UTILIZATION OF SELECTED INFRASTRUCTURE AND ITS INFLUENCE ON ACADEMIC PERFORMANCE IN SUB COUNTY SCHOOLS IN UASIN GISHU COUNTY, KENYA.

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2025

DECLARATION

Declaration by the Student

This thesis is my original work and has not been presented for a degree in any other University. No part of this thesis may be reproduced without the prior written permission of the author and/or University of Eldoret.

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DEDICATION

This work is dedicated to my husband Benjamin Toroitich Kibor who offered financial and moral support throughout my study. I also dedicate this work to our children Sheila Toroitich, Kevin Toroitich, Mercy Toroitich, Martha Toroitich and Scholastica Toroitich for their encouragement during my study.

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ABSTRACT

School infrastructure is a key pillar for the effective learning process in any educational institution. School infrastructure plays a crucial role in academic achievements by providing good learning environment that supports student engagement, focus and overall well-being, directly impacting their ability to learn and retain information. School infrastructure includes classrooms, laboratories, dining hall, playground, games/sports equipment, dormitories, and sanitation facilities among others. Academic performance is measured by examination and is used as the main basis for judging a student's ability and as a means of selection for educational advancement and employment. The purpose of this study was to investigate the utilization of selected infrastructure and its influence on academic performance in Sub-County schools in Uasin Gishu County, Kenya. The study was guided by four objectives; to investigate the utilization of classroom facilities and academic performance, to investigate the utilization of library facilities and academic performance, to investigate the utilization of ICT and academic performance and to investigate the utilization of co-curricular facilities on academic performance in public secondary schools in Uasin Gishu County. This study was guided by Systems Theory. Mixed methods research design was adopted. The target population of the study was 162 Principals, 972 Teachers, 17820 form four and form three students from the 162 subcounty secondary schools and 6 Quality Assurance and Standards Officers. The sample size comprised of 48 principals, 972 teachers and 1 County Quality Assurance and Standard Officer (CQASO) while the sample size of students was 384 from the 48 selected public secondary schools. Data collection instruments were questionnaires, interview schedules and observation checklists. A pilot study was carried out in five public schools in the neighboring Trans Nzoia County to check on the consistency of the instruments. Cronbach's Alpha coefficient was used to assess the internal consistency of the questionnaire and a value of 0.7 was obtained for all the variables which were within the recommended range. Descriptive statistics, including frequencies, percentages, mean, standard deviations and graphical charts were used to summarize the numerical and categorical data. Inferential analysis adopted correlational and regression analysis technique to explore the relationship between the dependent and independent variables. Qualitative data was analyzed thematically. Based on the multiple regression models, the coefficient of determination (R squared) of 0.441 showed that 44.1% of the variation in student performance was explained by the utilization of the selected school infrastructure. The classroom, library, ICT infrastructure and co-curricular infrastructural facilities significantly influenced academic performance. The study concluded that overall investment in quality school infrastructure is a vital component of ensuring effective education delivery and maximizing student academic potential. The research recommended that the County Government should develop infrastructural development initiatives to solve the inadequacy of these facilities and enhance their utilization in the schools; policymakers should ensure that all public schools receive enhanced financial resources for infrastructural development for learners and teachers to effectively utilize them to achieve good academic performance.

TABLE OF CONTENTS

DECLARATION ii
DEDICATION iii
ACKNOWLEDGEMENT iv
ABSTRACT v
TABLE OF CONTENTS vi
LIST OF TABLES xi
LIST OF FIGURES xiii
ABBREVIATIONS AND ACRONYMS xiv
CHAPTER ONE 1
INTRODUCTION 1
1.1 Background to the Study 1
1.2 Statement of the Problem 6
1.3 Purpose of the Study 7
1.4 Objectives of the Study 7
1.5 Research Questions 7
1.6 Justification of the Study 8
1.7 Significance of the Study 8
1.8 Assumptions of the Study 9
1.9 Scope and Limitation of the Study 9
1.9.1 Scope 9
1.9.2 Limitations 9
1.10 Theoretical Framework 10
1.11 Conceptual Framework 11
1.12 Operation Definition of Terms 14
CHAPTER TWO 17
LITERATURE REVIEW 17
2.1 Introduction 17
2.2. Importance of Secondary Education 17
2.3 School Infrastructure 20
2.4 Utilization of Classroom and How it Influences Academic Performance 22
2.4.1 Previous Studies Done in Kenya on Influence of Classroom Environment on Academic Performance 40

2.5 Utilization of Library Facilities and How It Influences Student Academic Performance 43
2.5.1 Literature Review from Africa on how Utilization of Library influenced Academic Performance 44
2.6 Utilization of Information and Communication Technology and how it influences Academic Performance 47
2.6.1 Utilization of ICT and how it influences Academic Performance in African Schools 50
2.7 Utilization of Co-Curricular Facilities and How It Affects Academic Performance 53
2.7.1 Utilization of Co-curricular Facilities and Its influence on Academic Performance, Studies from East Africa 58
2.8 Challenges Faced by School Administration in Establishing and Designing School Infrastructures 61
2.9 Summary of Literature Review 66
CHAPTER THREE 71
RESEARCH DESIGN AND METHODOLOGY 71
3.1 Introduction 71
3.2 Study Area 71
3.3 Research Design 72
3.3.1 The Philosophical Worldview 72
3.3.2 Mixed Method Approach 74
3.4 Target Population 75
3.5 Sample Size and Sampling Procedures 77
3.6 Research Instruments 79
3.6.1 Questionnaire 80
3.6.2 Interview Schedule 82
3.6.3 Observation Schedule 83
3.6.4 Piloting of Research Instruments 83
3.7 Validity and Reliability 84
3.7.1 Validity of Research Instruments 84
3.7.2 Reliability of Research Instruments 85
3.8 Data Collection Methods and Procedures 86
3.9 Data Analysis Techniques 87

3.10 Ethical Consideration....87
3.11 Research Field Experiences....88
3.12 Summary of Chapter Three....89
CHAPTER FOUR....90
DATA ANALYSIS, INTERPRETATION AND PRESENTATION....90
4.1 Introduction....90
4.2 General Information....90
4.3 Demographic Characteristics of respondents....91
4.3.1 Gender of the Respondents....91
4.3.2 Position Held by Respondent Teachers in the School....92
4.3.4 Age Bracket of Teachers and Principals....92
4.3.5 Age of Students....93
4.3.6 Professional Qualifications....94
4.3.7 Teaching Experience....95
4.3.8 Level of Study of Student Respondents....96
4.4 Utilization of Classroom on Students' Performance....96
4.4.1 Student Responses on Classroom Utilization....96
4.4.2 Student Responses on Classroom Spacing....101
4.4.3 Frequency of Classroom Use....106
4.4.3 Rating the Spacing of Learners' Lockers and Chairs in the Classroom....108
4.4.5 Utilization of Classroom in Relation to Students' Academic Performance....109
4.4.6 Administrative Practices in Classroom Utilization....112
4.4.7 Description on Classroom Utilization Practices....116
4.4.8 Students' Performance in Sub County Public Secondary Schools in Uasin Gishu County....120
4.4.9 Overall Influence of Infrastructural Facilities on Student Academic Performance....123
4.4.10 Relationship between Classroom Utilization and Academic Performance of Students'....125
4.4.11 Correlation Analysis between Classroom Utilization and Academic Performance....126
4.4.12 Regression Analysis on Classroom Utilization and Student Performance....127
4.4.13 Analysis of Variance on Classroom Environment and Student Performance 128

4.5 Utilization of Library Facility as a Learning Resource and Its Influence on Academic Performance....130
4.5.1 Utilization of Library Facility in the School....130
4.5.2 Accessibility of the School Library....131
4.5.3 Adequacy of Teaching /Learning Resources in the School Library....132
4.5.4 Library Services and its Influence on Students' Performance....132
4.5.5. The Library Site within the School Compound....135
4.5.6 Utilization of Reference Materials in the Library....136
4.5.7 Students Rating the Aspects of School Library....136
4.5.8 Rating Utilization of Reference Materials in School Library....137
4.5.9 Teachers Rating the Aspects of School Library....138
4.5.10 Correlation Analysis between Library Service and Student Performance....139
4.5.11 Regression Analysis on Library Services on Student Performance....140
4.5.12 ANOVA on Library Services and Student performance....140
4.6 Influence of Utilization of Computer Facilities on Students' Performance…..…140
4.6.1 Utilization of Computer Laboratory in the School....142
4.6.2 Computer Studies Lessons Taught....143
4.6.3 Computer Literacy of Teachers....143
4.6.4 Frequency of Computer Use in Teaching....144
4.6.5 ICT Integration in School....145
4.6.6 Use of Computers in Teaching/Learning Process....146
4.6.7 ICT Integration on Teaching Process....146
4.6.8 Frequency of Utilization of ICT in School Management....150
4.6.9 Influence of ICT Utilization on Academic Performance of Students....151
4.6.10 Correlation Analysis between ICT and Student Performance....152
4.6.11 Regression Analysis on ICT on Academic Performance....153
4.6.12 ANOVA on ICT and Student's Performance....153
4.7 Effective Utilization of Co- curricular Facilities on Students' Performance....154
4.7.1 Utilization of Playground for Co- Curricular Activities in the School Most....155
4.7.2 Frequency of Utilization of Playground for Co- Curricular Activities....155
4.7.3 Utilization of Co- curricular Activities in the School....156
4.7.4 Utilization of Co-Curricular Facilities....157
4.7.4 Effective Utilization of Co-Curricular Activities and Academic Performance 157
4.7.5 Participation of Students in Co-curricular Activities....158

4.7.6 Highest Level Reached in Co-curricular Activities during Competitions 161
4.7.7 Utilization of Co-Curricular Facilities and its Influence on Overall Performance 162
4.7.8 Correlation Analysis between Utilization of Co-Curricular Activities and Student Performance 163
4.7.9 Regression Analysis on Utilization of Co-Curricular Activities and Academic Performance 164
4.7.10 ANOVA on Utilization of Co-Curricular Activities and Student Performance 164
4.7.11 Multiple Regression Analysis 166
CHAPTER FIVE 168
SUMMARY, CONCLUSION AND RECOMMENDATION 168
5.1 Introduction 168
5.2 Summary of Research Findings 168
5.2.2 Utilization of Library as Teaching/Learning Resource and Its Influence on Academic performance 170
5.2.3 Utilization of Information and Communication Technology and Its Influence on Academic Performance 170
5.3 Conclusion 172
5.4 Recommendations 173
5.5 Suggestions for Further Studies 174
REFERENCES 175
APPENDICES 216
Appendix I: Letter of Introduction 216
Appendix II: Student Questionnaire 217
Appendix III: Questionnaire for Teachers 224
Appendix IV: Questionnaire of Principals 234
Appendix V: Observation Schedule/Checklist 241
Appendix VI: Interview Schedule for Quality Assurance and Standards Officer 242
Appendix VII: Research Permit 245
Appendix VIII: Introductory Letter (University of Eldoret) 246
Appendix IX: Map of Uasin Gishu 247
Appendix X: Similarity Report 248

LIST OF TABLES

Table 3.1 Target Population....77
Table 3.2 Sample Size....79
Table 4.1 Gender of Respondents....91
Table 4.2 Age Bracket of Teachers and Principals....93
Table 4.3 Professional Qualifications....95
Table 4.4 Level of Study of Student Respondents....96
Table 4.5 Student Responses on Classroom Utilization....98
Table 4.6 Student Responses on Classroom Spacing....103
Table 4.7 Frequency of Classroom Use....106
Table 4.8 Utilization of Classroom in Relation to Students' Academic Performance....110
Table 4.9 Administrative Practices in Classroom Utilization....114
Table 4.10 Description on Classroom Utilization Practices by Teachers....117
Table 4.11 Students' Performance....121
Table 4.12 Overall Influence of Infrastructural Facilities on Student Academic Performance....124
Table 4.13 Correlation Analysis Between Classroom Utilization and Academic Performance....126
Table 4.14 Model Summary on Utilization of Classroom and Student Performance 128
Table 4.15 Utilization of Classroom and Student Performance Analysis of Variance....128
Table 4.16 Library Services and Students' Performance....133
Table 4.17 Utilization of Reference Materials in the Library....136
Table 4.18 Students Rating the Aspects of School Library....137
Table 4.19 Teachers Rating the Aspects of School Library....138
Table 4.20 Correlation Analysis Between Library Service and Student Performance....139
Table 4.21 Library Services Model Summary....140
Table 4.22 ANOVA on Library Services and Student Performance....141
Table 4.23 Computer Literacy of Teachers....144
Table 4.24 Use of Computers or ICT in Learning....146

Table 4.25 ICT Integration on Teaching Process 148
Table 4.26 Frequency of ICT Utilization in School Management..... 150
Table 4.27 Correlation Analysis between ICT and Student Performance 152
Table 4.28Model Summary on ICT and Student Performance..... 153
Table 4.29 ICT and Student Performance Analysis of Variance..... 154
Table 4.30 Utilization of Playground for Co- Curricular Activities in the School.... 155
Table 4.31 Frequency of Utilization of Playground for Co- Curricular Activities.... 156
Table 4.32 Utilization of Co-curricular Activities in the School..... 156
Table 4.33 Utilization of Co-Curricular Facilities..... 157
Table 4.34 Effective Utilization of Co-curricular Activities on Academic Performance..... 158
Table 4.35 Participation of Students in Co- Curricular Activities..... 159
Table 4.36 Correlation Analysis between Utilization of Co-Curricular Activities and Student Performance 163
Table 4.37 Utilization of Co-curricular Activities Model Summary..... 164
Table 4.38 ANOVA on Utilization of Co-curricular Activities 165
Table 4.39 Overall Model Summary 166
Table 4.40 Overall ANOVA..... 167

LIST OF FIGURES

Figure 1.1 School Infrastructure and Student Performance 12
Figure 4.1 Responsibility of Teachers in the School 92
Figure 4.2 Age of Students 94
Figure 4.3 Teaching Experience 95
Figure 4.4 Rating the Spacing of Learners' Lockers and Chairs 108
Figure 4.5 Relationship between Classroom Utilization and Academic Performance 125
Figure 4.6 Utilization of Library as a Learning Resource 131
Figure 4.7 Accessibility of School Library 132
Figure 4.8 Utilization of Reference Books in School Library 137
Figure 4.9 Utilization of Computer Laboratory 142
Figure 4.10 Computer Studies Lessons Taught 143
Figure 4.11 Frequency of Computers Use in Teaching 145
Figure 4.12 ICT Integration in School 145
Figure 4.13 Influence of ICT Utilization on Academic Performance of Students 151
Figure 4.14 Influence of Co-Curricular Facilities on Overall Performance 162

ABBREVIATIONS AND ACRONYMS

CBC	Competency Based Curriculum
CBE	Curriculum Based Establishment
CQASO	County Quality Assurance and Standard Officer
ECD	Early Childhood Development
EFA	Education for All
ERSWC	Economic Recovery Strategy for Wealth and Employment Creation
FDSE	Free Day Secondary Education
FPE	Free Primary Education
GOK	Government of Kenya
HOD	Head of Department
ICT	Information and Communication Technology
KCSE	Kenya Certificate of Secondary Education
KESSP	Kenya Education Sector Support Program
KNEC	Kenya National Examination Council
L&MICs	Low- & Middle-Income Countries
M.D.Gs	Millennium Development Goals
MOE	Ministry of Education
MOEST	Ministry of Education Science and Technology
NACOSTI	National Commission for Science, Technology and Innovation
NEPAD	New Partnership to Africa Development
NESP	National Education Sector Plan
OECD	Organization for Economic Co-operation and Development
RoK	Republic of Kenya
SDG	Sustainable Development Goals
SPSS	Stastitical Package for Social Science
SSA	Sub-Sahara Africa
TSC	Teachers Service Commission
TVET	Technical and Vocational Education and Training
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Countries are constantly faced with ever-changing economic challenges and social transformations due to globalization and technological development. Education helps countries overcome these challenges by developing knowledge and high skills, allowing better opportunities and faster economic progression (OECD, 2019). In both developed and developing countries, education is a very crucial process through which an individual's life chances are determined (Makori and Onderi, 2013; Sarker, Wu and Hossin, 2019a). Educational institutions are mandated to use education as a tool for social transformation and the quality of a school is measured by the quality of grades students produce through academic performance (Biama, 2014).

The social and economic development of a country is directly linked to student academic performance. Academic performance is a threshold assessment used to measure a student's ability to meet performance criteria. Grades are used to measure learning or knowledge and attainment of learning objectives and acquisition of skills and competencies (York, Gibson & Rankin, 2015). They noted that academic failure is not only frustrating to pupils and parents; its effects are equally grave on society in terms of the death of manpower in all spheres of the economy and politics. Farombi (2018) opined that the wealth of a nation or society could determine the quality of education, emphasizing that a wealthy society would establish good schools with quality teachers, and learning infrastructures, where such students may learn with ease thus bringing about good academic achievement.

Academic performance as measured by the examination results is the aggregate score in a course or grade point average (GPA) and is one of the major goals of a school

globally (Oredein, 2016). The measure of academic performance can also be used to assess the teacher's effectiveness. Good schools are those that can groom the students well enough to achieve the set standards. This is measured by the use of students' academic performance both at the school level and nationally (Molokomphale, 2015). Arif (2017) argued that in the United States educational system, student advancement is predicated on graded performance in a series of classes. Failing to achieve passing grades has numerous additional implications during secondary school and beyond the school level. Students' academic failure is a major determinant of status attainment and adult well-being. Low-performing students are less likely to graduate from high school and less likely to go to college. This increases high school dropouts, and substantially lower adulthood wages.

