. Fressler (1992) identified the first, also called the survival stage and the pre-teaching concern stage, which takes place during the first year of teaching when teachers do not have adequate knowledge of the teaching and learning environment: the confidence level of the teacher level also reduced for those unwilling to try different approaches of teaching. He (Burden) called the 2nd phase, which takes place first four years of teaching, the adjustment stage, at which teachers adapt a great deal to preparedness in terms of planning and organization. At this phase, a teacher's confidence level is improved such that the teacher can see students with dignity. The last phase is the third phase which is referred to as the maturity stage, which begins in the mature stage, which starts from five years of experience upwards, wherein the teacher has grasped and discovered the job.

In his study, Moen (2005) concluded that the mature stage of a teacher typically discovers the teaching profession leading to enhanced students' academic performance. It is a phase of consolidating, mastering teaching content, and reefing. At the mature stage, teacher preparedness has been improved through experience (tutoring, training, mentoring, coaching, and management of learners). Odumbe, Simatwa, and Ayodo (2015) assert that a long teaching experience among teachers improves the academic performance of the learners placed in their hands. The lengthy teaching career experience aids in improving the teachers' lesson preparation and is keen on learner digression from performance. Piper et al. (2016), found that teaching procedures are achieved by long teaching in a classroom and help better student academic performance outcomes compared to the teachers with the least teaching

experience. The study conducted by Crossman and Harris (2000) indicated that female teachers are not satisfied in the teaching profession as compared to male teachers, who are more satisfied. Satisfaction in the teaching profession leads to excellent teacher preparedness and, sometimes, good learner academic performance grades. Fetler, M (1995) conducted a study and established that, various previous publications in the education policy analysis journal California on High school staff characteristics and mathematics test results that teacher experience measured by the average number of years in service was positively related to test results. Rice (2013) found that in CADER's Article on experiential learning.: Evidence on the effects and supply of teacher experience and the indicators for teacher policy that years of teaching experience affects learner academic performance achievement. A study carried out by Rice, J.K (2010) argued that in Urban School Washington D.C journal article on The effects of Teacher Experience: evaluating the Evidence and Policy Indicators that Experience, Effects of teaching experience on learners' academic achievement at Kenya Certificate of Primary Examination DOI: 10.9790/1959-0903032430 www.iosrjournals.org 26 | Page obtained over time, improve the knowledge, skills, and productivity of workers" and that teachers show the most significant productivity gains during their first few years on the job, after which their academic achievement tends to level off. In a similar outcome in the same journal on Teacher Quality, she argued that the gap in Teacher Quality between High-and Low-poverty schools is associated with poor productivity outcomes of experienced teachers in High poverty schools; and that High-poor schools are doubly limited in the fact that they have higher proportions of inexperienced teachers and their experienced teachers are not adequate. Ladd and Sorrensen (2017) in their study found that according to that paper 112 on Returns to Teacher Experience: Learner academic performance and

Motivation in Middle School, experience has significant returns for teachers in the form of higher test scores and enhancement in learner behaviour with clear behavioural impacts cropping for lowers in learner absenteeism.

2.6 Summary of the Literature review and Research Gap

The literature review found that a combination of determinants influences learners' academic achievements. In the learning environment, the literature review has highlighted that inadequate resources and unfavourable resources for learning resources adversely hamper learners' academic achievements. Teachers' experience, professional qualification, professional development, and years of service are perceived as determinants of a teacher and affect learners' performance in education. Better teachers are known to impact the improved learners' performance in education. Moreover, students' entry behaviour influences learning, resulting in poor academic performance. Concerning students' teacher ratio, large class sizes have various challenges, recommending a smaller class size to improve students' academic achievements.

There have been instances when students with low entry marks achieve higher grades consequently in their KCSE examinations. Moreover, some students from unconducive learning environments perform better in their examinations, leading to a need to research various variables contributing to student academic achievement. The gaps identified indicate insufficient data describing how determinants of students' academic achievement influence academic achievement in public secondary schools. There was a need to carry out a study to examine the determinants of students' academic achievement in Machakos County, hence the main objective of this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes research methods the researcher used that were applied objectively to establish determinants of learners' academic performance in public secondary schools in Machakos County. It also shows the target population, research design, and the data analysis procedure.

3.2 Research Design

The research adopted a descriptive survey research design. Because the method is extensive in data collection and ensures a critical analysis of the results, this research design is descriptive, which is used to gather data on the current status of the phenomenon and to describe 'what exists' concerning variables or conditions in a situation (Kaleem et al., 2008). A descriptive research design enables a researcher to use both qualitative and quantitative methods in collecting data, especially from the administrators in secondary schools and other stakeholders. Kothari (2004) argues that descriptive research design is used when the researcher can engage in a field survey by going to the population of interest for the respondents to explain or respond to certain features of the problem under study.

3.3 Location of the Study

The study was conducted in Machakos County. Most of the schools are on the plain, thus being accessible, and in those areas with steep slopes, like Iveti hills, there is a need for private vehicles or motorbikes to access the areas. Machakos County is one of the 47 counties of Kenya. Its capital is Machakos. Its largest town is Machakos, the country's first administrative headquarters. The county had a population of 1,421,932

as of 2019. The county borders Nairobi and Kiambu counties to the west, Embu to the north, Kitui to the east, Makueni to the south, Kajiado to the southwest, and Muranga and Kirinyaga to the northwest. The county lies Latitude**:** -1° 29' 59.99" S

Longitude: 37° 14' 60.00" E

3.4 Target Population

The study targeted 369 public secondary schools in Machakos County. It also targeted 4,267 teachers and 11,134 from four students. The secondary schools were divided into three strata, namely, 307 mixed schools, representing 83.2% of the public secondary schools, 27 girls (7.3%), and 35 boys' schools (9.5%).

3.5 Sample and Sampling Procedures

According to Kombo and Tromp (2006), sampling is the process of selecting several individuals or objects from a population such that the selected group contains elements representative of the characteristics found in the entire group. Simple random sampling was used to sample the principals. According to Mugenda and Mugenda (2003), between 10 and 30 % sample size is taken to be a good representation of the target population. Hence the researcher sampled 37 secondary schools. The principals from the sampled schools were purposively selected; hence, 30 principals from mixed schools, three from girls' schools, and four from boys' schools.

The sample size of teachers was determined using Yamane's 1967 formula shown below:

$$n = \frac{\mathrm{N}}{1 + \mathrm{N(e)2}}$$

Where:

n=Number of samples

N= Total population

e= Error tolerance (0.05)

Therefore:

$$390 = \frac{4267}{1 + 4267(0.05)2}$$

Teachers were randomly stratified according to their type of school (mixed schools, boys, and girls' schools). In the distribution of the schools, 323 teachers were selected from mixed schools, 27 from girls' schools, and 40 from boys' schools.

The sample size of students was determined using Yamane's 1967 formula shown below:

$$n = \frac{\mathrm{N}}{1 + \mathrm{N(e)2}}$$

Where:

n=Number of samples

N= Total population

e= Error tolerance (0.05)

Therefore:

$$397 = \frac{115{,}132}{1 + 115{,}132(0.05)2}$$

In each sample, the researcher randomly sampled 323 students from mixed schools, 32 from girls' schools, and 42 from boys' schools, which ensured that every student had equal chances of participating in the study.

Table 3.1: Sampling Matrix

Category	Target population	Sample (n)	Sampling Technique
Principals	369	37	Purposive
Teachers	4267	390	Random Stratified
Students	115,132	397	Random Stratified
Total	**119,768**	**822**	

3.6 Data collection tools.

The data collection tools used included three questionnaires. The questionnaires were administered to the students, teachers, and principals. The structured questionnaire was closed and open-ended questions. They were based on the research objectives of the topic of study.

3.7 Pilot Study

Before collecting data, the researcher conducted a pilot study in, Mukaa sub–county in Makueni County. Makueni County was selected for piloting as it has characteristics similar to Machakos County. Four class teachers and four students from form three to four were selected to fill out questionnaires of the randomly selected schools; the school principal was interviewed to determine the validity and reliability of the research instruments.

3.7.1 Validity of Research Instruments

The procedure for assessing content validity is to use a professional or expert in the field (Mugenda & Mugenda, 2003). The instruments were appraised by the supervisors in the Department of Education Management and curriculum studies and

fellow student colleagues in the master's degree program. Their comments were considered by the researcher in making necessary amendments to the instrument before the collection of data. This was to ascertain and clarify that the test instruments would measure what they were intended to measure.

3.7.2 Reliability of Research Instruments

Reliability of measurements concerns the degree to which a particular measuring procedure gives equivalent results over several repeated trials (Orodho, 2009). Reliability determines whether an instrument consistently obtains similar results over time. The questionnaires were tested using test-retest techniques. In two weeks, the same instrument was administered twice to the same group of respondents. Individuals who were randomly selected were asked to fill out the questionnaire and then fill out the same questionnaire again after two weeks. A minimum reliability index of 0.7 using Cronbach Alpha was considered acceptable for instrument reliability. The Alpha coefficient for the principals' questionnaire was 0.723, 0.751 for the teachers' questionnaire, and 0.702 for the students' questionnaire.

3.8 Data Collection procedures

The researcher sought clearance from Machakos university and a research permit from NACOSTI to do research. Permission was sought from the county director of education and the county commissioner. Moreover, the researcher obtained permission from secondary school principals to collect data in their respective schools. Questionnaires were self-administered by the researcher to facilitate communication with the respondents for the study. The researcher physically handed over the questionnaires to the respondents for them to fill in. After completion they were collected for analysis. According to Neuman (2006), the advantage of the self-

administration of questionnaires is that a single researcher can easily undertake the survey.

3.9 Data Analysis Methods

Descriptive statistics were conducted using frequency, percentage, and standard deviation. The researcher observed trends in the data, which triggered further statistical procedures to make conclusions. The SPSS software version 28 was used in the analysis. Moreover, inferential statistics were used to determine the relationship between variables. The results were presented in tables, graphs and a pie chart. The study applied Analysis of Variance (ANOVA)

3.10 Logistical and Ethical Considerations

The issue of ethics is very important in research (Oso & Onen, 2005). Therefore, the researcher informed the selected respondents about the purpose of the study and informed them that their involvement would be voluntary. The researcher sought consent before engaging the respondents. The confidentiality of the participants was assured, and respondents were requested not to write their names.

CHAPTER FOUR

DATA ANALYSES, PRESENTATION, AND INTERPRETATION OF FINDINGS

4.1 Introduction

This chapter covers data analysis, presentation, and interpretation based on study objectives. The study's general objective was to establish the determinants of students' academic achievements in public secondary schools in Machakos County. The study was organized based on the study's research questions. The responses are analyzed using descriptive and inferential statistics and tabulated.