Research worldwide shows that the learning environment plays a significant role in shaping students' academic outcomes. In the United Kingdom, studies indicate that physical classroom conditions can account for up to 25% of students' academic performance, with overcrowded classrooms often linked to lower achievement and diminished engagement. Despite policymakers' efforts to improve education quality, many countries still adopt partial or inconsistent strategies to enhance school infrastructure. In California, Queiroz, Sampaio, and Sampaio (2020) found that classrooms with comfortable temperatures and well-organized spaces allow students to engage more actively in discussions. Similarly, Nuggroho and Wiboro (2019) reported that schools with adequate facilities in Asia tend to produce better learning outcomes, highlighting the importance of sufficient infrastructure for effective education.

According to Nuggroho and Wiboro (2019), well-equipped educational facilities are essential for supporting lesson delivery and achieving learning goals. Insufficient infrastructure can reduce students' motivation and active participation, hindering both

cognitive and physical engagement. Schools that invest in functional libraries, laboratories, computer centers, and multipurpose spaces foster environments where students can learn more efficiently and confidently.

In Nigeria, private schools generally offer better resources than public schools, resulting in higher student performance (Ikegbusi & Adindu, 2022). Evidence shows that many students admitted to tertiary institutions including Colleges of Education, Polytechnics, and Universities come from private secondary schools with superior facilities. Nonetheless, all Nigerian secondary schools are expected to meet national educational objectives, emphasizing high academic achievement (Manafa, 2018). Otchere and Afara (2019) reported a strong correlation between the quality of school facilities and student outcomes, a view supported by Ikegbusi, Eziamaka, and Iheanacho (2021) and Alimi (2014), who emphasized that access to resources influences cognitive development, talent discovery, and the acquisition of essential academic skills. Conversely, inadequate resources hinder student success, as noted by Ikegbusi, Onwuasoanya, and Chigbo-Okeke (2016).

School facilities extend beyond basic shelter; they directly affect comfort, safety, and learning engagement (Okechukwu & Oboshi, 2021). In Ghana, public secondary schools often face shortages of libraries, teaching materials, and learning centers (Sekyere, Sekyere, & Akpalu, 2013). Limited access to modern, especially digital, resources restricts independent study and weakens academic habits. Tanzania exhibits similar challenges, where insufficient teachers and poorly resourced classrooms contribute to low student performance (Mdee & Donatha, 2015; Mosha, 2014). Efforts to implement free secondary education have been complicated by overcrowding and a lack of essential facilities, such as desks, classrooms, and staff offices (Yusuph, 2019; Saga, 2014).

In Kenya, the pattern is comparable. Simiyu (2013) found that well-stocked libraries, appropriate textbooks, and suitable classrooms significantly improve student performance in public secondary schools. Mwangi and Obiero (2019) observed that learners with disabilities particularly benefit from adequate facilities and teacher support. Likewise, Chepkonga (2017) and Gichu, Kabaara, and Njagi (2017) reported that schools with insufficient infrastructure struggle to deliver quality instruction and achieve strong learning outcomes.

Investing in school infrastructure not only enhances academic performance but also promotes higher attendance, better staff morale, and overall institutional effectiveness. In Kenya, education and training are central to national development under Vision 2030 (Ministry of Planning, National Development and Vision 2030, 2010). Secondary education equips students with knowledge and skills to contribute meaningfully to social and economic progress. Academic achievement is primarily measured through the Kenya Certificate of Secondary Education (KCSE), administered by the Kenya National Examinations Council (KNEC), with only students achieving a minimum grade of C+ qualifying for higher education (Kieti, 2017; Kigotho, 2012). Although examinations remain a key benchmark, true academic success also encompasses critical thinking, intrinsic motivation, personal values, learning habits, and strong teacher–student relationships (Lamas, 2015).

The K.C.S.E 2021 results, released by Cabinet Secretary of education on 23/4/2022 indicated that 831,026 candidates sat for 2021 examination rose up from 2020 which was 743,299. The increased number of candidatures was an indication of the Government's effort in providing education for its citizens. From the KCSE (2021) results the Cabinet Secretary made the following remarks on Citizen T.V Station *"A*

large number of candidates representing over 50% of students have scored below grade C+ (plus) and thus have not gotten a university entry. A total of

441 candidates saw their exam results withheld because of irregularities''.

(Magoha, 23/04/2022)

All parties concerned in the education sector, including parents and instructors who have a direct hand in the learning process and results, have been greatly troubled by the pupils' deteriorating performance on the KCSE Examination. A sizable fraction of students nationwide frequently have extremely low grades, are unable to advance to higher education institutions, and hence give up on their studies. Only when students successfully complete the educational cycle from primary and secondary school to institutions of higher learning can a nation achieve national growth.

The Kenyan government's introduction of educational programs such as Free Primary Education (FPE), Free Day Secondary Education (FDSE), and the 100% Transition Rate improved access, equity, academic achievement, and engagement for all students in the nation. Due to the increased demand for education in the nation brought about by these policies, new schools were established and registered (Mutuku, 2015). The majority of these schools were mixed-day initiatives started by local communities and lacked the fully developed physical infrastructure and human resources necessary for successful academic performance. As a result, even though their academic performance had been deteriorating, more applicants were submitted for the KCSE over time due to the growing number of schools. However, the researcher decided to look at the use of specific infrastructure and how it affects academic performance in Uasin Gishu County's subcounty public secondary schools because of the consistently low academic performance in these schools.

1.2 Statement of the Problem

The Government of Kenya introduced the FPE policy in 2003 and the FDSE policy in 2008, to increase access, equity and participation of all school-going children to education as it's entailed in the Basic Education Act 2013. These policies together with the 100% transition rate provided the background information in understanding the challenges faced in the education sector in the country. Kenya's Vision 2030 identifies life-long training and education as critical elements in the production of globally competitive and adaptive human resources. Currently, efforts are being made to improve student's academic performance as the main objective through education reforms and restructuring. Kenya introduced a new curriculum the Competency Based Curriculum (CBC) in 2017 to replace the 8-4-4 system of education which has been in existence for more than 30 years, to equip learners with competencies and skills.

In order to handle the increased enrollment in secondary schools, communities have established new schools as a result of FDSE, FPE, and 100% transition policies. However, these new schools have not yet fully developed their physical infrastructure, which has put a great deal of strain on the existing physical infrastructure, including classrooms, laboratories, utilities, and boarding facilities, among other things. This has resulted in inadequate use of physical infrastructure, which has affected pupils' academic performance on the National Examination, particularly the KCSE, at the nation's public secondary schools.

From studies done in primary and secondary schools to establish how infrastructure influenced the overall performance of students, it was clear that performance was influenced by many factors which included; home and school-based factors, parental level of education and income and physical facilities among others. However, the persistent posting of poor academic performance by learners in public secondary

schools prompted the researcher to investigate the utilization of selected infrastructure and its influence on academic performance in Sub-County secondary schools in Uasin Gishu County.

1.3 Purpose of the Study

The purpose of this study was to investigate the utilization of selected infrastructure and its influence on academic performance in Sub County Secondary schools in Uasin Gishu County, Kenya.

1.4 Objectives of the Study

The following are the objectives of the study:

i. To investigate how the utilization of classroom influences academic performance in Sub County secondary schools in Uasin Gishu County.
ii. To investigate how utilization of library facilities as a learning resource influenced academic performance in Sub County secondary schools in Uasin Gishu County.
iii. To investigate how the utilization of information and communication technology as a teaching and learning resource influenced academic performance in Sub County secondary schools in Uasin Gishu County.
iv. To examine how utilization of Co-curricular facilities influences academic performance in Sub County secondary schools in Uasin Gishu County.

1.5 Research Questions

The research was guided by the following questions:

i. How does utilization of classroom influenced academic performance in Sub County secondary schools in Uasin Gishu County?

ii. How does utilization of the library facility as a learning resource influenced academic performance in Sub County secondary schools in Uasin Gishu County?

iii. How does utilization of information and communication technology as a teaching/learning resource influenced academic performance in Sub County secondary schools in Uasin Gishu County?

iv. How does utilization of Co-curricular facilities influence academic performance in Sub County secondary schools in Uasin Gishu County?

1.6 Justification of the Study

According to Yusup (2019), school infrastructure enables students to study in comfort, enhances academic achievement, and makes it easier for instructors and students to participate in the teaching and learning process. Secondary education leavers are generally expected to have acquired lifelong skills and be more competitive in terms of their employability in the global job market. Therefore, even while the government funds the construction of infrastructure to provide access to education for all of its residents, the low academic achievement of students after secondary school has significant ramifications for the nation's economic development. This study was significant because it aimed to determine how academic performance in public secondary schools was affected by the use of certain school facilities.

1.7 Significance of the Study

The results of the study might help the Uasin Gishu County Government make sure that all public schools purchased and used learning materials to boost student performance. Additionally, the findings might be helpful to Ministry of Education educational planners, policymakers, and educational managers who are in charge of creating policies and organizing the physical infrastructure of learning instructions to guarantee

that schools have the resources they need. The knowledge produced by this study was beneficial to both teachers and students, particularly with regard to the use of school facilities and how it affects academic achievement.

1.8 Assumptions of the Study

The following assumptions were made:

i. Respondents would give genuine, truthful and honest responses to the questionnaire
ii. Secondary school students were to make responsible judgment about the existing infrastructural facilities within their schools.

1.9 Scope and Limitation of the Study

1.9.1 Scope

Out of 162 schools in the same category in Uasin Gishu County, 48 Sub-County public secondary schools were the subject of the study. In order to determine how use of specific infrastructure affected academic performance in sub-county secondary schools, the study took into account the opinions of principals, instructors of Form Four and Form Three classes, and students of Form Four and Form Three. The study only looked at a few chosen school amenities and infrastructure and how they affected students' academic performance.

1.9.2 Limitations

i. To start, this study employed both qualitative and quantitative methods, and as the data was self-reported, it was challenging for the researcher to regulate the respondents' views, which may have affected the reliability and validity of their answers. The researcher did, however, reassure the participants that the data would only be utilized for scholarly study. Additionally, this restriction was

lessened by using an observation checklist, which assisted in confirming some of the respondents' answers.

ii. Second, because of fear of being victimized, research participants might not provide the requested information. In order to solve this issue, the researcher approached them in a professional manner and gave them the assurance that their name would remain confidential and that the results would only be utilized for academic purposes.

iii. Many factors influence academic performance which cannot be controlled in this study hence a limitation

1.10 Theoretical Framework

A theoretical framework provides the foundation for explaining and organizing concepts within a study. As Kivunja (2018) notes, it serves as a structure that helps describe and support a theory. A theory itself is essentially a set of interrelated ideas and definitions that offer a systematic way of understanding phenomena by clarifying the relationships among variables.

This study applies **Systems Theory** advocated by von Bertalanffy (1968) to explain how schools' function as interconnected systems where outcomes emerge from the interaction of parts rather than isolated factors as noted by Capra (1997). Within this framework, infrastructure is treated as a vital input influencing processes like lesson delivery and resource use which then shape outputs such as student achievement as Strauss (2005) noted. The model also stresses interdependence thus showing that facilities interact with teaching methods, class size and curriculum design as noted in Checkland (1997) and Weinberg (2001) studies. Effective utilization of classrooms, libraries, labs as well as ICT centers therefore matters more than their mere presence.

Systems Theory further highlights adaptation, reminding us that schools must adjust resource use in response to changing social and policy contexts, as seen during COVID-19. Thus, the theory offers a lens for assessing how infrastructure when properly managed, strengthens other subsystems and improves educational outcomes.

Ultimately, Systems Theory provides more than a descriptive model; it serves as a diagnostic and prescriptive tool. By mapping how infrastructure use interacts with teaching, learning, and policy subsystems, educators and policymakers can identify leverage points for improvement. This systemic perspective ensures that interventions are holistic, targeting not only the physical environment but also the processes and relationships that transform infrastructure into tangible academic success.

1.11 Conceptual Framework

The conceptual framework refers to ‘an argument about why the topic one wishes to study matters, and why the means proposed to study it are appropriate and rigorous’ (Ravitch & Riggan, 2017). They further suggested that the theoretical framework be based on published, identifiable theories. Private conceptualization or theoretical constructions do not qualify, and in addition, they held that the theoretical framework resides within the conceptual framework and is not synonymous with it. Therefore, a conceptual framework helps to organize the researchers' thinking and complete investigation successfully and explains the possible connection between the variables. In this study, the utilization of physical infrastructure which included, classroom facilities, library facilities Information and communication technology facilities and cocurricular are independent variables. The dependent variable for this study was academic performance, while government policies and community participation were intervening variables.

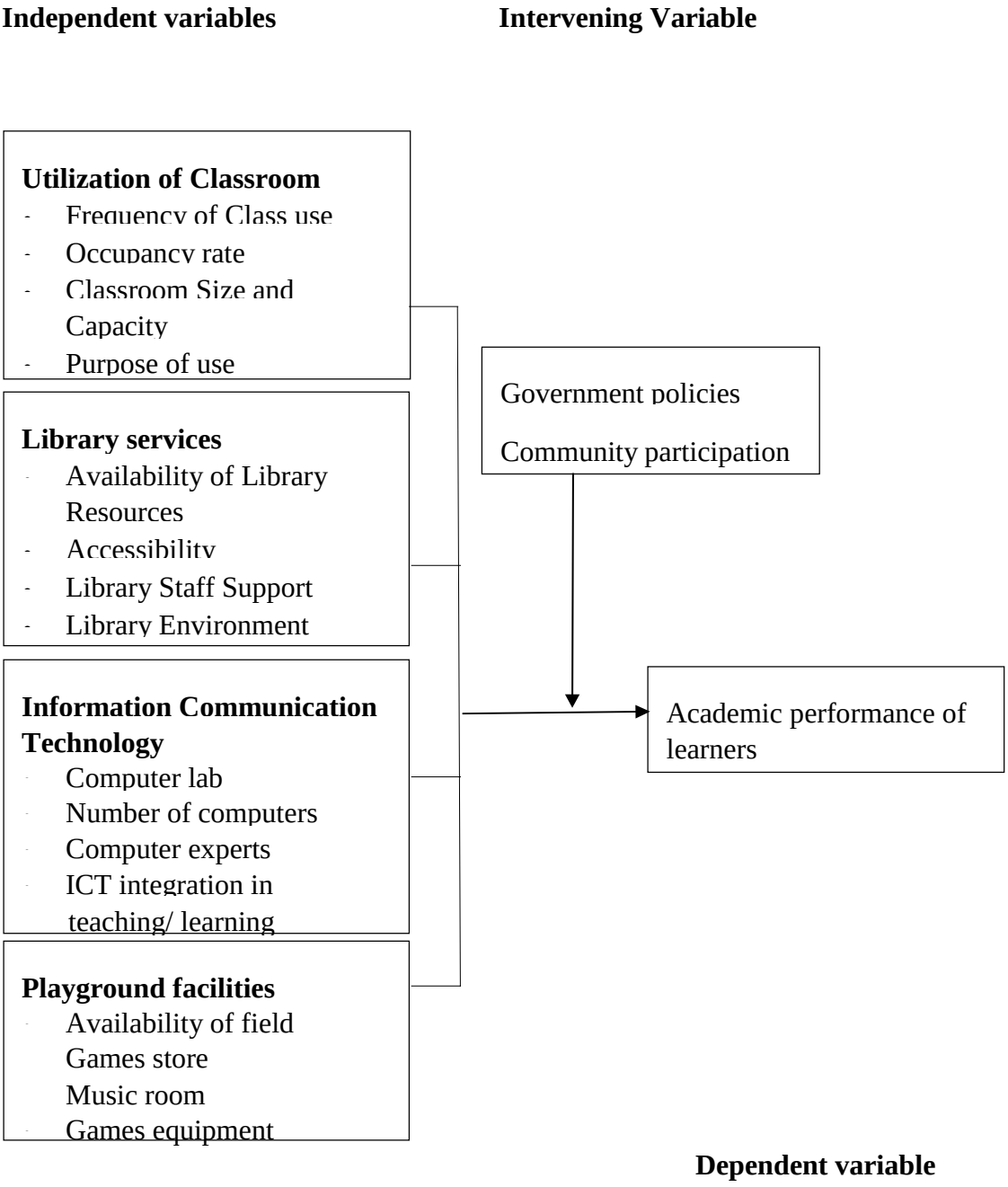

Figure 1.1 School Infrastructure and Student Performance

Source (Author, 2025)

The researcher has to comprehend the goal of a conceptual framework, which primarily highlights the connection between variables and study design, in order to create an instructive conceptual framework (Robson & McCartan, 2016). Understanding the

importance and applicability of the study, research design, data collecting techniques, and data analysis techniques that the study will employ to achieve its goals is made feasible by a conceptual framework. Additionally, as seen in Figure 1.1 above, it is a model that illustrates how the independent and intervening factors affect the dependent variable.

The representation of the relationship between utilization of selected infrastructure and academic performance in a diagram was to organize the researcher's thinking in aligning the Systems theory in support of the utilization of physical infrastructure for the academic achievements of students in public secondary schools in Uasin Gishu County. Figure 1.1 above is a conceptual framework showing the relationships between the utilization of physical infrastructure and academic performance. Therefore, the conceptual framework indicates a relationship between classroom facilities, library facilities, ICT facilities and co-curricular facilities and academic performance. The literature reviewed indicated that academic achievements were influenced by many factors which include; Learner entry behavior, socio-economic background, peer pressure among others.

The conceptual framework grouped the four selected infrastructure (independent variables) into four sub-sections namely; utilization of classroom considered aspects like the frequency of classroom, occupancy rate, classroom size and capacity and purpose of use. Utilization of library facilities considered such aspects as availability of library resources, accessibility, library staff support and library environment and librarian utilization. ICT facility considered such aspects as availability of computer lab, number of computers, computer expert and ICT integration in teaching/ learning while underutilization of co- curricular facilities aspects as; availability of field/playground, games equipment, games store and special rooms (music) were

considered. These aspects were used to investigate how they influenced academic performance.

Therefore, for good performance to be realized learners and teachers should utilize this selected infrastructure in teaching /learning process to produce quality grades that would make learner enroll in competitive courses at higher levels of education.

1.12 Operation Definition of Terms

Academic performance:	This refers to the tangible and measurable signs of a student's learning progress which includes scores from examinations and classroom assessments, active involvement in class activities and the extent to which the student achieves the intended curriculum goals.
Boarding facilities:	These are the physical structures and resources that support students living on campus, such as dormitories, dining areas and sanitation amenities designed to ensure students' comfort, safety and overall well-being during both school hours and overnight stays.
Co-curricular:	They consist of physical spaces and resources that support students' social, emotional and physical development which include sports fields, recreational halls, and indoor activity rooms, all intended to promote active participation, teamwork and overall personal growth.
Computer facility:	Information and Communication Technology (ICT) utilization involves the intentional use of digital tools, computer systems and other notable electronic resources to facilitate and improve teaching and learning processes.

Computer lab:

This is a dedicated area equipped with computers and digital resources for use by a particular group such as students in schools or colleges or visitors in public libraries where access is typically guided by clear rules to promote responsible usage and maintain the equipment in good condition.

Facility:

The school environment encompasses the overall context of an educational institution, including its physical facilities and available learning materials. It provides the conditions and resources necessary for students and teachers to engage effectively in the teaching and learning process.

Government policy: This encompasses the set of rules, regulations, and policies that guide how institutions operate and are managed within a country.

Influence:

The ability to shape or influence the growth, behavior, or development of a person or thing.

Infrastructure:

Refers to the basic systems and services that are necessary for an organization to run smoothly. This study will focus on physical facilities in the schools.

Learning facilities:

Refers to physical space and equipment that supports teaching and learning programs and they include classrooms, laboratories and libraries.

Library facilities:

In this study, library facilities include books, periodicals,
newspapers, manuscripts, films, maps, prints, documents, microform, CDs, cassettes, videotapes, DVDs, Blu-ray, Discs, e-books, audiobooks, databases, and other formats used as learning resource.

Performance:	Refers to the demonstrated ability of students to accomplish learning tasks and meet expected educational outcomes.
Physical facilities:	These are infrastructure in schools and they include administrative offices, classrooms, laboratories, libraries and workshops.
Playground:	A field that is specifically designed to be used in a school for students to carry out co-curricular activities in the sampled schools.
Sub-County Schools:	Refer to public secondary schools that primarily function as day schools, meaning students typically go home after class each day and are usually located within a similar administrative area called a sub-county; they are considered the lowest tier of public secondary schools compared to national, extra-county, and county schools.
Utilization:	Refers to the efficient use of infrastructural facilities for learners to achieve educational objectives.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, the researcher presents a review of the literature related to the study. It covers literature on the importance of secondary education, school infrastructure and secondary education in Kenya, utilization of classroom facilities, utilization of library facilities, utilization of ICT facilities, utilization of co-curricular facilities and challenges faced in establishing and designing school infrastructure. The sources of information for the literature review included Books, Journals, periodicals, magazines and the internet, education abstracts or education full texts and reference lists from books.

2.2. Importance of Secondary Education

The World Bank (2016) reported that the enrolment of secondary schools increased from year to year. This increase, which was not proportionate to the improvement of school infrastructure to accommodate the increasing numbers, led to overcrowding in the classrooms where one class had more than 74 students. In consideration of the crucial role that school infrastructure plays in achieving the desired learning outcomes, the increase in the number of students resulted in the need for additional resources: materials, informational resources, physical resources, and total textbooks per student. Arif (2017) argues that in the United States educational system, student advancement was predicated on graded performance in a series of classes. Failing to achieve passing grades has numerous additional implications during secondary school and beyond the school level. Students' academic failure was a major determinant of status attainment and adult well-being. Low-performing students were less likely to graduate from high

school and less likely to go to college. This increased high school dropouts and substantially lowers adulthood wages.

In Pakistan, Suliah and Arafat (2019) assessed headmasters' strategies to maximize infrastructure use and teachers' role in improving the quality of learning in elementary schools. The study findings indicated that headmasters used their efforts to maximize the teaching and learning processes in the classrooms but did not achieve their objective due to an insufficient number of classrooms, where classes were split by dividing study hours so that some came in the morning and others came in the evening. Challenges faced by educators as they struggle to integrate technology in the school as well as classrooms included insufficient equipment or connectivity, internet problems, poor electricity supply and inadequate teacher training or skills (Van Horne, Russell & Schuh, 2016). To facilitate quality education, there was need to consider the prevailing situations in the learning institutions and supply the required equipment related to technology.

The indicators of quality of education, as highlighted by Hassan (2016), are libraries, instructional time, homework, textbooks, teacher subject knowledge, teacher experience, laboratories, dormitories and class size. The specifications given for the establishment, management and material resources in public secondary schools were postulated in the laws and policies that govern the county's education system (Sultana Set al., 2017). Buildings, laboratories, classrooms, dining hall, and equipment- were education infrastructure. They were vital learning elements in the school environment. Kajunju (2015) observed that in Africa, there is a growing recognition among African governments of the need to invest in and expand access to secondary education and hence, quality grades. Secondary education is essential in preparing students for higher education and important life skills in South. Africa. The quality of education of learners

is encouraged to remove the intergenerational cycle of poverty so that children do not inherit the social standing of their parents or caregivers (Tamrat, 2017).

In Brazil, Jordan, Argentina, the United Arab Emirates, Uruguay, and Kazakhstan, heads of secondary schools complained that limited school facilities prevented effective utilization to a lower extent than in the OECD countries. Inadequacy of these learning resources hindered their maximum utilization and had a negative influence on learning. Therefore, effective provision of institutional learning resources enhanced students' academic performance to achieve above average (OECD, 2013). Moreover, the development of the affective and psychomotor domains is also facilitated by the presence of necessary and relevant school facilities in Malaysia (Hilary, 2017). In Nigeria, good secondary education, either from public or private schools, backed with complete Ordinary Level papers, qualifies the candidate for admission into tertiary institutions. Most parents and secondary school students aspire to have quality grades (Odukoya et al., 2018). Further, children who complete secondary education are expected to have acquired lifelong skills and be competitive in the global village when it comes to their employability (Kajunju, 2015). This therefore, calls for students to excel academically or, hopefully, perform to the satisfaction of the nation.

According to Mokaya (2013), as supported by Ngwaru and Oluga (2015), physical space and concentration do not matter, but researchers and psychologists suggest that environmental factors can increase academic performance and motivate attendance (Kapur, 2018). On the same note, Naz, Hussain, and Khan (2018), for instance, stated that overcrowded and stressful environments can affect the learning capabilities of children. Therefore, the site for educational institutions like schools is of crucial concern, as noise and temperature levels are said to negatively impact the students' ability to comprehend subject content during lessons. Physical conditions can have both

positive and negative effects on the students' all-inclusive development in terms of motivation for learning.

2.3 School Infrastructure

School infrastructure included facilities such as buildings, playgrounds, ICT devices, teaching and learning resources among others which enabled students and staff to realize the desired outcomes in the teaching and learning process (Saga, 2014). As opined by Davis (2021), poor school infrastructure contributes negatively to academic performance. In contrast, solid evidence has shown that high-quality infrastructure facilitates, improves learners' academic performance, and reduces the rate of dropouts. Balos (2021) emphasizes that an effective science education program cannot function without the proper facilities. These resources are crucial because they allow both teachers and students to develop problem-solving abilities and cultivate scientific thinking. In general, school infrastructure is a key factor in the teaching and learning process, as it helps address challenges related to students' access to education and supports improved academic outcomes.

Chiedozie et al. (2018) further highlight that the presence of well-constructed school buildings and thoughtfully designed facilities contributes significantly to good academic performance. A positive learning environment, complemented by essential amenities such as washrooms and playgrounds, also plays a vital role in supporting effective teaching and enhancing student achievement.

Yusuph (2019) emphasizes that well-developed school infrastructure not only improves academic achievement but also creates a comfortable learning environment and encourages active participation from both teachers and students. Investing in school facilities is therefore essential for addressing challenges related to improving students' academic outcomes.

In the Philippines, Limon (2016) conducted a study on the effect of adequate school facilities on students' performance in Technology and Livelihood Education (TLE). The study revealed that insufficient or poorly maintained facilities negatively affected students' academic performance, and that school administration often failed to take meaningful steps to address these issues. The findings suggest that school stakeholders need to carefully plan, support, and manage TLE-related facilities. According to Limon, school infrastructure is a powerful factor influencing academic success. Yet, many schools continue to operate with inadequate or even nonexistent facilities, highlighting a lack of understanding among school administrators about the critical role of infrastructure in shaping students' learning outcome.

In Nigeria, there is a widely held view that children perform better in private schools than in public ones, largely because private schools are better equipped with both personnel and physical resources. This situation has prompted many parents to enroll their children in private schools (Ikegbusi & Adindu, 2022). Evidence also shows that a significant number of students admitted to tertiary institutions—including universities, polytechnics, and colleges of education—come from private secondary schools with well-developed educational facilities.

Similarly, in Kenya, poor school infrastructure has long been a challenge. In many schools, inadequate facilities hinder students' access to quality education and complicate school planning (Kerubo, 2013). Frequently, schools fail to meet basic health and inspection standards due to poor planning, coordination, and maintenance. With the adoption of a broad-based curriculum at all levels of education, which has introduced more diversified and specialized programs, the effective planning of physical facilities and learning resources has become even more critical (Sarker et al., 2020). Proper organization, coordination, and supervision are necessary to ensure that

space and equipment are optimally utilized and that teaching and learning activities are effectively supported (Ngithi, 2013).

In addition to the availability of school resources, proper management of those resources in the teaching and learning process leads to high student academic performance. Therefore, school management committed in enabling the learners achieve the desired competencies should make efforts to improve on the quality of school environment by constructing, rehabilitating and repairing school physical facilities with the help of central and local governments (Nzoka and Orodho, 2014).

The Government of Kenya (2012) notes that learning can occur anywhere, but the positive learning outcomes generally sought by educational systems happen in quality learning environments. Ironically, although the government introduced the Free Primary and Secondary Education system, the system has been peddled as an accelerator of the aforementioned problems. Since its inception in 2003, shool enrolment had increased significantly; however, several challenges continue to plague the implementation of these programs, including overstretched facilities such as classrooms, latrines, hostels and laboratories and overcrowding in classrooms. It may be a fact that dilapidated, crowded, or uncomfortable school infrastructure leads to low morale among students, teachers and parents (Barrett et al., 2019). Therefore, this has led to the poor performance in most public secondary schools and the researcher selected the school infrastructure in order to explore the extent to which these facilities influenced academic performance.

2.4 Utilization of Classroom and How it Influences Academic Performance

A classroom is a learning place in which student's skills and knowledge are nurtured (Ryan, 2013; Ainon & Rosmaizura (2018). The classroom environment consisted of a teacher having "wittiness", that is, comprising effective transitioning and challenging

lessons. Research shows that during this time, effective environment strategies were linked to students' behavior and academic achievement (Roskos & Neumann, 2012). The classroom environment in the 21st century has changed along with society. The concept of a student-centered learning environment has so permeated the educational landscape that steps into just about any twenty-first-century learning environment today and the goal was (whether in theory or practice) to give learners more autonomy in their learning. To promote this autonomous learning, educators around the world have recognized the need for flexible learning spaces that meet the varied needs of students. Hence, this means that there has been a paradigm shift in the classroom environment from a teacher-centered approach to a learner-centered approach especially with the advent of technology (Gosh & Dask, 2017).

In positive classrooms, student participation and collaboration are encouraged in a safe environment that has been created. A positive classroom environment can be encouraged by being consistent with expectations, using students' names, providing choices when possible, and having an overall trust in students. Educators have daily opportunities to help students grow confidence and feel good about themselves. Despite all the negativity that may be around them within their households. Through such actions as boosting their self-esteem through praise, helping them work through any feelings of alienation, depression, and anger, and helping them realize and honor their intrinsic worth as human beings. These actions may result in better behavior in the longline jeopardy of the students (Lucero & Rodrick, 2016).

The school is a special social space where education, training and personality development of children who are community's future assets were founded and run by proper training methods, appropriate physical space and favorable psychological environment (Raccoon Gang, 2018). Students in the process of socialization require a

healthy environment and models to increase their performance. Hence, clean, quiet and comfortable environments are important components of a learning environment (Gilavand, 2016). Furthermore, creating an ideal learning environment ought to be a priority of every concerned educationist because being comfortable should be a combination of several factors which include temperature, lighting, noise control, among others. (Murugan & Rajoo, 2013).

Parrett and Budge (2020) state that a good learning environment promotes learning, Students need to feel safe and supported to learn, in the absence of these conditions the human mind reverts to focusing on survival. A favorable school environment is a stimulus for learning experiences; this is because children spend a lot of time in school whose environment is capable of influencing performance through teaching techniques and relationships (World Bank, 2018). A school environment that is supportive and caring promotes learners to be more motivated and engaged in learning (Opiyo et al., 2018). However, there are times when, regardless of the infrastructure, students do not perform well. A supportive school environment is important in promoting academic success as it influences student's learning and growth which includes a significant aspect of their development-socially, emotionally and ethically.

According to Williams (2016), "class utilization" refers to the use of the physical and instructional resources that are accessible as well as the upholding of classroom discipline for more efficient education and improved student learning. Curriculum, instructional strategies, teacher conduct and interactions with students, learning environment, academic and social environment, and support services utilized in the classroom for the teaching and learning process are all examples of internal and external components that are combined in this process (Jawaid & Aly 2014). Teachers employ a wide range of strategies and abilities in the classroom to maintain students' focus,

organization, and active participation in order to achieve successful outcomes (Arshad et al. 2018). Planning, organizing, communicating, and coaching are all part of it.

The term "physical environment" describes the room's physical qualities. The physical classroom environment is comprised of a variety of factors, including lighting, temperature, ventilation, room size, floor, walls, desks, chairs, carpets, whiteboards, and computers (Suleman and Hussain, 2014). The physical environment of classrooms affects academic performance and student learning (Baafi, 2020; Jiang, Wang, Liu, Xu, and Liu, 2018; Stafford, 2015; Wang et al., 2018; Wargocki, Porras-Salazar and Contreras-Espinoza, 2019). Inadequate parameters of classroom environmental elements such as air quality, temperature, lighting, and noise had a negative effect on academic performance (Baafi, 2020; Puteh et al., 2015). Suleman and Hussain (2014) revealed that the classroom's physical environment was critical in enhancing students' academic performance. They asserted that a classroom with adequate physical equipment had a considerable positive effect on academic performance.

According to Lawal (2014), learning is the methodical process by which students acquire information or skills both within and outside of educational institutions via formal or informal educational systems. A key element in raising students' academic performance is the effective use of a variety of pedagogical techniques in the classroom, which improves instruction quality and student learning (Ramli et al. 2014). It included the architectural and social settings of educational establishments. While the physical environment is made up of the physical features of the classroom, such as the design, decoration, lighting, color, ventilation, seating arrangements, and instructional technology (ICT), the social environment is the interaction between teachers and students and their active participation in classroom teaching and learning activities (Tanner & Lackney, 2006). Teachers may successfully deliver lessons and aid students

in better understanding topics by utilizing a variety of teaching techniques, skills, pedagogical approaches, and instructional tactics in the classroom. These techniques, which range from project-based learning to field excursions, technology use, role-playing, inquiry, teamwork, questioning, lecturing, and debate, are crucial components in raising student learning outcomes, which in turn improve academic achievement (Dorgu, 2015).

Similarly, the classroom plays a critical role in shaping both teaching effectiveness and student achievement. A well-organized, adequately equipped, and conducive classroom—furnished with appropriate seating, teaching aids, learning materials, and technology—positively affects students' behavior, promotes participation, and significantly improves their academic performance (Suleman, Aslam & Hussain, 2014; Isaiah, 2013; Akomolafe & Adesua, 2015; Manca et al., 2020).

Beyond learning outcomes, research has also shown that the classroom's physical environment affects students' health and comfort. Inappropriate furniture and prolonged sedentary positions can lead to musculoskeletal discomfort, including spinal abnormalities, back and neck pain, fatigue, and general discomfort, which may negatively influence students' concentration and learning (Gilavand, 2016; Gumasing, dos Santos & Villanueva, 2021; Guirado et al., 2021; Zeverdegani, Yazdi &

MollaAghaBabaee, 2021). Ergonomics.

Students' performance is actively improved in classrooms with enough lighting, a bright environment, the use of ICT instructional devices, shelves and cabinets, an electric power source, air coolers or ceiling fans, and audio-visual aids. The performance of students is negatively impacted by an unfavorable classroom environment, which includes things like a small classroom size, inadequate ventilation, a high temperature,

a lack of ICT instructional teaching aids, inappropriate desks, improper seating arrangements, a lack of fresh air, and an overcrowded classroom (Umar, 2017).

A well-designed classroom facilitates easy learning and improved academic performance for both teachers and students. Students' learning outcomes are improved in classrooms when appropriate teaching and learning tools are used. According to Qamar et al. (2018), it improves students' learning. It includes a number of elements that have a positive impact on students' learning, such as the size of the room, the lighting, the temperature, the walls, the ventilation, the whiteboards, the mats, the chairs, the floor, the PCs, and other materials (Suleman & Hussain, 2014). The primary features that enhanced children' learning were school buildings, electricity, natural and artificial lighting and ventilation in classrooms, drinking water, restrooms, and playgrounds (Awan, 2018). According to Olufemii and Olayinka (2017), pupils who attend well-furnished, small-class rooms with superior facilities do better academically than those who attend big classrooms.