4.2 Response Rate

The study respondents were principals, teachers, and students. The response rate is presented in Table 4.1

Table 4.1: Questionnaire Return Rate

Respondents (%)	Sample size	Number Collected	Return rate
Principals	37	19	51.3
Teachers	390	245	63.0
Students	397	397	100
Total	**824**	**661**	**71**

Table 4.1 demonstrates that the average questionnaire return rate was 71%. The researcher collected data from many respondents that represented the study's target population well. According to Mugenda (2019) a response rate above 70% is adequate for analysis. Rowley (2014) noted that a high response rate results in highly credible findings. Sampson et al. (2008), stated that a response rate of 60% should be the target of every social science researcher. The researchers' effort to closely monitor the data

collection process and constant communication with the school administration achieved a higher response rate.

4.3 Background Information of Respondents

The respondents' background information concentrated on gender, age, academic qualification, and professional experience. The researcher sought this information to establish the demographic distribution of the study respondents.

4.3.1 Respondents' Gender

A gender-sensitive institution for school administrators and teachers provides a conducive environment where staff and students interact with colleagues of the opposite gender to achieve set targets. Findings on respondents' gender are presented in Figure 4.1

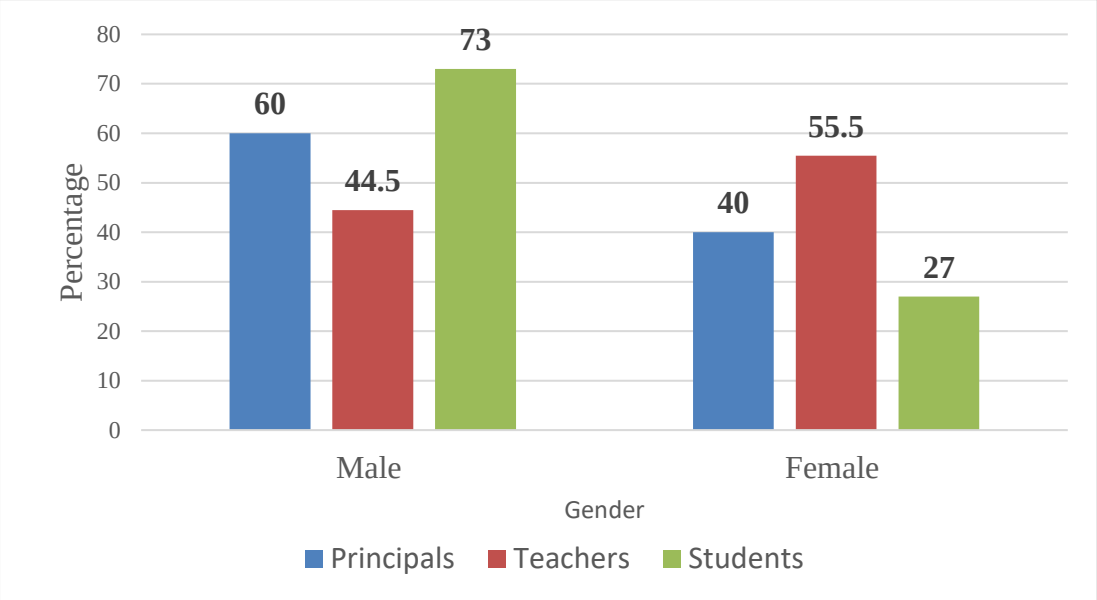


Figure 4.1: Respondents' Gender

Findings show that most principals were male, with 60 %. There is male dominance in school leadership in the county. Findings may also imply that females are shying off

from leadership roles in public secondary schools. Findings concur with Ngipuo (2015), who found more men than women in administrative positions in learning institutions. Murakami and Tornsen (2017) also found fewer female principals in public secondary schools than male principals.

Regarding the gender of teachers, findings show that there were fewer male teachers (44.5%) than females in secondary schools. Indicating that, as opposed to leadership roles, females are willing to take up teaching jobs. As a result of the flexibility of the teaching job compared to school leadership, female teachers can balance their work and family. Maqsood, Munazza, and Ishtiaq (2018) found that gender balance in the teaching fraternity enhances students' performance and that every leader should strive to ensure equal distribution of gender in the teaching fraternity. Findings show that there were fewer female students than male students. The community in the county puts more emphasis on boys' secondary education hence sidelining the girls. The results could also imply fewer slots for girls in the public secondary schools in the county.

4.3.2 Respondents' Age

Respondents were asked to indicate their age. Because as people grow, their perception of issues differs. The older teacher could have better classroom management practices than younger teachers. Students, on the other hand, may consider elderly teachers as their parents and could feel free to open up to them on issues bothering them. Student behavior also changes as they grow from teenagers to young adults. Figure 4.2 presents data on respondents' age.

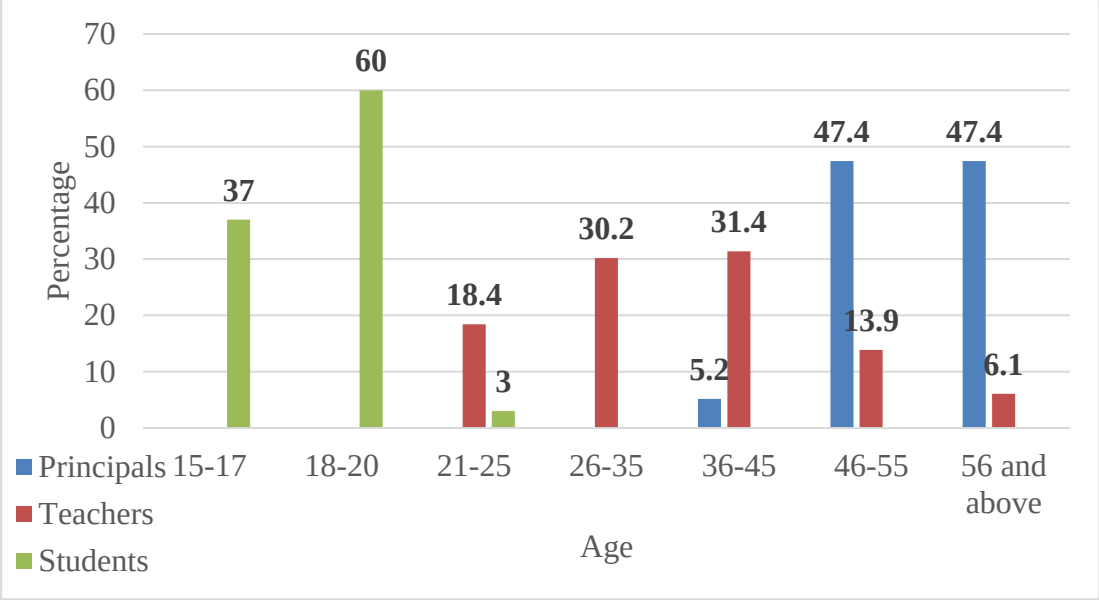


Figure 4.2: Respondents' Age

Findings show that most principals were older than 46 years; with 94.8 %, this implies that the principals were relatively older and may be regarded as elders in school management hence knowledgeable on secondary school management. Findings further show that most teachers were aged between 26-45 years; with 61.6%.

Findings show that the teachers were relatively youthful and energetic in delivering curriculum and extra-curricular activities. Regarding students' age, the majority were aged between 18-20, with 60%, although there were a few aged between 21-25 years; with 3%, this could imply that some students start school at a late age and hence attend secondary school as adults. However, most students are still within the age bracket of a secondary student in Kenya (15-20 years), with 97%.

4.3.3 Principals' and Teachers Academic Qualification

The study sought the principals' and teachers' academic qualifications. The Basic Education Act emphasizes the qualifications of school administrators and teachers. Policy guidelines from the Ministry of Education guide principals' and teachers'

academic qualifications. Figure 4.3 presents data on principals' and teachers' academic qualifications.

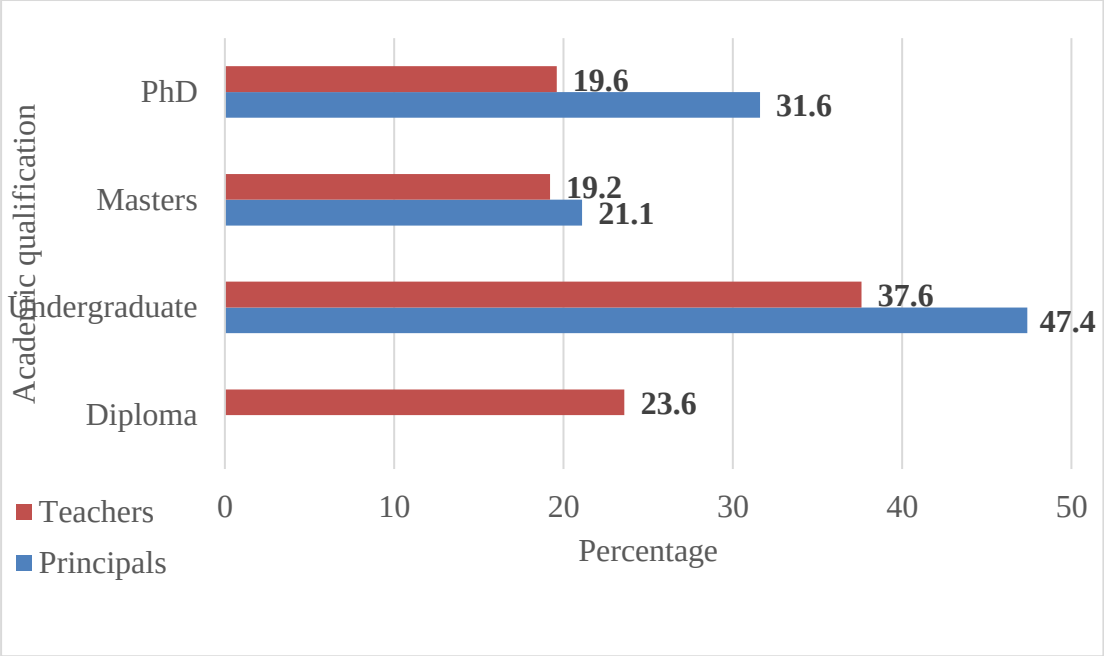


Figure 4.3: Academic Qualification

Findings show that 100 % of the principals had a minimum of an undergraduate degree. Hence, all the principals were qualified to take up secondary school leadership as stipulated in the Jonyo (2017) education reform policy on identifying, selecting, and deploying institutional administrators, requiring a principal to have at least a Bachelor's degree.

The guideline also stipulates that for a teacher to be promoted to an administrative position, he/she must have attained either a bachelor's degree or a postgraduate diploma in education (Farrell, 2015). Results further show that 100% of the teachers had either attained a diploma in teaching or an undergraduate degree; this shows that all the teachers were qualified secondary school teachers and are trying to attain

higher education. Sofo et al. (2012), found that academic qualification determines the teachers' instruction quality and academic achievement.