In addition to helping teachers teach more effectively, the employment of a variety of teaching methods, skills, techniques, pedagogical approaches, and instructional strategies in the classroom also makes it easier for students to grasp lessons, which is another important factor in boosting learning. Lecture, discussion, questioning, group projects, talk chalk, field excursions, modeling, roleplaying, simulation, theater, inquiry, discovery, demonstration, Dalton plan, and scheduled learning, experimentation, project, microteaching and use of various learning methods in classrooms. They not only help teachers to teach effectively but also help students enhance their learning which improves their academic performance (Dorgu, 2015). A comfortable classroom improves student learning results and teachers' ability to teach effectively. It consists of the floor, windows, whiteboards, LCD or computers, dice,

cabinets, seats or desks, and walls embellished with charts and maps. Students' academic performance is positively impacted by a classroom that is well-equipped, facilitated, and structured (Suleman, Aslam & Hussain, 2014). Students' conduct changes as a result, which indirectly enhances their performance (Isaiah, 2013). Research also revealed that students' academic performance is significantly impacted by the classroom environment (Akomolafe & Adesua, 2015). Another study's findings also showed that a supportive classroom environment enhances learning (Manca et al., 2020). In addition to academic performance, several studies have examined the effect of the classroom's physical environment on students' musculoskeletal discomfort (Gumasing, dos Santos, and Villanueva, 2021). Inappropriate use of educational furniture in schools and hence students' sitting on this furniture causes an inappropriate position of the body, resulting in abnormalities of the spinal cord, back pain, neck pain, fatigue, and discomfort (Gilavand, 2016). This is critical since today's school children would become tomorrow's adults. Consequently, many researchers have investigated the relationship between sedentary position and musculoskeletal discomfort on the impact of students in the classroom (Guirado et al., 2021; Zeverdegani, Yazdi, and MollaAghaBabaee, 2021).

The literature review results revealed that the classroom is a significant determinant of student's academic performance and also their musculoskeletal discomfort. While we consider educational activities or environments, ergonomics is a key science not only to remove undesired design features from the environment or equipment but also to enhance the educational experience (Zunjic et al., 2015). For evaluating the physical environment of the classroom, several studies have analyzed students' physical environment, such as lighting, classroom size, and technology (Ramli, Ahmad, and

Masri, 2013; Yang, Becerik-Gerber, and Mino, 2013; Widiastuti, Susilo, and Nurfinaputri, 2020).

Yang et al. (2013) revealed that students are greatly influenced by spatial qualities, namely visibility and furniture, and ambient attributes, specifically air quality and temperature, both of which are significantly influenced by classroom design, administration, and maintenance. Widiastuti et al., (2020) stated that the greatest influence on the learning comfort of students comes from the physical conditions in the classroom. The number of green buildings and their implementation in school environments as an alternative to conventional buildings is growing rapidly (Liu and Wang, 2022).

Green building is concerned with the environmental impact, but it is also important to create a comfortable, healthy, and productive working environment (Olubunmi, Xia and Skitmore, 2016). In addition, Hedge and Dolsen (2013) mentioned that Green to be energy efficient while effectively promoting the comfort, health, and productivity of its occupants. In this way, occupants will not be exposed to work-related musculoskeletal discomfort risks caused by insufficient workstation designs and office layouts. Therefore, it is associated with how these buildings promote the occupants' overall health, well-being, and productivity (Henge and Dolsey, 2013).

These days, schools are being built using green buildings (Liu and Wang, 2022). In terms of natural ventilation, lighting, general comfort, acoustics, carbon dioxide concentration, and thermal comfort, research indicates that classroom environments in green buildings differ greatly from those in conventional buildings (Golbazi, El Danaf, and Aktas, 2020; Huang, Huang, Lin, and Hwang, 2015; Issa, Rankin, Attalla, and Christian, 2011; Liu and Wang, 2022; Radwan and Issa, 2017).

The necessity for adaptable learning environments that satisfy students' diverse demands has been acknowledged by educators worldwide as a means of encouraging independent learning in the classroom. This indicates that a paradigm change from a teacher-centered approach to a learner-centered approach has occurred in the classroom, particularly with the introduction of technology (Gosh & Dask, 2017). According to Narad and Abdullah (2016), academic performance is conceptually defined as the information acquired that is represented by grades from a teacher and/or learning objectives that students and instructors have established to be met during a given time frame. They added that these goals are measured by using continuous assessment or examination results. The academic performance of students is a key feature in education and it is considered to be the Centre around which the whole educational system revolves.

According to Narad et al. (2016), students' academic performance dictates whether an academic institution succeeds or fails and directly affects a nation's socioeconomic development because successful students are more likely to make well-informed career decisions. Students are encouraged to participate and work together in a safe atmosphere in positive classrooms. A positive classroom environment can be encouraged by being consistent with expectations, using students' names, providing choices when possible, and having an overall trust in students.

Educators have daily opportunities to help students grow confidence and feel good about themselves. Despite all the negativity that may be around them within their households. Through such actions as boosting their self-esteem through praise, helping them work through any feelings of alienation, depression, and anger, and helping them realize and honor their intrinsic worth as human beings. These actions may result in better behavior in the long-line jeopardy of the students (Lucero & Rodrick, 2016).

The layout of the classroom, the placement within the school grounds, and the availability of teaching aids and resources all influence how much learning may be improved. It is thought that by promoting efficient teaching and learning, a school with a suitable learning environment helps to elicit the intended learning outcomes that would support strong academic achievement (Duruji et al., 2014). The quality and character of school life, according to Cohen et al. (2015), encompasses the many different patterns of school life experiences that reflect on norms, values, goals, teaching, learning, interpersonal relationships, leadership practices, and the organizational structures of the school as a whole.

Visual factor, according to Negiloni, Ramani, and Sudhir (2017), is the standard of illumination in various areas of the classroom. The amount of accessible natural and artificial light in the classroom will determine it. It also describes how the setting of the classroom is set up. The lighting, side displays, color of the visual task, and wall color are the main visual elements in a classroom setting. Inadequate lighting, according to Winter Bottom and Wilkins (2009), hinders students' ability to concentrate in class and has a negative impact on their academic performance. Poor lighting makes it harder to see and can make one uncomfortable, which one to lose interest and focus. Better visibility requires that the chalkboard's contrast levels remain high.

In the international sphere, Halder and Argyropoulous (2019) conducted a study in the United Kingdom (UK) that examined the influence of the physical school environment on the delivery of high-quality secondary school education in the country. According to the report, the majority of classrooms in UK schools lacked decorum. Additionally, there was insufficient room, ventilation, and heat insulation in the schools. This study also reported that urinals and incinerators were inconveniently located, putting the

schools' plants in poor condition. The aims and expectations of public secondary schools were not met as a result of these many flaws, which led to large disparities in the uniformity of the learning environments. Numerous negative consequences of the physical environment on the delivery of high-quality education in the UK were identified by the study. As a result, the deficiencies have caused secondary students to perform below expectations. According to this report, the physical learning environment in UK public schools is in a state of disrepair. To put it another way, most schools lacked the necessary resources to offer secondary school pupils in the United Kingdom a high-quality education. The study found that the physical learning environment in public schools was in poor condition and needed stakeholder attention, despite the fact that the UK is a wealthy country.

DiGropello (2014) carried out an experimental investigation on the influence of the physical environment on the academic performance of students in Brazilian public secondary schools. The study examined the physical environments of urban and rural secondary schools. An experimental research design was employed in the study. The study found that Brazilian schools were underfunded, had instructors with inadequate training, had strict pedagogies, and had excessively controlled school administration. The building of physical infrastructure had been hindered by the lack of suitable funds. In comparison to secondary schools in metropolitan areas, the study also found that secondary schools in rural Brazil lacked the necessary equipment to meet the educational demands of their pupils. The classrooms' crumbling walls and flooring, as well as their inadequate ventilation and lighting, were clear signs of the inadequate physical infrastructure. As a result, neither teachers nor students were able to focus well in class. Teachers working in demanding circumstances were demotivated by the

unfavorable physical surroundings. All of these factors led to a decline in students' academic performance.

In a similar vein, Javed and Asghar's (2017) study on the relationship between classroom environment and academic achievement of secondary school girls in Pakistan discovered a positive correlation between the two variables. The study also found that classrooms with sufficient physical amenities that facilitate the teaching-learning processes had more favorable atmospheres. Girls' secondary school academic performance would be more fruitful if there were sufficient facilities available. Learning is facilitated by classroom settings that provide the necessary materials and up-to-date facilities for the teaching and learning process. The positive effect of classroom environment on academic achievement was found in small, medium as well as in large category of schools.

In a related trend, Mudassir and Norsuhaily (2015) investigated the effects of the school environment on students' academic performance in a few Kuala Terengganu secondary schools. According to the study's findings, pupils who attend schools with sufficient resources, qualified faculty, and a positive atmosphere outperform those who attend schools with fewer resources, less supportive environments, and unsatisfactory facilities. Kekare (2015) used a sample of 80 students from several institutions in Aurangabad, India, to investigate the physical classroom environment and students' academic performance. The study's findings demonstrated a substantial correlation between students' academic performance and the physical atmosphere of the classroom.

According to research by Queiroz, Sampaio, and Sampaio (2020), which was corroborated by Akoto-Baako (2018), smaller classes and comfortable classroom temperatures provide excellent chances for students to engage fully in discussions, which lowers indiscipline cases and improves performance. It was across from schools

with shoddy infrastructure. The researcher sought to determine the impact of classroom environment, among other amenities, on students' academic performance at public sub-county schools in Uasin Gishu County, despite the fact that this project was comparable to the current study.

The mean performance of students taught in an ideal learning environment differed significantly from that of students taught in a dull learning environment, according to a study done in Yobe State, Nigeria, by Shamaki (2015) to ascertain the impact of learning environment on students' academic achievement at the senior secondary school level. Adamu (2015) investigated how the learning environment affected the performance of students in public secondary schools in Taraba State, Nigeria. The results showed a significant difference between the experimental and control groups' performances, suggesting that a classroom with a small class size, appropriate furniture, and instructional materials has a positive effect on junior secondary school students' performance.

Duruji, Azuh, and Oviasogie (2014) conducted a study that looked at how the learning environment in secondary schools in Ota, Nigeria, affected students' performance on external exams. They looked at things like class size, school facilities, location, plant planning, aesthetics, maintenance culture, sanitation, and conveniences. The study found that students' academic performance is significantly impacted by the condition of the learning environment, the caliber of the infrastructure, and how well they are maintained.

Additionally, Ezike (2018) looked at the relationship between senior secondary chemistry students' academic interest and the classroom environment in a few public secondary schools in Ibadan, Oyo State, Nigeria. The findings indicated that academic accomplishment and classroom environment were significantly correlated, and that

academic interest and classroom environment both contributed equally to academic achievement. In a study that sought to determine how environmental factors—such as the open space of schools, noise levels, lighting, and paintings in educational institutions—affect elementary school students' learning and academic performance, Gilavand (2016) discovered that environmental factors—such as appropriate coloring, the lighting of the educational environment, and the open space of schools—have an effect on these outcomes.

In their study, "The Effect of Environmental Factors in Teaching and Learning in Primary and Secondary Schools in the Edo State of Nigeria," Eimuhi and Ogedegbe (2016) looked at environmental factors to determine the results of teaching and learning everywhere and at any time. They came to the conclusion that the more enriched the learning environments, the greater and more pervasive the benefits are for student outcomes, including academic performance.

Similarly, Odeh, Oguche, and Ivagher (2015) carried out a study whose primary goal was to look at how the school environment affects secondary school students' academic performance. The study's findings show that secondary school pupils' academic performance in Benue State, Nigeria, is significantly impacted by the physical facilities, school atmosphere, and discipline. This suggested that schools may not give their kids their best effort, particularly in the area of academic accomplishment, if they do not provide the required learning facilities and foster an environment that is favorable to teaching and learning.

A research on the impact of the learning environment on students' academic performance in mathematics was carried out by Adamu (2015) at a few secondary schools in Yobe State, Nigeria. In line with Nwadiani (2010), who noted that under certain circumstances, a learner developed new abilities, knowledge, and suitable

influences, his research demonstrated that the learning environment had a substantial impact on students' academic scores and grades. In the Enugu Educational Zone in Enugu State, Nigeria, Chukwu, Eze, and Agada (2016) examined the impact of the availability of instructional materials at the basic education level. In the Enugu Education Zone in Enugu State, Nigeria, the study looked at the availability of basic education instructional materials and discovered that resource availability was crucial.

According to Waldman (2016), kids need to feel secure both psychologically and physically before they can thrive intellectually. Additionally, a safe learning environment requires that students feel valued, encouraged, and accepted. Students also need to experience a sense of belonging to other students, staff, and instructors. By emphasizing students' social and emotional learning (SEL), schools may foster these relationships. Students must also feel supported by all those connected to their learning experience like teachers, classmates, administrators, family, and community members for a higher academic feat (Waldman, 2016). For kids to succeed academically, emotionally, and socially in school, productive learning environments are essential. A conducive learning environment is not something that just happens. Conscious practices such as favorably interacting with students and modeling good behaviors that support learning activities in the classroom should be used to generate them (Becton, 2017). Oluwatayo and Oyeboade (2016) explored the relationship between secondary school biology students' performance and the classroom environment in Ibadan North Local Government Area, Oyo State. Their study revealed that students generally performed well in biology and that teachers regarded the classroom environment as conducive to learning. Academic performance refers to the measurable indicators of a student's learning progress, including examination results, classroom assessments, participation in learning activities, and the extent to which curriculum objectives are

achieved. Research has consistently shown that academic outcomes are closely linked to the quality of the learning environment.

The school environment encompasses the overall context of an educational institution, including physical facilities, learning materials, and resources that provide conditions for effective teaching and learning. Boarding facilities, for instance, offer students residential support through dormitories, dining areas, and sanitation amenities, ensuring comfort, safety, and well-being. Co-curricular facilities, such as sports fields, recreational halls, and indoor activity rooms, foster social, physical, and emotional development by encouraging active engagement and holistic growth. Similarly, the deliberate use of digital resources through ICT and access to computer laboratories enhances teaching and learning by providing students with tools for research, practice, and digital literacy. Governance within schools, guided by rules, regulations, and policies, ensures that these facilities and resources are managed efficiently, promoting a conducive learning environment.

Empirical studies highlight the importance of these factors. Foluso, Omotayo, and Olugbugi (2017) found that biology students in South West Nigeria performed better in smaller classes, even though laboratory availability had limited impact. Ezike (2018) reported that classroom conditions and student interest significantly influenced chemistry performance in Ibadan South West Local Government Area. Similarly, Duru and Oviasogie (2014) observed a positive relationship between learning environments and academic achievement in Ogun State.

Private schools often provide superior facilities compared to public schools, creating more supportive environments for learning. While Abu Sayeed (2015) reported no significant link between school environment and performance among class IX students in Malda District, India, Koroye (2016) emphasized that school aesthetics and

infrastructure significantly affect student outcomes in Bayelsa State. Other factors, such as school location, availability of teaching materials, and adequacy of equipment, also play a role.

In Benue State, Odeh, Oguche, and Ivagher (2015) found that school climate, discipline, and facilities strongly influenced student achievement, a finding reinforced by Anbalagan (2017) in Markurdi District. Collectively, these studies indicate that well-maintained classrooms, adequate facilities, and a supportive school environment are crucial for enhancing students' learning outcomes.

The study also found that mixed schools differed significantly from boy's schools and that rural and urban school settings differed significantly. Nsa, Offiong, Udo, and Ikot (2014) investigated the relationship between students' academic achievement in agricultural science and school environmental factors. The study's findings demonstrated a strong correlation between students' performance in agricultural science and farming facilities and the availability of laboratory facilities.

According to research done in Uganda in the East African area by Namusisi (2015), well-designed classrooms improved students' learning progress in math, reading, and writing by 16%. One factor that has a bigger impact on student achievement is the learning environment. This occurs more frequently when proper partnerships, co-curricular activities, and instructional strategies are offered, fostered, and maintained in a well-coordinated manner.

Additionally, Nyawenga and Makosi (2018) found that among the stresses that pupils in public secondary schools in the Guru District of Uganda had to deal with were inadequate ventilation and an unfavorable physical environment. In achievement assessments, low academic performance in English reading (36%), writing (38%),

grammar (26%), and comprehension (28%), was linked to overcrowded classrooms and inadequate ventilation. Particularly in English, where reading and writing demands the highest level of focus, students in a poorly ventilated classroom may find it difficult to focus throughout class (Kotut, 2016).

Teachers' perceptions on the availability of teaching resources and physical facilities at secondary schools in Tanzania's Arusha District were examined by Lyimo, Too, and Kipng'etich (2017). This study looked into how teachers felt about the physical facilities and instructional materials available in secondary schools in Tanzania's Arusha district. It found that, as a result of the growing number of students attending community schools, there were not enough textbooks, reference books, maps, or globes in the schools under investigation. In addition, schools lack sufficient physical resources like desks, seats, and classrooms, and the ones that are present are ill-built and not Researchers advise policymakers and curriculum creators at the Tanzania Institute of Education to produce a policy guideline that will improve the availability of educational resources and physical infrastructure.

Classrooms that feature vibrant walls, visual displays, and explanatory materials can significantly enhance students' learning experience and academic performance (Fentiman et al., 2013). In a study of Adventist secondary schools across Shinyanga, Mwanza, Mara, Arusha, and Kilimanjaro regions, Makewa et al. (2012) found that visual displays helped students recall information more effectively. Their research specifically explored the impact of classroom lighting and the use of visual aids on teaching English. The findings suggested that when teachers incorporated creative visual aids into lessons, students became more engaged and motivated, as these tools provided them with something concrete to observe, interact with, and reflect on.

2.4.1 Previous Studies Done in Kenya on Influence of Classroom Environment on Academic Performance

Osundwa (2016) noted that the physical, social, intellectual, and cultural aspects of the school learning environment in Kenya play a significant role in shaping students' learning and academic outcomes. However, research on this topic has produced mixed results. For example, Sifuna (2000) emphasized the critical importance of learning environments for academic success, while Eshiwani (2009, 2013) offered differing perspectives, suggesting that other factors might be equally or more influential. These contrasting viewpoints highlight gaps in knowledge that warrant further investigation.

In a study conducted in Kaiti Division, Makueni County, Kitonyi (2013) explored how the learning environment affected students' performance in the Kenya Certificate of Primary Education (KCPE). The findings revealed that poor academic performance in local schools was largely influenced by the conditions of both home and school environments. Key challenges included high teacher-to-student ratios, inadequate physical facilities, and insufficient teaching and learning resources. Overcrowded and poorly maintained sanitation facilities created unhygienic conditions, further reducing students' ability to focus and learn effectively. Additionally, the lack of learning materials limited students' engagement with the curriculum. On a positive note, teachers who employed participatory teaching methods encouraging students to ask questions and actively engage in lessons helped improve the learning environment. Nonetheless, students' overall academic performance was negatively affected when either school or home environments were unfavorable.

In another study, Korir and Kipkemboi (2014) investigated the influence of peer pressure and the school environment on students' academic performance in Vihiga County, Kenya. Their research explored how students' peers and the broader school

setting affected their learning outcomes, with particular attention to the psychological effects of these factors. The study was guided by Albert Bandura's Social Learning Theory, which emphasizes that learning arises from the interaction of behavior, environment, and cognitive processes.

The findings highlighted that a supportive and well-structured learning environment is essential for effective teaching and learning. The researchers recommended that the government and other education stakeholders work together to reduce overcrowding by building more classrooms in secondary schools. In addition, schools should be provided with adequate furniture, and students should be trained on how to maintain these facilities, as misuse often leads to damage.

The study concluded that academic performance is closely linked to the quality of the learning environment and the availability of practical resources. Research consistently shows that an appropriate learning setting—encompassing physical, social, cultural, and psychological aspects is vital for student success (Mudassir & Norsuhaily, 2015). Students exposed to conducive environments tend to perform better academically, supporting Shamaki's (2015) assertion that "the quality of the learning environment is likely to determine educational attainment." Ultimately, the effectiveness of educational outcomes depends on the quality of secondary school learning environments. Well-designed classrooms, stimulating cultural and social activities, and sufficient learning resources not only enhance student development but also improve academic performance and teaching quality. In line with this, the Kenyan government has provided grants and subsidies to support the development and improvement of school infrastructure, ensuring that learning spaces are adequate, safe, and conducive to learning.

The socioeconomic factors influencing females in agriculture at public mixed-day secondary schools in Kirinyaga Central Sub County, Kirinyaga County, Kenya, were the subject of another study (Murithi 2014). According to the study's findings, parental characteristics and girls' participation in housework.

A draft report on the cost and funding of education in Kenya states that the ratio of textbooks to school infrastructure is one metric used to assess the quality of education (Kanyangi, 2017). Student academic performance is significantly impacted by the quality and sufficiency of the physical infrastructure. Compared to schools with inadequate physical resources, those with more and better teaching materials are probably going to do better.

Child rights are enhanced by the proper and adequate construction of a child-friendly and safe environment, according to UNESCO (2015). The Kenyan Ministry of Education has developed the Safety Standards Manual for Schools in Kenya (MoEST, 2015). This publication highlights the significance of adhering to the Public Health Act (Cap 242) and the Basic Education Act (Cap 211). The handbook talks about the quantity and scale of physical infrastructure, which includes buildings like playgrounds, kitchens, laboratories, classrooms, and water tanks, among others. This M.o.E. handbook states that a classroom's length and width should be 7.5 by 5 or 7.5 by 6 meters. The MOE circular on health and safety standards (2001) states that the class should have no more than 30 students at a single setter station or 40 students at two setter desks. However, in order to accommodate a maximum of 40 pupils during the COVID-19 epidemic, the size was raised to 8 by 6. The floor should always be level and clean, the classroom should have adequate lighting and ventilation, and any cracks in the cement floor should be fixed as soon as possible. The literature reviewed so far does not indicate the extent to which utilization of classroom conditions influence

academic performance in sub-county secondary schools leaving room for the current study to explore**.**

2.5 Utilization of Library Facilities and How It Influences Student Academic Performance

A library, according to the *Oxford Advanced Learner's Dictionary*, is defined as a building or room where collections of books, newspapers, recordings, and other materials are kept for people to read, study, or borrow. Beyond simply being a place to store books, a school library functions as a central hub of knowledge where both teachers and students can access resources that support learning, teaching, and research (Ainon & Rosmarzura, 2018). Researchers widely recognize that libraries are an essential component of the educational experience, providing not only information but also guidance to their users (Ayaz, Ali, Khan, Ulah & Uilah, 2017).

Regular use of library facilities has been shown to enhance the learning process as libraries provide quick and convenient access to up-to-date knowledge as noted by Ayaz et al. (2017) and (Oji & Abana, 2012; Jato, 2014). In education system, the concept of "facilities" extends beyond physical buildings to include all the resources available to support both teachers and learners where classrooms, libraries and laboratories are widely regarded as the most essential facilities for effective learning (Onyeji, 2017; Lance & Hofschire, 2012; Goodall & Pattern, 2011; Stone & Ramsden, 2013; Strong, 2013). Among these, libraries play a particularly central role in serving not just as book storage but as organized spaces that provide vital resources for both teachers and students as noted by Adewusi (2013). Research (Anyawu, Obichere & Ossai Onah, 2013; Arinde, 2010; Lance & Hofschire, 2012; Owate & Iroha, 2013) consistently shows that well-equipped libraries improve reading, writing, study habits and overall academic success. In Latin America, Paul (2015) found that libraries

alongside facilities like laboratories and sanitation boost enrolment and learning outcomes, reaffirming their role as critical infrastructure in expanding educational opportunities globally.

2.5.1 Literature Review from Africa on how Utilization of Library influenced Academic Performance

Yeloye (2012), Joy (2016) and Ikegbusi (2012) in a Nigerian case study highlighted that school facilities are central to achieving secondary education goals, though the study did not clearly show how they affect classroom performance. Similarly noted that while libraries are among the most important resources, many schools either lack them or operate with outdated collections.

Where students depend only on textbooks, there is a risk of relying on obsolete information. Madiba (2016) pointed out that in many older schools, learners still use decades-old books donated by groups such as the British Council. This aligns with global evidence linking poor library access to weak academic performance (Cox & Margie, 2012 and Fawcett (2013). To strengthen their role, Anaehobi (2017) proposed introducing structured reading periods in junior secondary schools where students interact with librarians, select books, and practice independent reading. In addition, Obi (2017) noted that effective learning environments extend beyond teachers and textbooks, giving students the chance to explore broader knowledge and develop independent study skills.

Exposure to diverse sources enables learners to practice gathering, organizing and synthesizing information, which is essential for problem-solving. Without such supplementary resources, students remain at a disadvantage, whereas those with access to well-stocked libraries build the foundation for independent, lifelong learning.

Omehia (2017) described school libraries as dynamic spaces that select, organize, preserve, and share both historical and current information for academic and recreational purposes. Supporting this view, Agomou (2016) investigated the relationship between access to varied reading materials and English language proficiency in Aba, finding that students in schools with richer library collections performed better in comprehension, vocabulary, and grammar tasks. Similarly, Allison (2015) found a direct link between library usage and GPA at a Midwestern U.S. university, showing that students who regularly used library resources achieved higher academic performance. Wijesinghe et al. (2015) reported comparable findings among 160 undergraduates, confirming a positive connection between library use and academic outcomes.

In Nigeria, Philomena (2016) found a strong connection between students' use of library resources and their academic achievement at a university in Lagos. The study also highlighted that counseling services could encourage students to engage more actively with the library. Similarly, Stemmer and David (2016) used regression analysis to demonstrate that academic library usage has a measurable impact on outcomes such as student retention, graduation rates, and GPA, noting that this relationship can evolve over the course of an undergraduate program. In Ghana, Banleman and Adjoa (2017) reported that students who regularly accessed the WA campus library achieved higher GPAs, with electronic resources identified as the most influential factor in supporting their academic success.

The situation in developing countries adds another dimension. Francis et al. (2010) noted that in much of the Global South, a culture of reading has not been fully cultivated, which undermines the perceived value of books and libraries. Yet, in Africa, library development has been tied to improvements in student performance. Way

(2011) highlighted that South Africa, Botswana, Ghana, Tanzania, and Malawi have made considerable progress in using libraries to enhance learning outcomes.

Evidence from Nigeria further reinforces these patterns. Oji and Abana (2012) confirmed a positive relationship between library services and academic performance, insisting that a school without a library cannot be regarded as a quality institution. However, some studies contradict this. Ajegbomogun and Salaam (2011) and Uzuegbu and Ibiyemi (2013) found no significant relationship, attributing this to the prevalence of dilapidated, poorly equipped libraries that discourage use. Similarly, Jato, Ogunniyi, and Ogbodo (2014) reported that students' poor study habits, coupled with weak library services, contributed to low academic performance. They recommended that library use should be made compulsory through formal scheduling in school timetables, with extended operating hours to encourage access. Befii–Nwile and Amie-Ogan (2021) also stressed that the provision and proper use of both classrooms and libraries directly influence performance in junior secondary schools in Rivers State.

Elsewhere, Muvunyi (2016) found that middle school students with access to library facilities performed about 18% better than peers without such resources. Similarly, Raphael (2015), in a study of Kenyan public primary schools, concluded that inadequate library services contributed to poor exam results. His findings echo the Kenyan government's recognition in the National Policy on Education (NPE), which mandates funding for libraries in all institutions alongside the training of professional librarians. Raphael (2015) emphasized that libraries must be central to education systems if schools are to achieve better academic results.

In summary, the reviewed literature presents a mix of findings, but a common thread is clear: functional and well-equipped libraries play an important role in fostering reading

culture, supporting independent learning, and improving student achievement. However, gaps remain—particularly in demonstrating the direct impact of library use on classroom learning outcomes in sub-county secondary schools, which is the focus of the current study in Uasin Gishu County.

2.6 Utilization of Information and Communication Technology and how it influences Academic Performance

Tapera and Kujeke (2019) describe information and communication technology (ICT) as a type of technology that facilitates activities related to information management, such as collection, processing, storage, and presentation. In schools, ICT can be applied in diverse ways—from keeping financial records to supporting teaching and learning. Similarly, Khan, Khan, Din, Ismail, Khattak and Jan (2015) view ICT as technologies that provide access to information through various devices such as computers, scanners, printers, and internet connections. By incorporating ICT, schools and organizations are able to improve their efficiency and adapt to the rapidly changing world (Ngeze, 2017).

Globally, ICT is increasingly being integrated into teaching and learning to enhance the effectiveness of both teachers and students. It enables access to the knowledge required for classroom instruction (Kim, Raza & Seidman, 2019). ICT encompasses a wide range of tools, including digital hardware such as laptops, projectors, tablets, mobile phones, and visual/audio equipment, as well as software applications, multimedia platforms, and internet-based resources such as cloud computing (Goldhaber, Khuan & Allysa, 2021). Education systems worldwide continue to embrace ICT as part of classroom practice across different subjects (Murithi & Yoo, 2021).

A UNESCO review involving 90 countries categorized nations into three groups: those with fully integrated ICT systems, those with national ICT policies and pilot projects,

and those still in the early stages of integration. Although such classifications highlight global progress, they often overlook contextual challenges faced by individual schools. Schmid and Petko (2019) stress that successful ICT adoption in schools requires more than availability of devices; it demands thoughtful integration into classroom practice. In this regard, computers, laptops, tablets, and mobile phones should be wisely deployed in adolescent education. The COVID-19 pandemic further reinforced the importance of ICT, as digital platforms became essential in ensuring continuity of learning worldwide (OECD, 2015; OECD, 2019).

The pandemic, first reported in Wuhan, China, in December 2019, disrupted education on an unprecedented scale (Roy et al., 2020). School closures forced teachers and students to adapt to online platforms (Ng & Peggy, 2020). Although this shift enabled continuity, it also raised concerns about long-term impacts on academic life (Rajkumar, 2020).

In Europe, many countries had already made substantial progress in ICT integration prior to the pandemic, largely due to government investments. For instance, in the United Kingdom, the government invested GBP 1.8 billion between 1998 and 2014 to establish a national grid for learning (Iglesia et al., 2014). By 2014, nearly all secondary schools (99%) and the majority of primary schools (91%) had broadband internet access. Secondary schools reported an average of 246 desktop computers and 38 interactive whiteboards, giving a student-to-computer ratio of 1:3.6. In OECD countries more broadly, over 65% of secondary schools had access to advanced digital devices, with near-universal access in Denmark, Norway, and Sweden (Nusche & Minea, 2020). In Slovenia, Lithuania, and Denmark, broadband access reached 90% of secondary schools.

Belay, Khatete and Mugi (2020) observed that many Australian secondary schools faced shortages in ICT facilities including computers, laboratories, projectors and reliable internet access to name a few. In schools where these resources existed, demand often exceeded availability, requiring teachers to schedule in advance. Thomson (2015) reported that the average student-to-computer ratio in Australian secondary schools was 1:3, significantly better than the global average of 1:18. Access to the internet in schools was often provided through libraries and laboratories yet a growing number of students preferred bringing their own laptops, reflecting a move toward personal ownership of technology. Studies have demonstrated that digital tools such as projectors, multimedia systems and computers can significantly enrich the learning process as noted by Ahmed, Arshad and Tayyab (2019) and Imran, Mahmood, and Ahmed (2020) who observed that ICT-equipped classrooms tended to be more interactive and effective.

Although computers were available in many schools in Malaysia, Hasin and Nasir (2021) found that weak internet connectivity limited both teachers' access to information and students' chances for independent study. Likewise, Khalid, Nawawi, and Roslan (2019) reported that many teachers expressed frustration at the shortage of projectors, computers and stable internet. These gaps have left Malaysia behind several European and Asian countries in terms of ICT use in education. More broadly, as Ertmer et al. (2012) and OECD (2020) stress, technology on its own cannot transform learning; it must be supported by cooperation among teachers, learners, and families. Japan illustrates this point clearly: despite major government investment in ICT, inadequate training and rigid teaching approaches meant many teachers struggled to adapt these tools effectively in their classrooms. Teras et al. (2020) and Nuncio (2020) reported that fewer than one-quarter of Japanese teachers felt confident using computers in the classroom, and over one-third lacked even basic computer skills.

Elsewhere, Nikolopoulou and Gialamas (2015) identified lack of internet connectivity as a major barrier to ICT use in Greek high schools, underscoring how the digital divide continues to hinder progress. In many developing countries, barriers such as inadequate equipment, unreliable electricity, and insufficient teacher training remain pressing challenges (Jegede, 2019). As Gray and DiLoreto (2016) argue, educational institutions must address these systemic issues to fully realize the benefits of ICT in teaching and learning.

2.6.1 Utilization of ICT and how it influences Academic Performance in African Schools

Baghdady and Zaki (2019) reported that Sub-Saharan African secondary schools perform poorly and governments cannot reach secondary education targets. The economy is affecting school infrastructure, which is essential to teaching and learning.

According to Kaufmann and Vallade (2020), the quality of the learning environment is a crucial factor in students' performance. Resource management in education improves student performance (Wuni, Agyeman-Yeboah and Boafo, 2017). Thus, a school administration committed to student success should collaborate with central and local governments to create, remodel, and repair school infrastructure (Aguilera-Hermida 2020).

Over the years, scholars have made significant efforts to identify the factors that shape academic excellence and determine why some students perform better than others (Valli Jayanthi et al., 2014). A large body of research has focused on predictors of academic achievement (Suarez-Alvarez et al., 2014), yet only a limited number of studies have explored how computers influence student performance. Given the ongoing push for innovation in education (Admiraal et al., 2017), it has become

increasingly important to examine how students' interaction with computers impacts their learning outcomes. The global pandemic further highlighted this need, as technology use became essential, raising questions about its actual contribution to academic achievement.

In Nigeria, Gadzama (2019) investigated the integration of ICT in public secondary schools and found that the lack of both software and hardware infrastructure hindered effective utilization. Many schools across Adamawa State were not adequately equipped with ICT resources, meaning teachers could not integrate technology into their lessons as required. Similar findings were reported by Nwasinachi and Bernadette (2014) in Enugu Urban, where the unavailability of ICT facilities continued to obstruct meaningful adoption in teaching and learning. Both studies emphasize that effective ICT integration depends on reliable access to necessary software, hardware, and connectivity.

Comparable challenges were observed in Ghana and Tanzania. Asabere (2017) reported that poor wireless connectivity posed difficulties in integrating ICT into teaching and research within technical universities. In Tanzania, Ngeze (2017) studied 220 teachers across 32 secondary schools and concluded that most institutions lacked adequate ICT devices for effective integration. Ngimi (2013) also highlighted similar obstacles at the Open University of Tanzania, noting inadequate ICT infrastructure as a persistent barrier. Minja (2015) highlighted that unreliable electricity, high costs of computers, and limited school budgets are major obstacles to the adoption of ICT in schools. Beyond infrastructure, teacher competence also poses a challenge; Ndibalema (2014) noted that many educators lack the skills and confidence to effectively integrate ICT into their teaching.