4.3.4 Principals' and Teachers Professional Experience

The period an individual spends at an institution determines his/her knowledge about the institution. Therefore, the period spent in school enables teachers to understand trends in students' performance. Qualification and experience enhance better classroom management practices. Figure 4.4 presents data on respondents' gender.

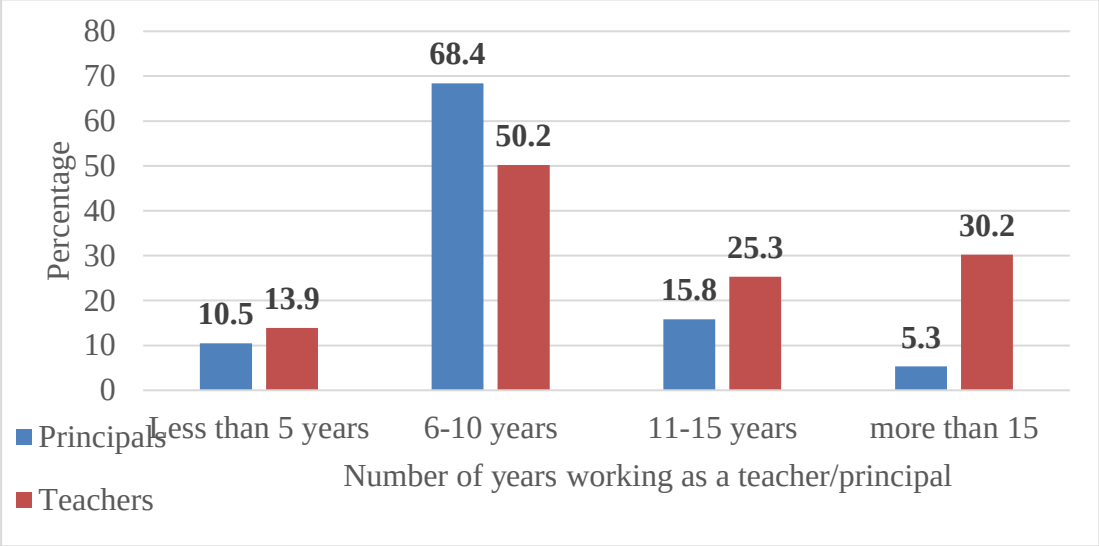


Figure 4.4: Professional Experience

Findings show that 68.4% of the principals have served as principals for 6-10 years; this shows that they have great experience in school administration and are expected to understand the factors influencing students' academic performance. Kadenyi (2014) found that experience was a consideration for appointment to administrative positions in secondary schools. Findings also show that 86.1% of the teachers have been teaching for more than six years, showing they have excellent school administration knowledge. Experienced teachers are in a better position to handle the

instructional processes in the school than novice teachers. Sule, Eyiene, and Egbai (2015) found that academic experience is essential in improving teachers' classroom instructional skills and improving students' academic performance.

4.3.5 Principals' Period of Serving in the Current School

Principals require adequate experience to be effective school administrators. Principals with many years of experience in the current school have a better understanding of their students and teachers. Schools with long-serving and experienced principals ensure effective implementation of activities in school without any problems. Findings on principals' serving periods in the current school are presented in Figure 4.5

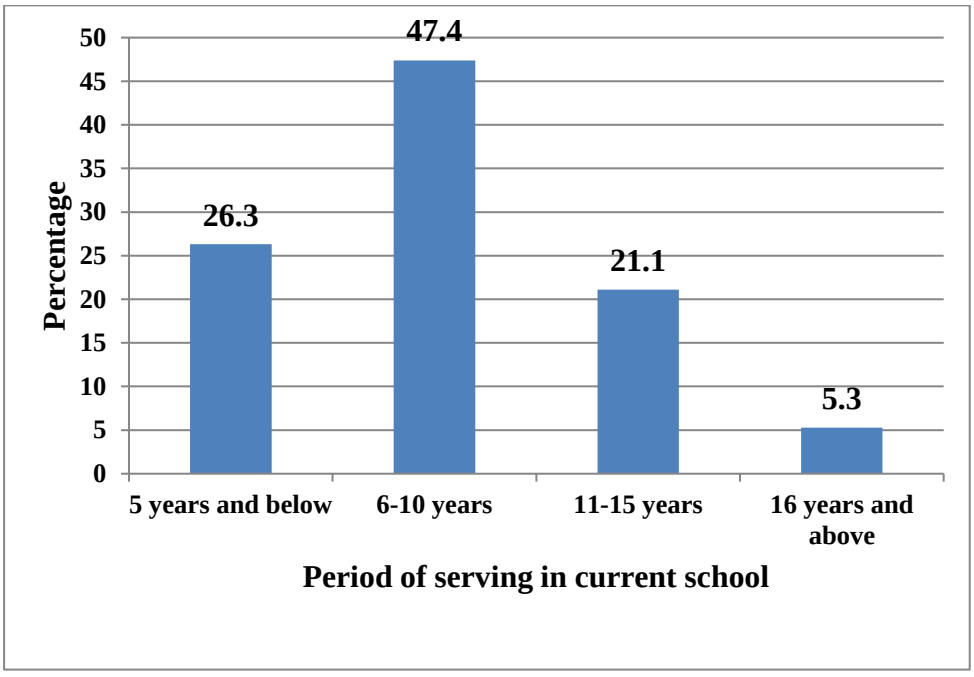


Figure 4.5: Principals' Period of Serving in the Current School

Findings show that 73.8% of the principals have served in the current school for more than six years; this means that they know students' performance in the schools and factors that may affect their academic performance. The principals are also

conversant with their schools' learning environment, hence suited for the current study.

4.4 Entry behaviour and Academic Achievements

The first objective sought to establish the extent to which entry behaviour influences students' academic achievements in public secondary schools in Machakos County. The principals were asked to indicate entry marks for learners in their respective schools, while the students were asked to indicate the marks they scored in KCPE. Findings are presented in Table 4.2.

Table 4.2: Entry Marks

Entry mark for	**Students**		**Principals**	
Learners	**Frequency**	**Percentage**	**Frequency**	**Percentage**
200-250	18	2.8	4	21.0
251-300	262	67.1	13	68.5
301-400	112	28.8	2	10.5
401-500	5	1.3		
Total	**397**	**100**	**19**	**100**

Findings show that 68.5% of the principals indicated that the entry marks for their form one students were between 251-300. The majority of the students (67.1%) also indicated that they joined the secondary schools with 251-300 marks; this implies the priority to admission in public secondary schools in the County is a minimum of 250 marks. However, some schools admit students with lower marks. Admission of students with low marks could be a challenge to the school administrators and students since they may take time to understand concepts and significantly affect the general mean score for the class. This may pose a challenge in planning for better students' performance. Findings concur with Sekyere, Sekyere and Akpalu (2013).

Students with high mean grades register the highest grades in their final examination at the end of the course.

The entry marks for students is a minimum of 250 marks in the Kenya Certificate of Primary Education. However, some students enter secondary schools with 250 marks and below. This leads to poor results in the overall mean grade scores in secondary schools.

The principals were also asked whether subsidized secondary education affects secondary school students' entry grades. Findings are presented in Table 4.3

Table 4.3: Effect of Subsidized Secondary Education on Entry Marks

Effect of subsidized secondary education	Frequency	Percentage
Poor enrollment marks	18	94.7
Poor need for secondary education	1	5.3
Total	**19**	**100**

Findings show that almost all the principals (94.7%) agreed that subsidized secondary education affects the secondary school students' entry grades. Hence the government's plan to ensure a 100% transition to secondary schools affects entry marks to secondary education, which implies that some schools may be forced to admit students that do not meet their admission threshold, especially if the student is selected to join the school through the ministry of education secondary schools' selection systems. Admission of poor-performing students may affect education plan for quality grades if efforts are not made to provide extra tuition for the students admitted to secondary schools with low marks. Findings concur with Mobegi (2007), who found that low entry behaviour was identified as a challenge experienced by school principals in their attempt to provide quality education. The principals were

further asked to indicate the effect of entry marks influenced by Free Secondary Education (FSE) on secondary education. Findings are presented in Table 4.4

Table 4.4: Effect of FSE entry marks on Secondary Education

Effect of FSE KCPE entry marks	Frequency	Percentage
High enrollment	5	26.3
Overcrowding in classes	8	42.1
Constrained teaching and learning Resources	6	31.6
Total	**19**	**100**

Findings show that subsidized secondary education leads to high enrollment in secondary schools, class overcrowding, and constrained teaching and learning resources. The rate at which student numbers increase in secondary schools does not rhyme with school resources and facilities. Therefore, school principals are challenged in planning for the school by inadequate resources and facilities. Teachers also face the challenge of teaching many students in a class. Due to constrained teaching and learning resources, students cannot revise, particularly in the school library, as they have to share the available resources, which may negatively affect academic performance. Findings concur with Mukudi (2004), who found out that the tremendously increasing admission of learners in public secondary schools has aggravated challenges in the learning process facilities, overcrowding classrooms, high number of learners compared to teachers, and inadequate textbooks among other learning resources which influence the admission of the learners. Principals were also asked to indicate the number of streams in their schools. Findings are presented in Figure 4.6

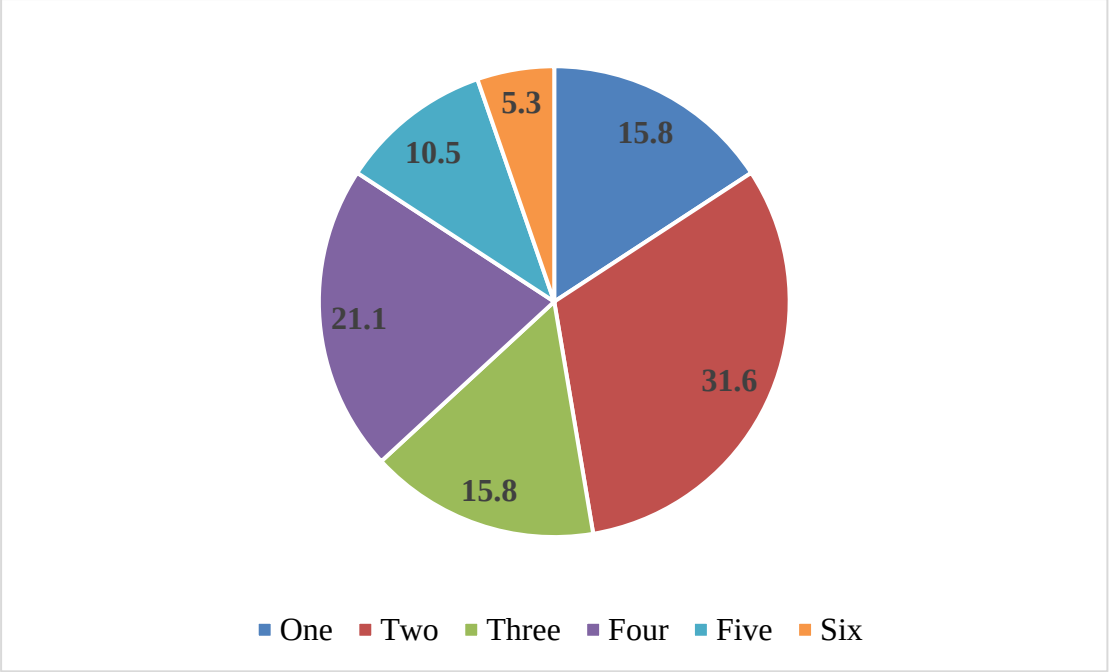


Figure 4.6: Number of Form One Streams

Findings show that while some schools have one stream, other schools have more than four streams; this indicates high enrollment rates in public secondary schools, which is an effect of FSE. This finding supports the findings in Table 4.4 that free secondary education has resulted in high enrollment in public secondary schools.