In Kenya, similar challenges exist. Mingaine (2013) identified the high cost of acquiring ICT resources and inconsistent electricity as key barriers to technology integration in secondary schools. Importantly, frequent computer use has been linked to both student confidence and academic performance, with students who regularly engage with ICT showing higher self-assurance and better results. To address these challenges, Kenya has implemented policy frameworks such as the Education Sector Support Program (KESSP) and the National ICT Education and Training Strategy (Oluoch, 2016). These initiatives cover areas including ICT policy, integration strategies, equitable access, digital content development, and public-private partnerships for equipping schools (Piper, Jepkemei, Kwayumba & Kibukho, 2015).

Government commitment is further reflected in Vision 2030, which emphasizes curriculum reforms and classroom innovations to equip students with modern ICT skills (Murithi & Yoo, 2021). The National Education Sector Plan (NESP) 2013–2018 expanded this vision by focusing on four pillars: policy support, teacher capacity building, digital content creation, and infrastructure development (Republic of Kenya, 2014). Collectively, these efforts aim to align education with the demands of a digital and knowledge-based economy (Kafu, 2019).

At a local level, Chepkwony (2022) investigated the link between ICT, library, and laboratory facilities and student performance in chemistry in Kesses Sub-County, Uasin Gishu County. The study found that students in extra-county and private schools achieved higher scores (means of 4.7 and 4.6) compared to those in sub-county schools (mean of 2.3), largely due to differences in access to and use of essential learning facilities. Despite these insights, there remains limited understanding of the specific role of ICT facilities as an independent factor in influencing academic performance. This gap underscores the need for the current study, which aims to explore how ICT

availability and usage affect academic outcomes in sub-county secondary schools in Uasin Gishu County.

2.7 Utilization of Co-Curricular Facilities and How It Affects Academic Performance

Playgrounds play a vital role in fostering children's physical, cognitive and imaginative development (Strader, 2015) and form an important part of children's development, offering both recreational and educational value. According to Karin and Paul (2014) and Playgarden (2016) equipment such as slides, swings and climbing frames among others often designed in bright, attractive colors capture children's interest and encourage outdoor activity. Although the Childcare Service Act (2007) does not prescribe specific play materials, it requires that whatever is provided should match the developmental stages of children as research further suggests that variety and challenge in play spaces foster exploration, social interaction and physical growth as noted by Better Brains for Babies (2015). Even simple activities such as swinging teach rhythm, balance, and spatial concepts like "back and forth" or "up and down" (Early Head Start National Resource Centre, 2013).

In schools, playgrounds are used not only for exercise but also for recreation, sports, and cultural events, making their maintenance a key responsibility of administrators (Kapur, 2018). Evidence from the United States shows that sports and recreational activities improve physical health, reduce stress, foster discipline, and can boost academic performance, while also lowering risky behaviors like substance use and school dropout (Hock, 2018). However, financial constraints have led some schools, including those in Ohio, to cut back on these programs (Moran, 2017).

Internationally, the United Kingdom's 2001 Expert Consensus Conference set guidelines for children and adolescents aged 5–18, highlighting daily play as essential for healthy development (Cavill et al., 2018). The panel recommended at least 60 minutes of moderate-intensity activity each day, with less active students engaging in strength, flexibility, and bone-supporting exercises at least twice a week. In Saudi Arabia, Yusuf (2017) found that while teachers value extracurricular activities for developing skills such as communication, implementation is often hindered by practical barriers. The majority of teachers (98%) reported that heavy workloads prevent them from adequately planning and delivering sports and games programs, suggesting that structural issues within schools can limit opportunities for student engagement.

Socioeconomic and demographic disparities further shape children's access to physical activity. In urban areas of the United States, especially in Los Angeles County, children from low-income families and communities of color often have fewer opportunities to access safe, high-quality recreational spaces compared to their middle- and upper-class peers (Fabricant et al., 2019; Los Angeles County Department of Public Health, 2017; Salvo et al., 2019; Whitt-Glover et al., 2009; Zhang et al., 2020). Gender differences also play a role: school-age girls consistently report lower levels of physical activity than boys, influenced by factors such as parental expectations, self-confidence, and the availability of supportive play environments (Klinker et al., 2014; Mårtensson et al., 2014; Pawlowski et al., 2019; Telford et al., 2016).

Limited physical activity in childhood has been associated with delayed motor development (Cheng et al., 2016; Hardy et al., 2012; Zeng et al., 2017), higher obesity rates (Hutapea, 2019; Vazquez & Cubbin, 2020) and long-term cognitive and psychological challenges (Chaddock-Heyman et al., 2018; Gu et al., 2019; Hakala et al., 2019; Lima et al., 2019). Increasing access to natural play environments has been

proposed as one way to counter these risks, particularly in urban settings. Studies consistently show that exposure to green spaces supports physical activity, motor skills (Almanza et al., 2012; Janssen & Rosu, 2015; Lim et al., 2017; Raney et al., 2019), healthy weight (Jia et al., 2020; Sanders et al., 2015; van der Zwaard et al., 2018), and a wide range of mental health benefits, including reduced ADHD symptoms, lower stress, improved cognition, and stronger academic outcomes (Taylor & Kuo, 2011; Dadvand et al., 2015; McCracken et al., 2016; Browning & Rigolon, 2019). Green play areas also foster creativity, cooperation, and social cohesion (Bates, Bohnert & Gerstein, 2018; Hyndman, 2015; Jennings & Bamkole, 2019).

Schoolyards are particularly important since recess accounts for much of children's daily moderate-to-vigorous physical activity (Kelso et al., 2021; Prince et al., 2019). Larger, less crowded playgrounds and features such as grass space and tree cover have been linked to higher activity levels (Cardon et al., 2008; D'Haese et al., 2013; Martin et al., 2012). Yet, some findings challenge the assumption that green or large areas always drive activity. Reimers and Knapp (2017) and Van Kann et al. (2016) reported that fixed equipment, such as soccer goals and climbing frames, sometimes promoted higher activity, while greenery could be associated with sedentary behavior. Other research found that while playgrounds with more fixed features attracted larger crowds, they did not necessarily result in higher proportions of active students (Colabianchi, Maslow & Swayampakala, 2011). Play markings and ball games have also shown mixed results boosting activity in some cases but fostering peer conflicts or gendered participation patterns in others (Blaes et al., 2013; Pawlowski et al., 2016; Roberts et al., 2013).

Enjoyment itself appears to be a strong motivator. Hyndman and Lester (2015) found that children who enjoyed vigorous recess games accumulated more steps, while

Kumar (2018) emphasized that structured physical education improves fitness, mental health, and academic readiness, though time and trained staff remain limited. Similarly, Wright et al. (2019) showed that preschoolers' physical development is closely linked to school readiness, yet research on younger children remains underdeveloped. Playground size and design also matter: larger grounds can encourage participation, provided age-appropriate areas exist, while smaller spaces may create unique opportunities for peer interaction that are still understudied (Lopes et al., 2015).

In addition to physical activity, extracurricular opportunities—particularly those grounded in the arts—also contribute to holistic child development. Olibie, Ifeoma, and Ifeoma (2015), in their study on curriculum enrichment for 21st-century skills, found that participation in extracurricular activities such as sports, games, and arts enhances creativity, critical thinking, productivity, and overall well-being. Creative outlets like drawing, painting, and craftwork provide opportunities for self-expression and innovation. Similarly, dance not only serves as a form of self-expression but also helps to keep the body and mind active, improving posture, strength, flexibility, and balance. These findings point to the value of integrating both physical and creative extracurricular activities into school programs to foster students' personal growth and community engagement.

Bamidele, Bamidele, and Obasaki (2016) examined the challenges facing physical education in secondary schools in Kogi State, Nigeria, focusing particularly on the lack of sports equipment. Their study emphasized the need for principals to ensure that schools are adequately supplied with sports and games materials. They suggested that funding for these supplies could be streamlined by allowing costs to be deducted directly from government capital grants. In addition, they highlighted the importance of equipping sports councils with affordable, standard facilities such as balls, jerseys,

whistles, nets, and other instructional aids, arguing that this would significantly strengthen the teaching and learning of physical education in schools.

In Ghana, Sofo and Asolo (2016) investigated barriers to delivering quality physical education in primary schools using a sample of 296 teachers across four regions. Data were collected using an 11-item, five-point Likert-type questionnaire and analyzed through descriptive and inferential statistics. Their findings revealed that effective teaching practices were central to encouraging children's participation in physical education. However, challenges such as limited guidance from teachers, insufficient time allocated to physical education, and a lack of support from colleagues or other school departments hindered its successful implementation.

A related study in South Africa by Cozett, Basset, and Leach (2016) explored the factors shaping participation in physical activity among children aged 11–13 years in the Western Cape. Drawing on data from 348 pupils across two schools, they employed the Children's Physical Activity Correlates Questionnaire and applied descriptive and inferential statistics, including correlation and regression analysis, to identify the strongest predictors of physical activity. Their results indicated that access to physical activity equipment played a significant role in promoting children's engagement, echoing earlier findings by Reimers and Knapp (2017) who had also linked equipment availability to levels of participation. However, given that the study was conducted in only two schools with a relatively small sample, the generalizability of its findings remains limited.

2.7.1 Utilization of Co-curricular Facilities and Its influence on Academic Performance, Studies from East Africa

Lazaro and Anney (2016), in their work on rethinking the role of co-curricular activities in Tanzanian secondary schools, observed that students who actively participated in sports and games gained an advantage in developing their talents. Beyond talent enhancement, such activities were also found to build language skills and foster self-confidence. Similar findings were echoed by Muloiwa and Odimegwu (2018), who noted that engaging in sports and other extracurricular activities promoted self-esteem and discipline among young people. They further emphasized that these activities play a protective role by reducing risky behaviors such as unsafe sexual practices, which can lead to HIV/AIDS, and substance abuse linked to long-term health complications.

Extracurricular activities have long been recognized as an important component of the school curriculum in Tanzania. They are valued for nurturing skills, creativity, physical fitness, and discipline. Acar and Gündüz (2017) described them as diverse, spanning sports, music, theatre, painting, and literature, all of which occur outside the classroom but significantly enrich student development. According to these authors, such activities not only equip learners with new skills but also provide social integration opportunities and constructive use of leisure time. Ahmad, Rahman, Ali, Rahman, and Al–Azad (2015) supported this view, reporting that students who engaged in extracurricular activities were more likely to attend classes consistently and demonstrated higher levels of self-concept.

At the policy level, the Kenya Institute of Curriculum Development (2017) emphasized the need to provide learners with activities drawn from three main categories—intellectual, emotional, and physical—to ensure well-rounded development. The policy

framework underscored a holistic and integrated approach to education that balances academic, emotional, and physical growth. This guidance sought to prevent teachers from sidelining subjects such as physical education, music, or art, which are critical for developing learners' broader competencies.

However, implementation has not always matched policy intent. Githaga (2018), for instance, investigated the frequency of teaching physical education in lower primary schools in Laikipia County, Kenya. The study found that poor playfield conditions prevented the subject from being implemented in line with Ministry of Education guidelines. While valuable, the study was limited to children in grades 1–3, leaving out preschool learners who may be even more vulnerable due to their developmental stage. Similarly, Kisango (2016), studying secondary schools in Lamu County, reported that the lack of adequate physical facilities and sporting equipment restricted students' opportunities to engage in co-curricular activities. Teachers in the study acknowledged that both limited resources and lack of awareness about available facilities contributed to the underutilization of existing infrastructure.

In Nairobi County, Akoth (2016) examined the impact of outdoor activities on preschool children's physical development. The findings showed stark differences between public and private preschools: while private institutions located in middle-class estates offered a range of facilities and equipment, many public preschools either lacked facilities altogether or had broken and poorly maintained ones, despite having larger playgrounds. Nevertheless, resourceful teachers and parents often improvised by donating or creating play materials to support children's active play.

Taken together, these studies highlight a recurring theme across Tanzania and Kenya: co-curricular and extracurricular activities are vital in nurturing learners' talents, confidence, and life skills. Yet, despite supportive policies, challenges such as

inadequate facilities, poor implementation, and resource disparities between schools continue to limit their full potential in shaping holistic education outcomes.

In Ng'enda Zone, Gatundu South Sub-County, Wanjiku (2016) investigated the quality of outdoor play environments in Early Childhood Development (ECD) centers, revealing notable disparities between public and private institutions. Public centers primarily relied on simple, portable items such as small balls and tyres, whereas private centers, in addition to these materials, also provided some fixed play equipment like swings and large tyres. Nonetheless, crucial facilities including climbing ladders, balancing frames and slides were largely absent in public institutions and in many cases unavailable even in private schools. Both categories of centers were therefore heavily dependent on small, movable materials such as ropes, balls and tyres. A further challenge emerged in private schools, where limited playground space relative to high enrollment constrained children's opportunities for active play. These findings highlight issues that remain pertinent to the current study. In a related study, Millicent (2010) examined the availability and use of learning and play resources in ECD centers in Suba East, Migori County. The research revealed that teachers tended to prioritize classroom-based learning materials, often at the expense of outdoor play facilities, thereby limiting children's engagement in active outdoor play. While indoor resources were considered central to learning, playground structures such as slides, swings, see-saws, and climbing frames were undervalued, despite their potential to foster children's active participation in outdoor play.

However, from the reviewed literature, it was evident that much of the research in Kenya has concentrated on preschool and primary school levels, with fewer studies targeting secondary schools. This creates a research gap that the current study addresses

by focusing on how the availability and use of co-curricular facilities influence academic performance in sub-county secondary schools.

Evidence from Mokaya (2013), who investigated the influence of school infrastructure on student performance in Kajiado County, underscores this point. The study emphasized that adequate playing fields and equipment are crucial not only for talent development but also for educational outcomes. Participation in co-curricular activities was linked to cognitive, affective, and psychomotor development, stronger self-concept, positive attitudes, and overall academic achievement. Mokaya recommended replicating such studies in other counties to allow comparative analysis, a recommendation that informed the decision to examine utilization of co-curricular facilities in sub-county secondary schools in Uasin Gishu County.

2.8 Challenges Faced by School Administration in Establishing and Designing School Infrastructures

Quality education is also a priority of the Sustainable Development Goals (SDG), as the fourth goal states: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (The United Nations, 2020). Additionally, education contributes too many SDGs by reducing poverty, driving economic growth, and preventing inequality and injustice, among others (UNICEF, 2019). Although there are national and international efforts to improve education in low and- middle-income countries (L&MICs), more cooperative, structured, systematic, and coordinated efforts are required from governments and multilateral agencies to enhance quality education and reduce inequality gaps.

The rising challenges hindering quality academic performance in developing countries has continued to attract attention among scholars (Sarker et al., 2019). Baghdady and

Zaki (2019) explain that secondary schools in Sub-Saharan Africa (SSA) perform poorly, and the governments are facing several challenges in achieving their objectives for secondary education. Among these challenges are lacks of funding and necessary infrastructure in rural areas.

Keinan and Karugu (2018), in their study on the provision of textbooks and school libraries in secondary schools across Sub-Saharan Africa, observed that these resources were not only insufficient but also unevenly distributed, with rural schools being particularly disadvantaged compared to their urban counterparts. Such disparities, they argue, directly undermine academic achievement since effective teaching is highly dependent on the availability of adequate learning resources. A shortage of textbooks and library facilities can therefore compromise teaching quality and, by extension, students' performance in national examinations. In line with this, Parrett and Budge (2020) identified several key indicators of educational quality, including the presence of well-stocked libraries, sufficient instructional time, regular homework, adequate textbooks, teachers' subject expertise, professional experience, functional laboratories, manageable class sizes, and fair teacher remuneration.

Classrooms, libraries, labs, and staff housing increase the physical learning environment in terms of preliminary technical abilities and the development of quality and suitable school elements (Hong and Zimmer, 2016). Garbage disposals, drainage, appropriate water for personal hygiene, clean rest rooms, and other school facilities might impact cleanliness (Gray and DiLoreto, 2016). Shmis, Ustinova, and Chugunov, (2019) noted that a school's physical elements reflected its academic and extracurricular offerings. School infrastructure determines classroom size and shape. The classroom's size, layout, and educational tools determine how students are taught. The quantity and mix of components that make school infrastructure management efficient determines

how well school administrators may achieve organizational goals (Cuesta, Glewwe, and Krause, 2016).

Similarly, the World Bank (2020) emphasizes that achieving quality education rests on five key pillars: learners, teachers, learning resources, school infrastructure, and effective systems management, which includes human resources and internal procedures. Both the World Bank (2020) and Parrett and Budge (2020) highlight the pivotal role of infrastructure in sustaining educational quality—a factor that became particularly evident during the COVID-19 pandemic. Nonetheless, this role manifests differently across contexts, as Low-Income Countries (LICs) often face significant limitations in financial and technical capacity compared to Middle-Income Countries (MICs), which are generally better resourced (Huss & Keudel, 2020).

Adequate development of school infrastructure provides numerous benefits to both staff and students. Well-organized facilities enable members of the school community to perform their duties more efficiently, foster motivation towards learning and teaching, and create a comfortable environment in classrooms, offices, and other learning spaces. Such conditions not only enhance individual satisfaction but also promote effectiveness in achieving both personal and institutional goals (Kapur, 2018). Given these benefits, it becomes critical for schools and the Ministry of Education to prioritize financial planning for infrastructure improvement. Financial resources are considered a key determinant in strengthening educational facilities, which in turn drive both economic and social development within a country. Educational planners, therefore, emphasize the importance of anticipating future trends in facility planning to ensure sustainability and relevance (Bihumia, Kunger & Duary, 2012).