In order to establish if there exist significant differences between entry marks and students' performance, an ANOVA test was conducted. Findings are presented in Table 4.5

Table 4.5: ANOVA Results for Entry level and Academic Achievement

		Sum of Squares	df	Mean Square	F	Sig
Students Entry level	Between Groups	.038	3	.038	.030	.863
	Within Groups	303.872	241	1.267		
	Total	**307.909**	**242**			

Table 4.5 shows that ANOVA (F (3,241) = 0.030, p = .863). The p>0.05 implies no statistically significant relationship between students' entry-level and performance; this implies that students' performance is not affected by their entry marks to secondary school. Some students who enter secondary schools with low marks may also perform poorly in secondary schools, while others perform very well. Similarly, some students enter secondary schools with high marks but perform poorly in secondary schools. Educational planners should constantly review the admission policy on entry behavior so that weak students are guided early enough to do extra reading, discussions, and consultations to improve their knowledge for better academic achievements. Emphasizing that if schools wish to better their academic performance, they should admit students with high marks because high entry marks are sustained. Moreover, education planners in conjunction with the ministry of education should organize for workshops and seminars to share best practices for improving academic achievements for students with low entry marks, and high entry marks to ensure value addition.

4.5 Learning Environment and Academic Achievements

The second objective aimed at establishing the association between the learning environment and student's academic achievements in public secondary schools in Machakos County. Principals, teachers, and students ticked on statements to indicate their level of agreement concerning learning environment in their school. Findings in Tables 4.6, 4.7 and 4.8.

Table 4.6: Principals' Responses on Learning Environment

Statements on learning environment	Strongly Disagree		Disagree		Not Sure		Agree		Strongly Agree		Mean
	F	%	F	%	F	%	F	%	F	%	
The learners have adequate text books	11	58.0	4	21.0	0	0	3	15.8	1	5.3	2.11
There is learner's congestion in the classrooms	2	10.5	3	15.8	0	0	13	68.4	1	5.3	3.58
There is a well-equipped library in the school.	11	57.9	3	15.8	0	0	2	10.5	3	15.8	2.53
The laboratories are enough in the school	15	79.0	3	15.8	0	0	1	5.3	0	0	1.95
All textbooks needed by learners are found in the library	4	21.0	11	58.0	0	0	2	10.5	2	10.5	2.32
Facilities like laboratories and classrooms are adequately equipped	1	5.3	15	78.9	0	0	2	10.5	1	5.3	2.34
The classrooms are clean and well aerated	0	0	1	5.3	1	5.3	4	21.1	13	68.4	4.53
The school has adequate teaching materials	2	10.5	10	52.6	0	0	6	31.6	1	5.3	2.57
There are enough computers in the computer laboratory	2	10.5	13	68.4	1	5.3	3	15.8	0	0	2.26

N=19

Findings show that most principals (58%); strongly disagreed that the learners have adequate textbooks (m=2.11). 68.4% agreed that there is learner congestion in the classrooms (m=3.58). 57.9% strongly disagreed that the school has a well-equipped library (m=2.53). 79% strongly disagreed that the laboratories are enough in the school (m=1.95).58% disagreed that all textbooks' learners need are found in the library (m=2.32). 78.9% disagreed that laboratories and classrooms are adequately equipped (m=2.34). 68.4% strongly agreed that the classrooms are clean and well-aerated (m=4.53). 52.6% disagreed that the school has adequate teaching materials (m=2.57). 68.4% disagreed that there are enough computers in the computer laboratory (m=2.26).

This implies that the work environment is generally poor, which may lead to teacher dissatisfaction and job performance. Dissatisfied teachers may be unable to deliver the curriculum effectively, causing poor academic performance. Inadequate textbooks mean that teachers and students must share the books; hence no individual revision and teachers need more time and resources to prepare for lessons. Congestion in classrooms hinders teachers from attending to every student individually, and some students, particularly the backbenchers, may feel neglected. A well-equipped library ensures that students have adequate reference materials for revision and reading ahead of lessons, improving their understanding of different concepts. However, their unavailability would deny the students the chance of adequate revision. Educational planners should plan effectively to have favorable learning environment for all.

Proper planning ensures facilities like laboratories enhance effective science lessons, and students understand theory in a better way through practicals. Teaching and learning resources enable the teaching and learning process to go smoothly,

improving student and teacher performance. Teaching and learning materials are essential ingredients in learning, and the intended curriculum can only be easily implemented with them. Using instructional materials would encourage a learner-centered method of teaching hence high students' academic achievement. The availability of computers enables teachers to research their teaching subjects, enhancing subject mastery, and the teachers would be able to clarify any concept queried by a student.

Findings concur with Reche et al. (2012), that the lack of important materials like science and computer laboratories influences the teaching of sciences. The school management and the administration have to ensure the libraries are well endowed with textbooks and other reference materials, and laboratories must be well equipped with apparatus and chemicals to enhance effective teaching and learning.

Table 4.7: Teachers' Responses on Learning Environment

Statements on learning environment	Strongly Disagree		Disagree		Not Sure		Agree		Strongly Agree		Mean
	F	%	F	%	F	%	F	%	F	%	
Your school has adequate textbooks	70	28.5	126	51.4	2	0.8	36	14.7	44	4.5	1.92
The learners are congested in classrooms	4	1.6	48	19.6	3	1.2	108	44.1	82	33.5	3.74
There is a library in your school	64	26.1	8	3.3	1	0.4	103	42.0	69	28.2	3.49
There are adequate laboratories in your school	87	35.5	102	41.6	6	2.4	9	3.7	41	16.7	2.34
Learners get the textbooks they need in the school library	94	38.4	83	33.9	1	0.4	7	2.9	60	24.5	2.33
The school has availed enough classrooms	85	34.7	95	38.8	3	1.2	55	22.4	6	2.4	2.44
There are clean and well aerated classrooms	9	3.7	72	29.4	6	2.4	83	33.9	75	30.6	3.41
There are adequate teaching and learning facilities for the teachers	67	27.3	97	39.6	5	2.0	60	24.5	14	5.7	2.41
There are enough computers in the computer laboratories	56	22.9	135	55.1	5	2.0	43	17.6	6	2.4	2.22

N=245

Findings show that 51.4% of the teachers; disagreed that their school has adequate textbooks (m=1.92).44.1% agreed that the learners are congested in classrooms (m=3.74).42% agreed that there is a library in the school (m=3.49). 41.6% disagreed that their school has adequate laboratories (m=2.34). 38.4% strongly disagreed that learners get the textbooks they need in the school library (m=2.33). 38.8% disagreed that the school had enough classrooms (m=2.44).33.9% agreed that there are clean and well-aerated classrooms (m=3.41).39.6% disagreed that there are adequate teaching and learning facilities for the teachers (m=2.41). 55.1% disagreed that there are enough computers in the computer laboratories (m=2.22).

The teachers concur with the principals regarding the learning environment. The teachers also opined that the teaching and learning facilities need to be improved, which also hinders teaching and learning. With adequate teaching and learning resources, the teaching process is positively affected. Teachers also need facilities like a laboratory to carry out practicals, particularly for science subjects. Findings support Earthman (2002), who found that good resources support educational endeavors. Secondary schools with enough facilities create a humble and conducive environment for teaching and learning. In addition, Lizzio et al. (2002), found that a favorable school learning environment influences students' academic performance.

Table 4.8: Students' Responses on Learning Environment

Statements on learning environment	Strongly Disagree		Disagree		Not Sure		Agree		Strongly Agree		Mean
	F	%	F	%	F	%	F	%	F	%	
Learners are congested in the classrooms	118	30.3	120	30.8	39	10.0	40	10.3	73	18.7	3.63
There is a Library in your school	125	32.1	200	51.3	21	5.4	17	4.4	27	6.9	3.97
There are adequate laboratories in your school	81	20.8	64	16.4	30	7.7	174	44.6	41	10.5	2.34
Learners find all the textbook in the library	73	18.7	62	15.9	33	8.5	156	40.0	66	16.9	2.38
The school has laboratories with enough apparatus	42	10.8	73	18.7	59	15.1	129	33.1	87	22.3	2.06
Teachers have the required and sufficient teaching aids	73	18.7	153	39.2	32	8.2	34	8.7	98	25.1	2.52
The computer lab is well equipped	95	24.4	173	44.4	20	5.1	30	7.7	72	18.5	2.43

N=245

Findings show 30.8% of the students, disagreed that they are congested in the classrooms (m=3.63). 51.3% disagreed that there is a library in their school (m=3.97), and 44.6% agreed that there are adequate laboratories. (m=2.34).40% agreed that they

find all the textbooks in the library (m=2.38).33.1% agreed that the school has laboratories with more apparatus (m=2.06). 39.2% disagreed that teachers have the required and sufficient teaching aids (m=2.52), and 44.4% of the students disagreed that the computer lab is well equipped (m=2.53). Results show that the students echo the teachers' and principals' perceptions that inadequate teaching and learning facilities and physical facilities characterize the school environment. Such an environment hinders effective teaching and learning and eventually affects students' academic performance. Findings concur with Crosnoe et al. (2004), that inadequate classrooms that do not match the learners' population lead to poor academic performance, and adequate resources help enhance the student's academic performance.

Table 4.9: ANOVA Results for Learning Environment and Students Performance

		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Learning environment	Between Groups	59.002	4	14.750	14.000	.000
	Within Groups	246.538	234	1.054		
	Total	**305.540**	**238**			

Table 4.9 shows that ANOVA (F (4,234) = 14.000, p = .000). The p<0.05 implies that there is a statistically significant relationship between the learning environment and students' performance; this implies that students' performance is affected by the school environment. A good learning environment will result in high academic achievement, while a poor environment will result in poor academic achievement. Findings concur with Kilei (2012), who found that adequate learning resources and

materials in the teaching and learning surroundings are vital aspects that lead to effective learning.

Findings encourages educational planners and the Ministry of Education to engage, principals, teachers, parents, and the community at the initial stages of planning to ensure the availability of adequate learning resources. Moreover, the Ministry of Education and educational planners should provide guidelines for monitoring and evaluating public secondary schools learning environment and invent strategies for improving the learning environment for better academic achievements.

4.6 Students' - Teacher Ratio and Academic Achievements

The third objective examined the relationship between students - teacher ratio and students' academic achievements in public secondary schools in Machakos County. The principals and teachers were asked to indicate the number of students in a class. Findings are presented in Table 4.10

Table 4.10: Number of Learners in a Class

	Principals		**Teachers**	
Number of Learners in a Class	**Frequency**	**Percentage**	**Frequency**	**Percentage**
20-29	1	5.3	32	13.1
40-49	13	68.4	124	50.6
50-59	5	26.3	60	24.5
75 and above			29	11.8
Total	**19**	**100**	**245**	**100**

Findings show that more than half of the principals (68%) and teachers (50.6%) opine that the classes have 40-49 students. The teacher-pupil ratio in most public schools is above the recommended 40:1 ratio by the TSC. The classrooms are congested, which

could be hard to manage, particularly regarding students' discipline, checking students' notes and assignments, and marking exams. Large classroom sizes are known for increasing learners' disruptive behavior and inattention, which duty teachers more and results in poor learner academic outcomes. Therefore, teachers in such schools do not focus more on the needs of individual students, particularly slow learners; hence their performance continues to deteriorate. The educational planners in schools should plan effectively to handle slow learners in a big class. Findings concur with Yusuf, Onifade, and Bello's (2016) reports that classroom sizes could negatively impact the learners' general behavior, attitude, and learning academic results. Teachers were further asked whether the teacher-student ratio affects academic achievement. Findings are shown in Table 4.11.

Table 4.11: Responses on whether TSR affect Academic Achievement

Responses	**Frequency**	**Percentage**
Yes	243	99.2
No	2	0.8
Total	**245**	**100**

Findings show that nearly all (99.2%) teachers opined that the teacher-student ratio affects academic achievement. As shown in Table 4.12, the student-teacher ratio results in the inability to check books for every student, poor student supervision during group work, lack of physical contact between teachers and students, teachers' work overload, time wastage, and inability to assess students' performance frequently. Findings agree with Shah and Inamullah (2012) that overcrowded classrooms affect learning. The teachers encounter several problems, such as behavioral problems, discipline, and poor performance of learners**.**

Table 4.12: Effect of Student-Teacher Ratio on Students' Academic Achievement

Effect of Student-Teacher Ratio	Frequency	Percentage
Teachers are not able to check students' books	196	80.0
Poor students' supervision during group discussions	180	73.5
A lot of time used in solving indiscipline cases	145	59.2
Lack of physical contact between teachers and students	139	56.7
Teachers are overworked in terms of lessons taught	135	55.1
A lot of time used in other duties apart from academics	130	53.0
Teachers are not able to assess students frequently	115	47.0

N=245

Table 4.13: ANOVA Results for Student-Teacher Ratio and Students Performance

		Sum of Squares	df	Mean Square	F	Sig
Student –Teacher Ratio	Between Groups	3.538	4	.884	.693	.597
	Within Groups	305.020	239	1.276		
	Total	**308.557**	**243**			

Table 4.13 shows that ANOVA (F (4,239) = 0.693, p = .597). The p>0.05 implies no statistically significant relationship between the student-teacher ratio and students' performance. The student–teacher ratio does not affect students' performance; although there could be a high student ratio and few teachers, the students try to use the available teachers well. Findings could also imply that the few teachers in the school are very committed to their work and use their spare time to attend students; hence the teaching staff gap does not significantly affect students. Findings support Verwimp (1999), who found an insignificant relationship between the quality of teaching and the learner-teacher ratio. Additionally, Ijaiya (1999) found a weak relationship between teacher adequacy and quality education. Findings advocate that educational planners with the government to take into account the availability of secondary school's teachers and plan for the teachers needs analysis in different regions. To ensure equitable distribution of teachers in the policy formulation in all regions.

4.7 Teacher Experience and Academic Achievements

The fourth objective sought to determine the relationship between teachers' years of experience and students' academic achievements in public secondary schools in

Machakos County. The principals, teachers and students were asked to tick the extent to which various teacher factors affect students' academic achievement. Findings are presented in Tables 4.14 and 4.15.

Table 4.14: Principals' Response on Factors Associated with Teachers

Factors associated with teachers	No extent		Low extent		Moderate extent		Great extent		Very great extent		Mean
	F	%	F	%	F	%	F	%	F	%	
Teacher's qualification	0	0	0	0	5	26.3	8	42.1	6	31.6	4.05
Teachers' year of experience	0	0	0	0	1	5.3	3	15.8	15	78.9	3.74
Teachers' workload	0	0	0	0	1	5.3	1	5.3	17	89.5	3.84
Opportunities for career development	1	5.3	0	0	6	31.6	12	63.2	0	0	3.53

N=19

Findings show that 42.1% of the principals indicated that; teachers' qualification affects students' academic achievement to a great extent (m=4.05). Teachers' year of experience affects students' academic achievement to a very great extent (m=3.74) 78.9%, teachers' workload affects students' academic achievement to a very great extent (m=3.84) 89.5%, and opportunities for career development affect students' academic achievement to a great extent (m=3.53) 63.2%. The teacher factors affect students' performance. Qualified teachers deliver the curriculum effectively using various methodologies. Experience equips teachers with skills of content mastery and classroom management; workload may contribute to teacher stress, and career

development allows the teacher to develop professionally and learn better teaching methods that may enhance students' performance. Findings support Rice and Wong et al. (2010), who asserted that teaching could lead to the acquisition of the required necessary skills, the productivity of good results, and improved teachers' knowledge. The finding also concurs with Kiamba (2018) that teacher competency helps the teacher adopt suitable teaching methods and allows teachers to clear up misconceptions and hard concepts to students, enabling them to improve their performance. Therefore, to improve students' performance, teachers must be competent in assessing students and preparing professional records and subject matter.

Table 4.15: Teachers' Responses on Factors Associated with Teachers

Factors associated with teachers	No extent		Low extent		Moderate extent		Great extent		Very great extent		Mean
	F	%	F	%	F	%	F	%	F	%	
Teacher's qualification	1	0.4	0	0	0	0	155	63.2	89	36.3	4.36
Teachers' year of experience	1	0.4	0	0	0	0	170	65.4	74	30.2	4.30
Teachers' workload	1	0.4	0	0	0	0	176	71.8	68	27.8	4.27
Opportunities for career development	1	0.4	1	0.4	0	0	170	69.4	73	29.8	4.28

N=245

Findings show that 63.2% of the teachers indicated that; teachers' qualifications affect students' academic achievement to a great extent (m=4.36). Teachers' years of experience affect students' academic achievement to a great extent (m=4.30) 65.4%, teachers' workload affects students' academic achievement to a great extent (m=4.27)

71.8%, and opportunities for career development affect students' academic achievement to a very great extent (m=4.28) 69.4%. The teachers concur with the principals that teacher factors such as teacher qualification, teacher experience, work overload, and development opportunities affect students' academic achievement to a great extent. Findings concur with Hariss and Sass (2008) that the working experience in the teaching experience has an important impact on student's academic performance. Odumbe, Simatwa, and Ayodo (2015) also asserted that a long teaching experience among teachers improves the learners' academic performance. Teachers were asked to indicate the years since they attended the last professional seminar/ workshop. The findings are presented in Table 4.16.

Table 4.16: Teachers' Responses on Professional Development

Number of years	Frequency	Percentage
0-2 years	10	4.1
3-5 years	195	79.6
5 years and above	40	16.3
Total	**245**	**100**

Findings show that 79.6% of the teachers had attended training more than three years ago. Teachers rarely attend seminars/workshops, which may be due to tight working schedules. The frequency at which the teacher service commission organizes workshops and seminars could be more satisfactory. Only a few teachers are recommended to participate in the workshops and seminars per school. Increasing the frequency would ensure that many teachers can participate in the workshops and seminars. Findings concur with Nasseri (2019), who suggested continuous training to enrich peoples' skills for the productive performance of tasks.

The teacher workload is related to the number of lessons they teach per week. Teachers were therefore asked the average number of lessons they taught per week. The findings are presented in Table 4.17.

Table 4.17: Teachers' Responses on Average number of lessons per week

Average number of lessons per week	Frequency	Percentage
15 and below	10	4.1
16-25	35	14.3
26-25	117	47.7
36 and above	83	33.9
Total	**245**	**100**

Results show that most teachers teach more than 26 lessons weekly (81.6%). An indication that the teachers work for more than 16 hours per week. Findings may imply that teachers are dedicated to their work and work for many hours to cover the syllabus on time. However, while this may enhance students' academic performance, it may also lead to burnout. Planners in schools should plan effectively so as to ensure proper distribution of lessons to ensure good performance of teachers. Findings align with Adika and Sika (2019), who indicated that teachers with maximum weekly lessons complete the syllabus by the end of term three and greatly influence students' academic achievement.

Table 4.18: ANOVA Results for teachers' experience and Students performance

		Sum of Squares	df	Mean Square	F	Sig
Teacher Experience	Between Groups	20.091	3	6.697	5.599	.001
	Within Groups	287.069	240	1.196		
	Total	**307.160**	**243**			

Table 4.18 shows that ANOVA (F (3,240) = 5.599, p = .000). The p<0.05 implies a statistically significant relationship between teacher experience and students' performance. An indication that students' performance is affected by the teacher's experience. Experienced teachers have better teaching methods, class management practices, and content mastery. Therefore, they can clarify concepts and deliver the curriculum effectively. Findings concur with Harris and Saass (2007) that students whose teachers have minimal teaching experience register poor academic results in their national examinations compared with students taught by teachers with more years of experience in the profession. Aina and Olanipekun (2015) also found that subject matter knowledge, academic qualification, professional development, and teaching experience are crucial and significantly related to students' academic achievement. Findings encourages the educational planners with the Ministry of Education to ensure efficiency in schools, based on teachers' skills and knowledge for optimum student learning because teachers play a critical role in educating learners and ensuring better academic achievements. Plans should be incorporated where teachers with more experience and high performance should be promoted to boost their morale in the classroom. Moreover, plan for mentorship programs between the more experienced teachers and the less experienced teachers.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the study, conclusion, and recommendations. The chapter also offers suggestions for further studies.

5.2 Summary of the Study

This study sought to establish the determinants of students' academic achievements in public secondary schools in Machakos County. This study sought to establish whether students' entry behavior, the learning environment, the student's teacher ratio, and the Teacher's years of experience play any key role in students' academic achievements in public secondary schools in Machakos County. The researcher adopted a descriptive survey research design. The study's target population was 369 principals, 4,267 teachers, and 115,132 students.