Evidence from Rwanda further illustrates this relationship. Uwimana and Andala (2020), in their study on the link between school infrastructure and student performance under the Twelve Years Basic Education (12YBE) program, found that 70.5% of respondents disagreed that infrastructure was adequate in Gasabo District. The inadequacy of essential facilities was associated with reduced academic performance. Their qualitative findings revealed that the most pressing needs included completed classrooms, well-equipped libraries and laboratories, proper playgrounds, and adequate sanitation facilities. Using a correlation design with a sample of 200 participants—including school heads, deans, teachers, students, and parents—the study concluded that insufficient infrastructure was a key barrier to quality education outcomes in Rwanda.

Saga (2014) examined access and quality challenges in community secondary schools in Kilolo District, Iringa Region, Tanzania. The study revealed that heads of schools grappled with inadequate teaching and learning materials alongside insufficient infrastructure. The findings emphasized that strong academic performance was closely tied to the availability of learning resources, particularly when aligned with favorable teacher-to-student ratios. The study concluded that effective teaching and learning in secondary schools required well-equipped laboratories, functional libraries, and adequate classrooms. With such facilities in place, students were more likely to achieve better academic outcomes.

Similar challenges were identified in Kenya. Gichu, Kabaara, and Njagi (2017), through a descriptive research design involving questionnaires and structured interviews, found that head teachers in public schools faced significant obstacles, particularly poor and unsatisfactory infrastructure. This negatively affected efforts to improve academic performance and maintain discipline. The study recommended the mobilization of

support from education stakeholders beyond government funding, highlighting the need for shared responsibility in developing adequate school infrastructure to sustain academic excellence.

Evidence from Perry, Lundie, and Golder (2019) further reinforces the positive correlation between institutional resources and students' academic achievement. Schools with limited resources tend to perform poorly compared to well-resourced ones. This relationship was also illustrated in Turkana County, Kenya, where a case reported by Muluka (2021) highlighted the transformative impact of improved infrastructure. In Kawarnaparan Primary School, the construction of new classrooms equipped with desks and ceiling boards significantly enhanced the learning environment. Students reported increased comfort, especially during afternoon lessons, which previously had been unbearable due to heat. The intervention not only made learning enjoyable but also led to higher enrolment, improved attendance, and better retention rates. These outcomes demonstrate how quality infrastructure directly contributes to improved academic performance and aligns with broader education quality indicators such as the School Education Quality Index (Muluka, 2021).

In Kenya, expenditures on physical facilities rank second only to teacher salaries within the education system. To justify such significant investment, the government undertakes activities such as constructing new classrooms, purchasing furniture, and carrying out maintenance, repair, remodeling, and replacement of facilities. These initiatives place a responsibility on educational planners to ensure that physical facilities are utilized in a cost-effective manner. A sound national education system, therefore, requires effective educational planning, as it is central to achieving broader educational goals and objectives (Samuel, 2022). However, educational planning in Kenya faces persistent challenges. These include a shortage of professional educational

planners, inadequate planning materials and data, weak capacity development programs, political instability, political interference, and insufficient funding.

2.9 Summary of Literature Review

Mgbodile (2014) and Ikegbusi (2018) pointed out that for effective teaching and learning situations, school facilities and educational goals should be viewed as being interwoven. School facilities such as buildings are very essential to the academic development of the students. Apart from protecting the pupils from the sun, rain, heat and cold, school building represents a learning environment that has a great impact on the comfort, safety, and performance of the children (Okechukwu & Oboshi, 2021). According to Limon (2016), facilities form one of the potent factors that contribute to academic achievement in the school system. However, many schools today are carrying out academic activities with little or poor availability of school facilities. Furthermore, many scholars had done research on physical facilities and how it influenced academic performance at various levels of education as demonstrated by the literature review, but little research has been done on the four research objectives of the current study.

The first objective of this study was to investigate how utilization of classroom conditions influenced academic performance. Literature indicated that visual displays and classrooms with colorful walls and explanations on them influenced students' performance by bringing life to the learning environment (Fentiman et al, 2013). Makewa et al. (2012) found that the visual displays helped students recall information more readily in their study of Adventist secondary schools in the Shinyanga, Mwanza, Mara, Arusha, and Kilimanjaro regions. The study looked at the influence of classroom lighting and visual displays in teaching English. Student's interest was reportedly raised by teachers' creative use of visual aids in lessons since it gave them something useful to see, do, and consider.

Okong'o (2017) reported that Kisii County performed poorly in the 2016 KCSE examinations largely due to inadequate infrastructural facilities in secondary schools. Similarly, Obegi (2016) highlighted persistent challenges in the county's education sector, such as lack of electricity, laboratories, and classrooms in some institutions. These deficiencies directly affected student performance, as the physical facilities available in schools play a significant role in shaping learning outcomes. The literature also indicates that the presence of adequate infrastructure not only enhances students' academic performance but also motivates teachers to deliver instruction more effectively.

Furthermore, evidence from previous studies emphasizes that learners at all levels of education should be provided with conducive classroom conditions that encourage effective study. Proper lighting and ventilation, well-maintained floors, and timely repair of cracks or damages are among the critical factors in sustaining a supportive learning environment. However, despite these insights, the reviewed literature does not explicitly address the extent to which classroom conditions influence academic performance in sub-county secondary schools. This gap provides an opportunity for the present study to investigate the issue more comprehensively.

The second objective of this study was to investigate the utilization of the library as a teaching and learning resource and its influence on academic performance. Literature consistently emphasizes that the library is an essential resource in any educational institution. Raphael (2015), in a study on the influence of school infrastructure on academic performance in public primary schools in Ruiri Location, Meru County, found that the absence or inadequacy of library facilities contributed to poor performance in national examinations. The study concluded that the library remains a critical factor in the teaching–learning process.

The importance of libraries has also been recognized by the Kenyan government through the National Policy on Education (NPE), which emphasizes the establishment of libraries in all educational institutions and the training of librarians and library assistants. Libraries are thus positioned as central to any educational system in achieving improved academic outcomes (Raphael, 2015). To maximize their impact, school managers are expected to ensure that libraries are well-equipped with proper seating, furniture, and textbooks, thereby enabling students to fully utilize them and enhance performance. Despite these insights, the reviewed literature does not explicitly explore the relationship between library utilization and academic performance in sub-county secondary schools, creating a gap that the present study seeks to address.

The third objective was to investigate the utilization of information and communication technology (ICT) and its effects on academic performance. Literature shows that ICT has gained significant attention in this digital era, with governments globally investing in ICT to prepare citizens for participation in knowledge-driven economies. In Kenya, the government has introduced several initiatives to integrate ICT into education, including Kenya Vision 2030, which emphasizes curriculum reforms and classroom innovations to provide learners with modern ICT skills (Murithi & Yoo, 2021). Similarly, the National Education Sector Plan (2013–2018), building on the 2006 National ICT Strategy for Education and Training, identified four key pillars for ICT integration in education: supportive policies, capacity building, digital content development, and ICT infrastructure (Republic of Kenya, 2014).

Chepkwony (2022), in a study examining the relationship between ICT, laboratory, and library facilities and academic performance in chemistry in Uasin Gishu County, found significant performance disparities among school categories. Extra County and private schools recorded mean scores of 4.7 and 4.6 respectively, while sub-county schools had

a mean of only 2.3. These findings suggest that the availability and utilization of ICT and related facilities strongly influenced student achievement. However, literature does not clarify the extent to which ICT facilities independently contribute to learners' academic outcomes, leaving room for the current study to examine how ICT utilization influences academic performance in sub-county secondary schools in Uasin Gishu County.

The fourth objective was to assess the utilization of co-curricular facilities and their influence on academic performance. Literature indicates that co-curricular facilities play a vital role in student growth and development, as they provide opportunities for physical activities, sports, recreation, and talent nurturing. Kapur (2018) noted that playgrounds serve not only as spaces for sports and leisure but also as venues for competitions, celebrations, and school events, which contribute to students' motivation and holistic development. Mokaya (2013), in a study on the influence of school infrastructure on student performance in public secondary schools in Kajiado County, found that adequate playing fields and equipment were critical for talent development. The study further highlighted that co-curricular activities contribute to cognitive, affective, and psychomotor development, while also improving self-concept, attitudes, and overall academic achievement. Mokaya recommended replication of similar studies in other counties, providing further justification for the current study's focus on sub-county secondary schools in Uasin Gishu County.

In conclusion, the reviewed literature underscores that the availability, proper management, and utilization of school resources are key drivers of academic performance. A committed school management, supported by central and local governments, should prioritize constructing, rehabilitating, and maintaining physical facilities to create conducive learning environments (Nyoka & Orodho, 2014).

Nevertheless, despite significant resource allocation by the Government of Kenya, sub-county schools in Uasin Gishu County continue to record low KCSE performance. This underscores the need for the present study, which seeks to investigate how the utilization of selected infrastructure influences academic performance in sub-county secondary schools in the county.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter presents the research design and methodology that was adopted in the study. It describes the location of the study, research design and methodology, target population, sample size, sampling procedures and research instruments. Further, the chapter outlines data collection procedures, data analysis techniques, validity and reliability of research instruments, ethical considerations observed in the study, field experience of the researcher and summary of the chapter.

3.2 Study Area

The study focused on public sub-county secondary schools in Uasin Gishu County, which hosts approximately 162 public secondary schools and spans an area of 3,345.2 km². The county is situated in the former Rift Valley Province, with Eldoret as its administrative and commercial hub. Geographically, Uasin Gishu shares borders with several counties: Elgeyo Marakwet to the east, Trans Nzoia to the north, Kakamega to the northwest, Nandi to the southwest, Kericho to the south, and Baringo to the southeast.

For administrative purposes, the county is divided into six sub-counties: Soy, Moiben, Kesses, Turbo, Kapseret, and Ainabkoi. Within these sub-counties, secondary schools are grouped into four categories—National, Extra-County, County, and Sub-County schools. This study specifically targeted sub-county public secondary schools spread across all six sub-counties. These schools were selected because they not only reflect the general characteristics of sub-county schools across Kenya but also face challenges of consistently low academic performance. Moreover, the principals and teachers in these institutions share similar professional profiles and operational challenges with

their counterparts in other sub-counties nationwide, making them representative for the study.

3.3 Research Design

The study adopted mixed methods research design which is an approach of inquiry involving collecting both quantitative and qualitative data, integrating these forms of data and adopting distinct designs that may include philosophical assumptions and theoretical frameworks. This study adopted a mixed-methods design to investigate how school infrastructure is utilized and how it influences academic performance in secondary schools across Uasin Gishu County with the approach combining qualitative and quantitative methods to provide a fuller understanding of the research problem than relying on a single method alone (Creswell, 2013).

Mixed-methods research integrates elements from both traditions, including perspectives, data collection techniques, analytical procedures and inference methods, to enhance depth, breadth, and the corroboration of findings (John, Onwuegbuzie, & Turner, 2007). It is grounded in a pragmatic philosophy that prioritizes practical solutions and leverages the strengths of both qualitative and quantitative approaches (Terrell, 2011). This approach is particularly suited for educational research, where both measurable outcomes and contextual factors shape student performance.

3.3.1 The Philosophical Worldview

A philosophical paradigm refers to the underlying belief system or worldview that guides the direction and actions of research. It provides the foundation for how knowledge is defined, interpreted, and applied in a study. According to Konasolaki (2012), research worldviews can be situated within several paradigms, including critical realism, constructivism or interpretivism, positivism, and functionalism. Each

of these paradigms shapes the way researchers perceive reality, frame their questions, and choose the methods for inquiry. A paradigm can be viewed as a set of fundamental beliefs that deal with ultimate's or first principles (Guba & Lincoln, 1994). A paradigm represents a worldview that gives meaning to the nature of the world, a person's place in it, and the series of possible relationships between that world and its parts. Orlikowski and Baroudi (1991) explained a classification of the three sets of beliefs that are responsible and necessary for delineating a way of seeing and researching the world, as they reflect the underlying beliefs of the researcher: Ontology (beliefs about the phenomenon and object of study, that is physical and social reality), Epistemology (beliefs about the notion of knowledge) and Methodology (beliefs about the relationship between knowledge and the empirical world).

The study was guided by pragmatism philosophy. Pragmatism is believed to be an offshoot of realism and was developed in the last century (Hall, 2013). Pragmatism is the better preferred by social science doing mixed methods research, because it allows the researcher to focus on adopting the best methodology to investigate the problem rather than aligning the methodology of study to a certain paradigm (Kaushik and Walish, 2019).

Pragmatists believe that human actions, beliefs, and experiences cannot be separated, reality keeps changing and human action has an intermediary role in those changes (Kaushik and Walish, 2019) enabling researchers to choose the most suitable tools for addressing their research questions (Kaushik & Walish, 2019; Kamau, 2020, Morgan, 2014). Its main strength lies in its practical orientation, which encourages the integration of multiple methods to produce meaningful insights. For this study, pragmatism was adopted because it does not restrict the researcher to a single

perspective, allowing the use of diverse techniques, assumptions and data analysis approaches that align well with the mixed-methods design.

3.3.2 Mixed Method Approach

A mixed-methods design combines qualitative and quantitative approaches to offer a more complete understanding of a research problem. It is commonly used in social, behavioral, and health sciences because it balances depth and breadth. In this study, the design facilitated triangulation through interviews, observation checklists, and questionnaires, allowing the strengths of one method to compensate for the limitations of another. This approach aligns with a pragmatic philosophy, which emphasizes using the methods best suited to the research question. According to Creswell (2014), mixed methods bridge philosophical, methodological, and practical considerations, generating richer findings. The underlying premise is that integrating qualitative and quantitative techniques provides unique insights and produces more reliable and applicable results (Johnson & Onwuegbuzie, 2004).

Mixed methods may involve collecting data concurrently, where interviews provide detailed perspectives while questionnaires yield statistical evidence (Creswell, 2008). Used together, they reduce bias and improve validity. Johnson and Onwuegbuzie (2004) further outline five purposes of this design: complementarity (one clarifies the other), triangulation (seeking convergence), initiation (challenging assumptions), development (using one to inform the other), and expansion (broadening the scope of inquiry). These purposes strongly justified the adoption of a mixed-methods design in this study.

Qualitative research, in particular, provides a deeper understanding of social phenomena by uncovering attitudes, perceptions, and behaviors that quantitative

methods alone may not capture (Babbie, 2007). In this study, qualitative tools such as interviews and observation checklists were combined with quantitative questionnaires, using both open- and closed-ended questions. This combination allowed for diverse forms of data collection, facilitated both thematic and statistical analysis, and contributed to a richer, more balanced understanding of the research problem (Creswell, 2014). Overall, the mixed-methods design ensured triangulation of findings, minimized methodological bias, and enhanced the credibility of the result.

3.4 Target Population

A population refers to the complete group of individuals, objects, or events that share a common characteristic and are relevant to a particular study (Mohajan, 2018). It represents the universe from which a researcher draws a sample and to which the findings are ultimately generalized (Snyder, 2019). In research, the accessible population consists of those elements that meet the study's criteria and are practically available for investigation.

For this study, the target population comprised 162 principals, 972 teachers and approximately 17,820 Form Three and Form Four students drawn from sub-county secondary schools in Uasin Gishu County, as well as one County Quality Assurance and Standards Officer (CQASO). The county had a total of about 162 sub-county schools alongside other categories such as county, extra-county and national schools. However, the focus of this research was specifically on sub-county schools and therefore both the schools and the principals from this category formed the core target population. Teacher numbers were estimated using records from the TSC County Office. Five schools were selected from each sub-county, and the number of TSC-employed teachers was counted, averaging six per school. Across 162 schools, this yielded an estimated 972 teachers. For students, Forms Three and Four were

considered, with 55 students per form per school (110 total). Multiplying by 162 schools resulted in 17,820 students. Six Quality Assurance and Standards Officers were purposively included, bringing the total population to 18,960 participants.

The target group was chosen to reflect the distinct roles each plays in relation to school infrastructure. Principals oversee and guide the use of facilities, while teachers and students interact with them daily, providing insight into how infrastructure supports or hinders learning. County Quality Assurance and Standards Officers (CQASOs) were included due to their responsibility, under the Basic Education Act (2013), to monitor the adequacy and compliance of school facilities.

Students being the direct beneficiaries of school infrastructure were further engaged to share how the availability and condition of these resources affect their academic progress. Their input provided firsthand evidence of the link between physical facilities and performance. Overall, this carefully structured population was selected to ensure that the study gathered perspectives from all key stakeholders thereby producing balanced insights into how infrastructure relates to learning in sub-county secondary schools. A summary of the target population is presented in Table 3.1 below.

Table 3.1 Target Population

Sub-county Name	QASO	Sub County public secondary schools	Principals	Teachers	Students
Soy	1	39	39	234	4290
Moiben	1	27	27	162	2970
Kesses	1	36	36	216	3950
Turbo	1	26	26	156	2860
Kapseret	1	19	19	114	2090
Ainabkoi	1	15	15	90	1650
Total	**6**	**162**	**162**	**972**	**17820**

Source (County Director of Education Office Uasin Gishu County)

3.5 Sample Size and Sampling Procedures

Sampling is the process of selecting a smaller group from a larger population to draw conclusions about the entire population (Zangirolami-Raimundo, Echeimberg & Leone, 2018). Sampling procedures, therefore, refer to the techniques employed by researchers to identify and select these participants. Samples play a vital role in ensuring that the findings of a study can be generalized, provided they adequately represent the wider population.