The researcher used purposive and stratified sampling techniques to extract the actual sample size for the study. The sample size was 37 schools; hence 37 principals, 390 teachers, and 397 students. Questionnaires collected data from the teachers, students, and principals. The researcher analyzed Qualitative data by organizing them thematically according to the objectives and labeled the themes for distinction.

On the other hand, quantitative data were analyzed with the help of Statistical Package of Social Sciences (SPSS) Version 28, applying descriptive statistics of mean, mode, and standard deviation from the research findings and conclusions. A correlation coefficient was obtained for the questionnaire's reliability. The supervisor from the department of Education of Machakos University ascertained the validity of the instruments. Quantitative data was collected using the questionnaires and were analyzed using descriptive statistics like frequencies and percentages.

Concerning objective one, findings show no statistically significant relationship between students' entry-level and performance (p = .863). Most principals indicated that the entry marks for their form one student were between 251-300. The principals further agreed that subsidized secondary education affects secondary school students' entry grades. Subsidized secondary education leads to high enrollment in secondary schools, class overcrowding, and constrained teaching and learning resources.

Objective two findings show a statistically significant relationship between learning environment and students' performance (p = .000). Findings show that most schools have inadequate textbooks, unequipped libraries and laboratories, and inadequate physical facilities (laboratories, libraries, computer rooms, classrooms). With adequate teaching and learning resources, the teaching process is positively affected. Teachers also need facilities like a laboratory to carry out practical's, particularly for science subjects.

Regarding objective three, findings show no statistically significant relationship between the student-teacher ratio and students' performance (p = .597). The teacher-pupil ratio in most public schools is above the recommended 40:1 ratio by the TSC. The classrooms are congested, which could be hard to manage, particularly regarding students' discipline, checking students' notes and assignments, and marking exams. Large classroom sizes are known for increasing learners' disruptive behavior and inattention, which duty teachers more and results in poor learner academic outcomes. A high teacher-student ratio results in the inability to check books for every student, poor student supervision during group work, lack of physical contact between teachers and students, teachers' work overload, time wastage, and inability to assess students' performance frequently.

The results of objective four show a statistically significant relationship between teacher experience and students' performance ($p = .000$). Teachers' qualifications, years of experience, workload, and career development opportunities affect students' academic achievement to a great extent. Most teachers had attended training more than three years ago, meaning that the teachers rarely attend seminars/workshops, which may be due to tight working schedules. Teachers feel that the Teachers Service Commission's frequency of organizing workshops and seminars could be better. Most teachers teach more than 26 lessons weekly, and though this may enhance students' academic performance; it may also lead to burnout.

5.3 Conclusions

Students' academic achievement is affected by teachers' years of experience, teachers' workload, and opportunities for career development, Teacher’s mastery of the subject matter knowledge, academic qualification, professional development, and year of teaching experience are crucial and significantly related to students' academic achievement. The learning environment could be better characterized by adequate school facilities and teaching and learning resources. Although some schools have a laboratory, they need to be better equipped and enough for the students. There is also a need for more textbooks in libraries. Inadequate physical facilities characterize the school environment. Such an environment hinders effective teaching and learning and eventually affects students' academic performance. Students' entry grades do not significantly influence academic achievement. Some students who enter secondary schools with low marks may also perform poorly in secondary school, while others perform very well. Similarly, some students enter secondary schools with high marks but perform poorly in secondary schools.

The study established that the Teacher-student ratio is high. The schools need more teachers, resulting in a heavy teacher workload. The teachers also spend quality time marking exams and assignments, and they may get tired and give marks that a student does not deserve. The high teacher-student ratio also means that the teachers handle many weekly lessons and may face class management challenges, particularly in discipline management. The number of students attended to by one teacher affects students' performance. The larger the class, the more demanding the class is, and the individual needs and interests of learners' especially slow ones, need to be adequately attended. Teachers are not satisfied with professional development, which helps teachers to improve on various skills like classroom management, students discipline management, proper use of teaching aids, student's assessment, content delivery, and teaching methodology. Online learning may help teachers who need more time to study physically in class, but this may be challenged by internet availability in the school compound. In-service training is rarely conducted, which denies teachers the chance to develop professionally.

5.4 Recommendations

The governments should plan to provide all the necessary teaching and learning resources and ensure that the secondary schools' infrastructure and other learning and teaching facilities are provided. Since the study findings reveal that the learning environment has significantly affected students' performance, the government should continue improving the learning environment. With the help of stakeholders, the schools' administration should build extra classrooms and laboratories with equipment and improve classroom conditions and teaching facilities to facilitate easy teaching-learning processes. TSC should allocate more teachers in schools with a high population to reduce teachers' workload and to facilitate the individual attention of

weak learners, which could help the students to improve their grades. More teachers would also significantly reduce teachers' workload; improve teacher motivation and job performance.

In conjunction with TSC, the ministry of education should plan to improve the frequency of organizing workshops/seminars and in-service training for teachers. They should also plan professional development programs during school holidays to ensure that many teachers attend. All teachers should be given equal chances to participate in training regardless of their subject. The ministry should also plan to support teachers who wish to further their studies by giving them incentives if they enroll in public universities. Academic experience is essential in improving teachers' classroom instructional skills and students' academic experience.

5.5 Suggestion for Further Research

i. A comparative study of determinants of students' academic achievement in public secondary schools in Machakos County and another County.
ii. A study of school and home-based factors affecting students' academic achievement.
iii. The determinants of students' academic achievements in private schools in Machakos County.

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APPENDICES

APPENDIX I: Introduction Letter

Machakos University

P.O. BOX 136 – 90100

Cell phone: 0721561906

To …….

Dear Sir or Madam,

REF: REQUEST FOR PARTICIPATION IN RESEARCH STUDY

I am a post graduate student in the school of education at Machakos University. My area of specialization is educational planning. I am currently undertaking a research study on determinants of students' academic achievement in public secondary schools in Machakos County. I kindly request that you spare some of your time and complete the enclosed questionnaire as per the instructions given. Note that any information you give will be treated as strictly confidential and shall only be utilized for academic purposes of this research. You may not write your name anywhere on the questionnaire. Your timely response will be highly appreciated.

Yours faithfully,

Njoroge Elizabeth Njoki

APPENDIX II: Questionnaire for School Principals

Research tool designed to gather data for academic study is one of the requirements for the award of a Master of Education degree in Educational Planning from Machakos University. The research will determine the determinants of students' academic achievements in public secondary schools in Machakos County. The information provided will be confidential.

Section A: Bio Data

Please tick in the brackets appropriately.

1. Your gender: Male ( ) Female ( )

2. Tick the age bracket below

24 years and below ( ) 25 – 35 ( ) 35 – 45 ( ) 46 – 55 ( )56years and above ( )

3. Please indicate the number of years you have served as a principal

4 years and below ( ) 5 - 9 years ( ) 10 to 14 years ( ) 16 years and above ( )

4. For how long have you served as a principal in the current station?

5 years and below ( ) 6 - 10 years ( ) 11 - 15 years ( ) 16 years and above ( )

5. What is your highest qualification?

P1 ( ) Diploma ( ) Degree ( ) Master's Degree ( ) PhD degree ( )

Section B: Learning environment

7. Please tick where appropriate as per your level of agreement with respect to learning resources allocation in your school.

SA – Strongly Agree, A – Agree, N – Neutral, D – Disagree, SD – Strongly Disagree.

Learning Environment	SA	A	N	D	SD
(a) The learners have adequate text books					
(b) There is learner's congestion in the classrooms					
(c) There is a well-equipped library in the school.					
(d) The laboratories are enough in the school					
(e) All textbooks needed by learners are found in the library.					
(f) Facilities like laboratories and classrooms are adequately equipped.					
(g) The classrooms are clean and well aerated.					
(h) The school has adequate teaching materials.					
(i) There are enough computers in the computer laboratory					

SECTION C: The factors associated with the teachers.

8. Kindly tick appropriately concerning the teacher associated factors on student academic achievement. Great Extent (GE) Moderate extent (ME) Neutral(N) Small Extent (SE) No extent at all (NE)

Teacher's related factors	GE	ME	N	SE	NE
Teacher's qualification					
Teachers' year of experience					
Teachers' workload					
Opportunities for career development					

Section D: Students' entry Grade

1. Please indicate the number of form streams in your school…….

2. Please tick the range of the number of learners in your class 20—29 ( ) 30—39( ) 40—49 ( ) 50— 59 ( ) 60 and above ( )

3. Please tick where appropriate as per the examples, the effect of subsidized secondary education on entry marks and the learning institution.

a. poor enrollment marks ( ) b. Poor need for secondary education ( ) c. Any other (give reason) .....

7. (a) Please tick the entry mark for your learners 100—149 ( ) 150—199 ( ) 200—249 ( ) 250—299 ( ) 300—349 ( ) 350 and above ( )

(b) In your thinking, did the FSE introduction affect KCPE entry marks of learners in your institution Yes ( ) No ( )

(c) with reference to the part (b), if your opinion is ‘yes’ kindly elaborate shortly your response?.....

.....

(8) Please indicate the effects of entry marks influenced by Free Secondary Education to your learning institution …….

Thanks for finding time to respond to this research instrument.

APPENDIX: III: Teachers' Questionnaire

Introduction.

The researcher seeks to collect data on the Determinants of students' academic achievement in public secondary schools in Machakos County. The respondent responses will be confidential for academic research purposes.

Part A: Please tick where applicable

1. Gender? Male ( ) Female ( )

2. Please indicate the range of your age.

Below 25 ( ) 26 – 34 ( ) 35 – 44 ( ) 45– 54 ( )

Above 55 ( )

3. For how long have you been a secondary school teacher?

Below 5 years ( ) 6 to 10 years ( ) 11 to 15 years ( )

Above 16 years ( )

4. Kindly tick your highest level of your education : Certificate ( ) Diploma ( ) Bachelor's Degree ( ) Master's Degree ( ) PhD ( )

5. Did you train as a teacher? Yes ( ) No ( ) If no, kindly justify the area of specialization ----------

Part B: Factors associated with a teacher.

6. Indicate the number of years since you attended the last professional seminar or workshop.

a) 0 – 2 years ( ) (b) 3 – 5 years ( ) (c) 5 years and above ( )

7. Please tick the number of lessons on average per week. 15 and below ( ) 16 to 25 ( ) 26 to 35 ( ) 36 and above ( )

8. Please tick accordingly in the table below on how teacher related factors affect the students' academic performance in your school.

Great extent (GE), Moderate extent (ME), Neutral (N), Small Extent (SE), No extent at all (NE)

Teacher's related factors	GE	ME	N	SE	NE
Teacher's qualification					
Teachers' year of experience					
Teachers' workload					
Opportunities for career development					

Part C: Teaching and Learning environment

9. Please tick appropriately the extent of agreement with respect to learning Resources in your school.

Strongly Agree SA, Agree-A, Neutral-A, Disagree-D, Strongly Disagree-SD.

Learning Environment	SA	A	N	D	SD
(a) Your school has adequate textbooks					
(b) The learners are congested in classrooms					
(c) There is a library in your school					
(d) There are adequate laboratories in your school.					
(e) Learners get the textbooks they need in the school library.					
(f) The school has availed enough laboratories and classrooms.					
(g) There are clean and well aerated classrooms.					
(h) There are adequate teaching and learning facilities for the teachers.					
(i) There are enough computers in the computer laboratories					

PART D

9 Indicate the approximate number of students in your class

Less than 30 ……

30 – 45 …….

45 – 60 ……

60 – 75 ……

75 and above ……..

10 Kindly tick appropriately against the area in which student's - teacher ratio affect students' academic achievement in your school.

Teachers are overworked in terms of lessons taught …….

Lack of physical contact between teachers and students …….

A lot of time used in other duties apart from academics …….

A lot of time used in solving indiscipline cases …….

Teachers are not able to give many exams within a term ……

11 Approximately what is the workload of teachers per week ……

12 In your opinion do you think teacher - student ratio affect academic achievement

Yes …… No ……

If yes kindly explain how ……

Thanks for finding time to fill this research tool.

APPENDIX IV: Students' Questionnaire

The researcher seeks to collect data on the Determinants of students' academic achievement in public secondary schools in Machakos County. The respondent responses will be confidential for academic research purposes

No names will be revealed.

Part A: Bio Data

This part seeks to collect data on your personal information.

Please tick accordingly in the brackets

1. Gender: Male: ( ) Female: ( )

2. Indicate the class/form you study: ( )

3. Indicate your age ( )

4. K.C.P.E marks: 200 and less: ( ) 201-300: ( )

301-400: ( ) 401-500: ( )

5. Sat KCPE Examination in: Private school: ( ) Public school: ( )

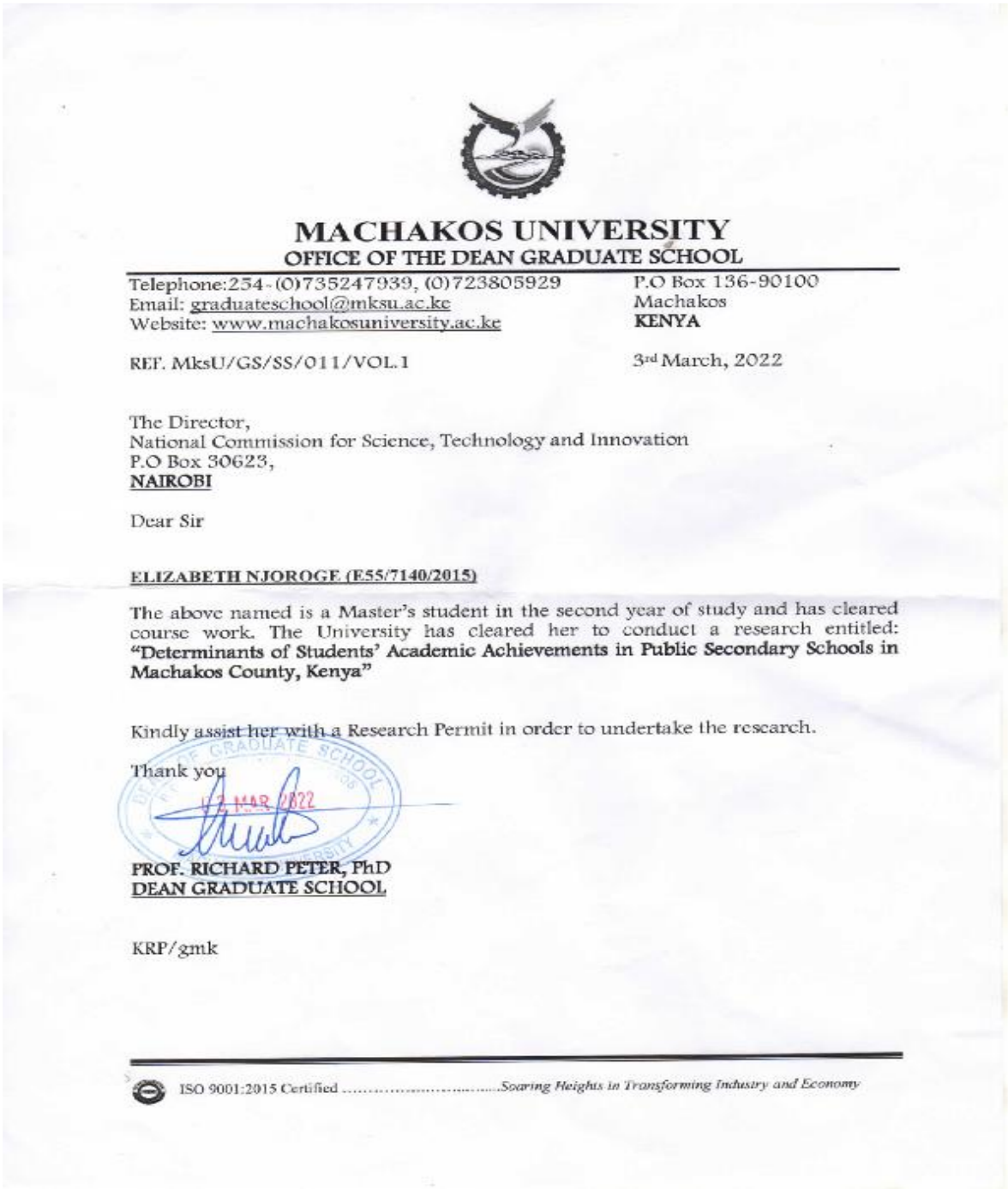
Part B: Learning environment

10. Please tick your level of agreement with respect to the following learning Resources in your school.

Strongly Agree-SA, Agree-A, Neutral-N, Disagree-D, Strongly Disagree SD.

Learning Environment	SA	A	N	D	SD
(a) Learners are congested in the classrooms.					
(b) There is a Library in your school					
(c) There are adequate laboratories in your school					
(d) Learners find all the textbooks in the library					
(e) The school has laboratories with enough apparatus and classrooms sufficiently equipped with required materials.					
Teachers have the required and sufficient teaching aids.					
The computer lab is well equipped.					

APPENDIX V: Introduction Letter from The Dean Graduate School.



MACHAKOS UNIVERSITY
OFFICE OF THE DEAN GRADUATE SCHOOL

Telephone:254-(0)735247939, (0)723805929
Email: graduateschool@mksu.ac.ke
Website: www.machakosuniversity.ac.ke

P.O Box 136-90100
Machakos
KENYA

REF. MksU/GS/SS/011/VOL.1

3rd March, 2022

The Director,
National Commission for Science, Technology and Innovation
P.O Box 30623,
NAIROBI

Dear Sir

ELIZABETH NJOROGE (E55/7140/2015)

The above named is a Master's student in the second year of study and has cleared course work. The University has cleared her to conduct a research entitled: **"Determinants of Students' Academic Achievements in Public Secondary Schools in Machakos County, Kenya"**

Kindly assist her with a Research Permit in order to undertake the research.

Thank you

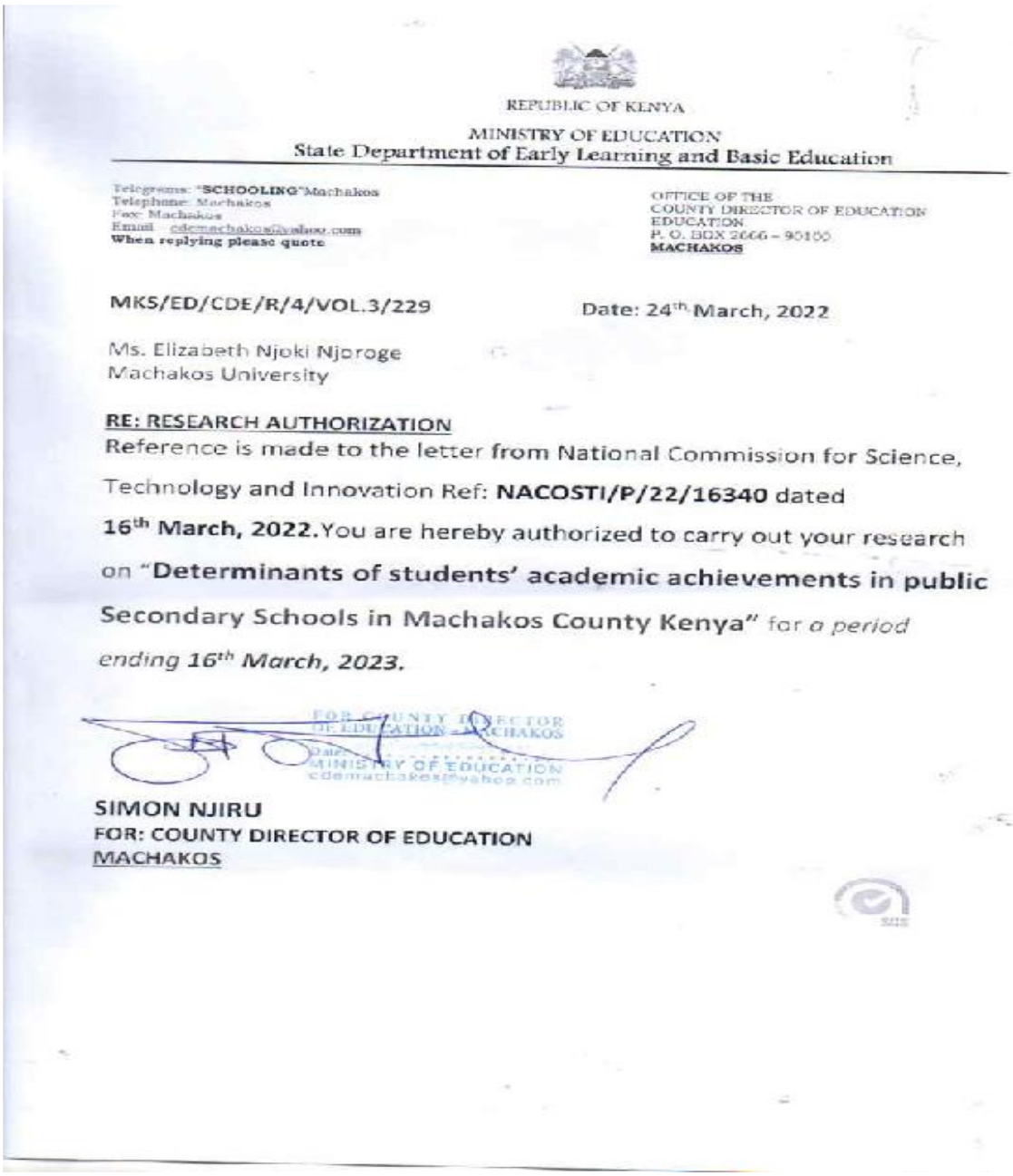
17 MAR 2022

PROF. RICHARD PETER, PhD
DEAN GRADUATE SCHOOL

KRP/gmk

ISO 9001:2015 Certified ..... *Soaring Heights in Transforming Industry and Economy*

APPENDIX VI: Authorization Letter from The County Director of Education Machakos County.



REPUBLIC OF KENYA

MINISTRY OF EDUCATION
State Department of Early Learning and Basic Education

Telegrams: "SCHOOLING"Machakos
Telephone: Machakos
Fax: Machakos
Email: cdemachakos@yahoo.com
When replying please quote

OFFICE OF THE
COUNTY DIRECTOR OF EDUCATION
EDUCATION
P. O. BOX 2666 – 90100
MACHAKOS

MKS/ED/CDE/R/4/VOL.3/229 Date: 24th March, 2022

Ms. Elizabeth Njoki Njoroge
Machakos University

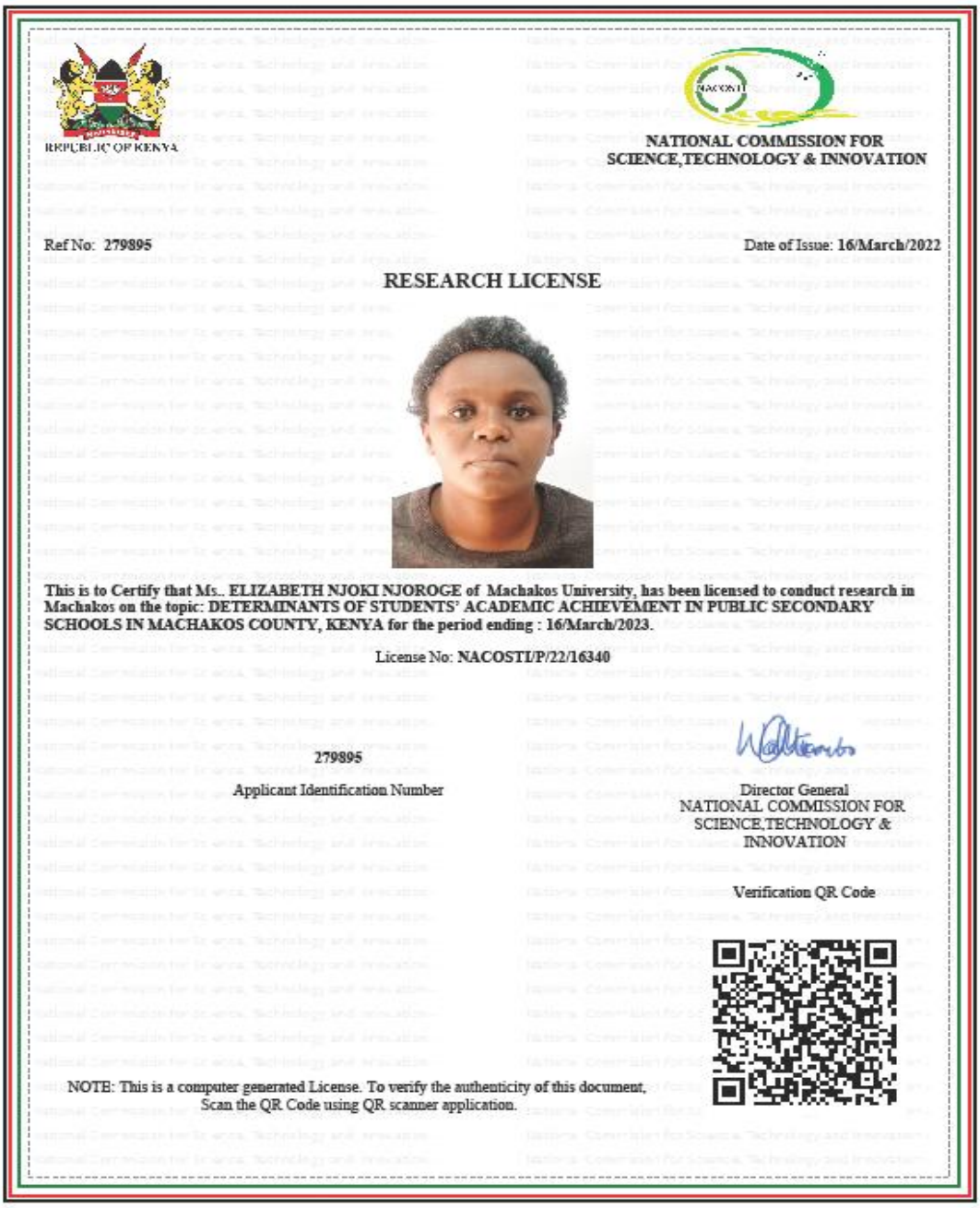
RE: RESEARCH AUTHORIZATION

Reference is made to the letter from National Commission for Science, Technology and Innovation Ref: **NACOSTI/P/22/16340** dated **16th March, 2022.** You are hereby authorized to carry out your research on **"Determinants of students' academic achievements in public Secondary Schools in Machakos County Kenya"** *for a period ending 16th March, 2023.*

FOR: COUNTY DIRECTOR OF EDUCATION MACHAKOS
Date
MINISTRY OF EDUCATION
cdemachakos@yahoo.com

SIMON NJIRU
FOR: COUNTY DIRECTOR OF EDUCATION
MACHAKOS

APPENDIX VII: Research Permit



REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **279895**

Date of Issue: **16/March/2022**

RESEARCH LICENSE

This is to Certify that Ms.. ELIZABETH NJOKI NJOROGE of Machakos University, has been licensed to conduct research in Machakos on the topic: DETERMINANTS OF STUDENTS' ACADEMIC ACHIEVEMENT IN PUBLIC SECONDARY SCHOOLS IN MACHAKOS COUNTY, KENYA for the period ending : 16/March/2023.

License No: **NACOSTI/P/22/16340**

279895

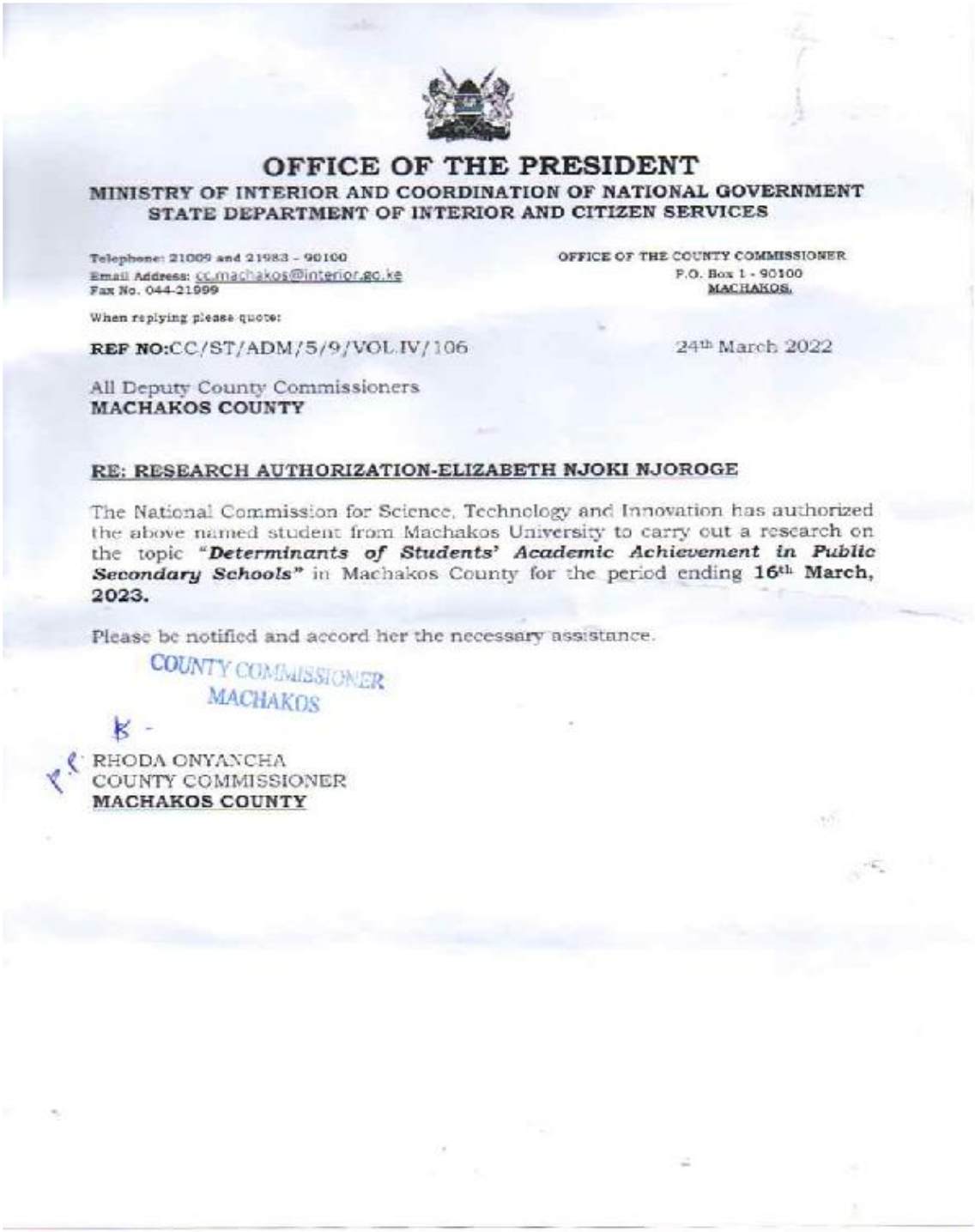
Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

APPENDIX VIII: Authorization Letter from The County Commissioner, Machakos County.



OFFICE OF THE PRESIDENT

MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT
STATE DEPARTMENT OF INTERIOR AND CITIZEN SERVICES

Telephone: 21009 and 21983 - 90100
Email Address: cc.machakos@interior.go.ke
Fax No. 044-21999

OFFICE OF THE COUNTY COMMISSIONER
P.O. Box 1 - 90100
MACHAKOS.

When replying please quote:

REF NO:CC/ST/ADM/5/9/VOL.IV/106

24th March 2022

All Deputy County Commissioners
MACHAKOS COUNTY

RE: RESEARCH AUTHORIZATION-ELIZABETH NJOKI NJOROGE

The National Commission for Science, Technology and Innovation has authorized the above named student from Machakos University to carry out a research on the topic ***"Determinants of Students' Academic Achievement in Public Secondary Schools"*** in Machakos County for the period ending **16th March, 2023.**

Please be notified and accord her the necessary assistance.

COUNTY COMMISSIONER
MACHAKOS

RHODA ONYANCHA
COUNTY COMMISSIONER
MACHAKOS COUNTY