Uasin Gishu County comprises six sub-counties which are Soy, Moiben, Kesses, Turbo, Kapseret and Ainabkoi each hosting schools across different. For the purpose of this study, the focus was placed on Sub-County secondary schools where the researcher first identified the total number of Sub-County schools in each sub-county and then applied simple random sampling to select schools for participation. Using a sampling rate of 30%, a total of 48 Sub-County secondary schools were selected out of 162. Principals were purposively sampled because of their central role in managing

resources and overseeing how infrastructure is utilized in their schools. For teachers, the county records indicated an estimated 972 TSC-employed staff in the selected schools. To obtain a representative group, 10% of this population was randomly sampled, giving 97 teachers. As Pandey and Pandey (2021) observe selecting between 10% and 30% of the target group generally yields a reliable sample. The County Quality Assurance and Standards Officer (CQASO) was also purposively included, considering their mandate to monitor and evaluate school facilities (Agoi, 2017).

To capture diversity across the region, the county was stratified into six sub-counties, each forming a stratum for balanced representation (Qrngreen & Levinsen, 2017). Regarding students, the study focused on approximately 17,820 learners in Form Three and Form Four across 48 sampled schools. From each school, eight students were selected based on academic performance rankings provided by class teachers. Specifically, a merit list was used to identify the top four students in Form Three and the top four in Form Four, ensuring that achievement levels were considered.

The actual student sample size was then determined using the formula widely applied in social sciences for identifying representative samples (Mugenda & Mugenda, 2003).

$$n = \frac{Z^2pq}{d^2}$$

Where n=the desired sample size (if the target population is greater than 10,000)

Z= standard normal deviate at required confidence level.

P=the proportion in the target population estimated to have characteristics being measured

Q=1-p

D= the level of statistical significance set.

Therefore, if no estimate available of the proportion in the target population with the characteristics of interest,50% should be used. Z-statistic is 1.96, accuracy at the.05 level hence sample size is;

$N=(1.96)^2(.50)(.50)/(.50)=384$

Therefore, the sample size for students is 384 and Table 3.2 below shows the sample size.

Table 3.2 Sample Size

Sub County	Principals	Teachers	Students
Soy	11	23	88
Moiben	8	16	64
Kesses	10	22	80
Turbo	8	16	64
Kapseret	6	11	48
Ainabkoi	5	9	40
Total	**48**	**97**	**384**

Source: (Author, 2025)

3.6 Research Instruments

The study employed three primary instruments for data collection: questionnaires, interview schedules, and an observation checklist. The questionnaire served as the main tool for gathering information from principals, teachers, and students in the selected schools. It was designed to capture perceptions and practices related to the effective utilization of school infrastructure in the teaching and learning process, and its contribution to academic performance in Sub-County secondary schools in Uasin Gishu County.

Specifically, the questionnaire focused on key areas of infrastructure use, including classroom utilization, library services, computer facilities, and co-curricular resources. To complement the questionnaires, interview schedules were administered to gather in-depth qualitative insights, while the observation checklist was used to directly assess the state and use of physical facilities within schools.

The combination of these instruments ensured that data were collected from multiple perspectives, thereby enhancing the credibility and comprehensiveness of the findings. This approach was necessary because no single tool could provide sufficient information to address the research objectives adequately.

3.6.1 Questionnaire

The questionnaire was the primary tool for collecting data from principals, teachers, and students. A structured format was chosen because it is cost-effective, easy to administer, and simplifies the process of analyzing responses (Orodho, 2009). Moreover, using standardized and carefully designed questions helps reduce researcher bias, thereby enhancing the reliability of the data collected (Dźwigoł & Dźwigoł-Barosz, 2018). The questionnaire was intended to produce quantitative data on how selected school infrastructure in sub-county secondary schools is utilized, particularly regarding its role in supporting teaching, learning, and academic performance.

To ensure a comprehensive understanding, the questionnaire combined both open-ended questions, which allowed respondents to provide detailed opinions and insights, and closed-ended questions, which generated measurable data that could be easily tabulated and analyzed statistically (Daniel & Harland, 2017). Three versions of the questionnaire were developed targeting principals, teachers, and students and administered across the 48 sampled secondary schools. This approach captured the

perspectives of all key stakeholders directly involved in managing, using, and experiencing the school infrastructure.

The student questionnaire was organized into five sections (A–E). Section A gathered demographic information, while Section B focused on classroom utilization and its effect on academic performance. Section C explored the use of library facilities as a resource for teaching and learning, and Section D assessed how computer facilities supported students' academic achievement. Section E examined the role of co-curricular facilities in influencing student performance. The questionnaire included both open- and closed-ended questions, with the latter measured using a five-point Likert scale ranging from 5 = Very adequate to 1 = Unable to rate (Appendix II).

The teacher questionnaire was organized into six sections (A to F), with Section A capturing demographic details, while the subsequent sections focused on different aspects of facility use within schools. Specifically, Section B asked about classroom utilization and its effect on performance, Section C addressed library use, Section D examined the integration of computer facilities, and Section E considered co-curricular resources, while Section F assessed student performance in public secondary schools. Responses were measured using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree, a format that not only made the questions easy to answer but also allowed responses to be pre-coded, which in turn simplified both data entry and analysis (Bryman & Bell, 2015).

Similarly, the principals' questionnaire contained seven sections (A–G). Section A gathered demographic information, while the other sections explored issues such as the layout of infrastructure, compliance with government policy, classroom use, library and computer facilities, as well as co-curricular resources and how these influenced academic outcomes. For this tool, responses were rated on a five-point Likert scale,

ranging from 5 = Excellent to 1 = Unable to rate, a choice considered suitable because it is easy to design, provides a clear way to rank responses, and increases the likelihood that respondents will supply feedback on all items presented to them (Snyder, 2019).

3.6.2 Interview Schedule

In the field of social sciences, interviews are often used when the researcher wants to go beyond short written answers and instead engage participants in a more open exchange of views and experiences. Unlike questionnaires that only provide written responses, interviews give room for personal interaction and also allow the interviewer to notice things like tone of voice, confidence, or hesitations, which may add meaning to the answers provided (Sahoo, 2021). In this study, questions were prepared to guide conversations with the County Quality Assurance and Standards Officer (CQASO) and the secretary of the Board of Management (BOM). These discussions were meant to capture their views on how school facilities are used and how such use connects with student performance in secondary schools across Uasin Gishu County.

To obtain this qualitative information, an interview schedule was used since it creates space for follow-up questions and clarifications, giving richer responses compared to fixed questionnaires (Kivunja & Kuyini, 2017). Interviews may be structured, semi-structured, or unstructured, and can be carried out either one-on-one or in groups, depending on the needs of the study. For this work, a semi-structured format was chosen, focusing on the BOM secretary and the CQASO. The discussions addressed issues such as policies guiding infrastructure development, whether facilities available in schools are adequate, and the difficulties encountered in maintaining them. Appointments were fixed in agreement with the participants: BOM secretaries were interviewed on the same day questionnaires were collected from their schools, while

the CQASO was interviewed later on a separate day that suited their schedule. The interview guide is provided in Appendix V.

3.6.3 Observation Schedule

An observation schedule is a to a tool that is drawn up before fieldwork begins whose aim is to outline in advance the specific behaviors, practices and environmental features that the researcher intends to monitor and record according to Sproull (1988). In this study, the researcher prepared a checklist that guided the observation of selected types of school infrastructure. During the same period when questionnaires were administered, the researcher noted how learners engaged with libraries, classrooms, playgrounds and computer laboratories. The prepared checklist used to record these details is provided in Appendix VI.

3.6.4 Piloting of Research Instruments

A pilot study was conducted in five public secondary schools in Trans-Nzoia County, chosen deliberately because they were outside the main study area. The schools selected were similar in category to those included in the main research and were picked using purposive sampling. The purpose of the pilot was to test the research instruments—questionnaires for students, teachers, and principals, as well as the interview schedule—before their use in the main study.

The pilot provided valuable feedback, revealing areas that needed clarification, identifying ambiguous or repetitive questions, and highlighting weaknesses in the instruments. Based on this feedback, the tools were refined to enhance clarity, accuracy, and overall reliability. Data collected during the pilot was not included in the final study analysis.

According to Hazzi and Maldaon (2015), a pilot study serves as an essential first step in research, offering a "trial run" of the planned procedures. It helps assess the suitability of the instruments, refine the methodology, and ensure alignment with the study objectives. In this study, the pilot was particularly useful for checking both the content validity and internal consistency of the questionnaires and interview schedule.

3.7 Validity and Reliability

Validity refers to how well a research instrument actually measures what it is intended to measure. In simple terms, content validity relates to how well the test items represent the subject matter and concepts that the study intends to measure according to Mohajan (2018). When instruments have strong validity, the results are more likely to capture the real situation being investigated rather than reflecting distortions caused by irrelevant influences or errors. Reliability by contrast deals with the steadiness of an instrument over time and thus a tool is considered reliable if it produces similar outcomes whenever it is applied under comparable circumstances as noted by Snyder, (2019). Consistency of this nature helps minimize random errors and in turn, strengthens confidence in the data that is eventually analyzed.

3.7.1 Validity of Research Instruments

Validity refers to how well a tool measures what it is intended to assess (Mohajan, 2018). In this study, it concerned how accurately the questionnaire items reflected the research focus. A key aspect is content validity, which examines whether the questions adequately cover the concept being studied. Since content validity cannot be statistically tested (Nayak & Singh, 2021), expert judgment was used. University supervisors reviewed the questionnaire and provided feedback on clarity, relevance,

and alignment with the study objectives, leading to revisions that refined the tool to better assess school infrastructure use and its influence on academic performance.

Content validity ensures that items represent the full range of issues under investigation, while face validity focuses on whether each question is clear and logically related to its intended measure. Input from colleagues in the Department of Educational Management at the University of Eldoret further confirmed that the questions met both content and face validity standards. Construct validity was also considered, ensuring that items effectively captured the specific dimensions they were designed to measure. Feedback from the pilot study was incorporated, enhancing the format, clarity, and scaling of items and strengthening the overall validity of the research instrument.

3.7.2 Reliability of Research Instruments

Reliability refers to the consistency of an instrument in measuring what it is intended to measure. When applied repeatedly under similar conditions, a reliable tool should yield comparable results (Snyder, 2019). In this study the internal consistency of the questionnaire was assessed using Cronbach's Alpha, a common statistic in social sciences that measures the degree of correlation among items within a scale without requiring repeated testing. Reliability tends to improve when a scale contains multiple items that are meaningfully related (Agoi, 2017). According to Kumar (2018), a Cronbach's Alpha of 0.7 or higher is generally considered acceptable.

The pilot study results showed that all variables exceeded the 0.7 threshold (see Table 3.3). Computer facilities had the highest internal consistency ($\alpha = 0.927$), followed by classroom utilization ($\alpha = 0.866$), student performance ($\alpha = 0.821$), co-curricular activities ($\alpha = 0.740$), and library services ($\alpha = 0.720$). These findings confirmed that

the questionnaire items were reliable across all domains, making the instrument suitable for the main study.

3.8 Data Collection Methods and Procedures

Before the study could begin, formal approval was sought at several levels. The researcher first obtained authorization from the university, after which a research permit was issued by the National Council for Science, Technology, and Innovation (NACOSTI). Additional clearance was granted by the Uasin Gishu County Director of Education, which allowed the study to be conducted in the targeted schools. Consent was then requested from the principals of the sampled institutions, enabling access to both the schools and the participants.

The main tool for data collection was the questionnaire, which was distributed directly to principals, teachers, and students. In schools where time permitted, the forms were completed and collected on the same day, while in others they were retrieved after one or two days, depending on the internal schedule of the institution. Allowing this flexibility ensured that respondents had enough time to reflect on the questions, resulting in more thoughtful answers. It also reduced the likelihood of missing responses. Since the participants were literate, they were able to communicate their views clearly and confidently. To further encourage full participation, the researcher personally followed up through reminders and courtesy visits until all responses were gathered.

Besides questionnaires, interviews were also held with two key informants: the Board of Management (BOM) Secretary and the County Quality Assurance and Standards Officer (CQASO). These were conducted face-to-face, with the researcher using the interview guide to record responses in real time. Once the data collection was complete,

the information from both questionnaires and interviews was cross-checked for accuracy, consistency, and completeness, following the guidelines suggested by Mugenda (2008).

3.9 Data Analysis Techniques

In this study, data analysis was carried out in several steps, beginning with cleaning and organizing the raw responses, followed by coding, entry, and then statistical examination. As Mugenda (2008) notes, field data must be systematically prepared before meaningful interpretation can occur. Quantitative data from questionnaires completed by principals, teachers, and students were analyzed using SPSS (version 28). Descriptive statistics, including frequencies and percentages, were presented in tables and charts for clarity.

Inferential techniques were also applied. Correlation and regression analyses were used to examine the relationships among variables and to determine how school resources and facilities influenced student outcomes. Regression analysis was particularly useful for assessing the combined effect of classroom utilization, library services, computer facilities, and co-curricular activities on academic performance, following the approach recommended by Creswell and Creswell (2018).

Qualitative data from interviews were reviewed, sorted into categories, and grouped into broader themes. This thematic analysis, based on Braun and Clarke (2006), provided insights that complemented the quantitative findings and added depth to the interpretation of result.

3.10 Ethical Consideration

The research received approval from the Department of Educational Management at the University of Eldoret. Formal authorization was also granted by the Ministry of

Education and the Uasin Gishu County Director of Education, following the issuance of a research permit by NACOSTI. In conducting the study the researcher adhered to ethical guidelines. Prior to data collection the purpose and objectives of the research were explained to all participants enabling them to make an informed decision regarding their involvement. Consent was obtained freely, consistent with Nnebue (2016) position that participation in research should remain voluntary and free from coercion.

During the fieldwork, participants were instructed not to include their names or those of their schools when completing the questionnaires. This step was taken to protect privacy and to make clear that the information provided would serve academic purposes only. The researcher strictly observed anonymity and confidentiality by ensuring that no data could be traced back to individual respondents or specific schools. To further maintain integrity, participants were assured that their responses would be handled securely and reported in a way that safeguarded both individuals and institutions. The names of schools were deliberately withheld during analysis and reporting to prevent reputational risk. In addition, the researcher carefully cross-checked data entry and coding to avoid errors, thereby guaranteeing that the results reflected accurate and trustworthy information.

3.11 Research Field Experiences

The study was carried out in Uasin Gishu County, covering six sub-counties, namely Moiben, Ainabkoi, Turbo, Soy, Kapseret and Kesses. The researcher visited the sampled schools to administer questionnaires and collect data. Most respondents were cooperative and provided the required information, though a few were hesitant due to time constraints or doubts about the relevance of a degree not officially recognized by the Teachers Service Commission. Some participants requested additional time to

complete the questionnaires, requiring the researcher to leave the forms and return later. While this improved the/ response rate, it also slowed the data collection process. Accessibility posed another challenge: schools near main roads were easy to reach, but those in remote areas could only be accessed via rough, dusty tracks. Since the work was done during the dry season, dust reduced visibility in some stretches and slowed travel, which further extended the time needed for data collection

3.12 Summary of Chapter Three

Chapter Three covers the study area, research design, and philosophical orientation. It also presents the methodology, target population, sampling procedures, instruments, pilot testing, validity and reliability checks, data collection and analysis methods, ethical considerations, and field experiences, before concluding with a summary. The study targeted a population of 6 SCQASOs, 162 principals, 972 teachers, and about 17,820 students. From this, the sample included 48 principals, 97 teachers, 384 students, and one SCQASO at the county level. Data were collected mainly through questionnaires distributed to principals, teachers, and students. Interviews with the SCQASO and the BOM secretary added further insights, while an observation checklist was used to support these approaches.

For the analysis, both descriptive and inferential statistics were applied. School infrastructure was treated as the independent variable, and students' academic performance was taken as the dependent variable.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND PRESENTATION

4.1 Introduction

This chapter presents the demographic characteristics of the respondents, followed by the findings and their interpretation in line with the four research objectives: (i) to examine how classroom utilization influences students' academic performance, (ii) to assess the extent to which library services contribute to academic performance, (iii) to evaluate how the use of ICT affects academic performance, and (iv) to determine the role of co-curricular activities in promoting academic performance.

Descriptive statistics were employed and the results are presented using tables and figures. Inferential statistics, specifically regression analysis and Pearson's correlation coefficient, were applied to measure the strength and direction of the relationships between the study variables. In addition, qualitative data was analyzed thematically using content analysis to complement and enrich the quantitative findings.

4.2 General Information

Data collection was done over a period of four months, from January to April 2023. The questionnaire issued to principals were 48, 97 issued to teachers and 384 were administered to students in the sampled schools. All the questionnaires from the respondents were collected back by the researcher giving a response rate of hundred percent (100%). The response rate for the study was within the recommended levels since Nyamjom (2013) argues that a response rate of 75% is considered excellent and representative of the population. The achieved response rate of 100% was attributed to the self-administration of the questionnaire applied by the researcher from the intended respondents and collected them immediately or at a later date upon agreement.

Therefore, the response rate of the study was excellent.

4.3 Demographic Characteristics of respondents

The study sought to determine the demographic characteristics of the respondents who participated in the study which included gender, position, age and professional qualifications. This was important in explaining the variations in respondent's views towards school infrastructure and how it influenced academic performance.

4.3.1 Gender of the Respondents

The gender of the students, teachers and principals were summarized in Table 4.1. Gender was used as one of the demographic characteristics of the respondents to show variation in their views. Majority of the teachers 58 (60.0%) were female teachers while male teachers were 39 (40.0%) of the sample. However, most of the principals 34 (70.8%) were male, and female principals comprised 14(29.2%) of the sample. This indicated that there was gender disparity among teachers and principals in Sub County public secondary schools in Uasin Gishu County, Kenya. Majority of the students 211(54.8%) were male and 173 (45.2%) were female. This indicated that there was gender disparity among students in Sub County public secondary schools in Uasin Gishu County, Kenya.

Table 4.1 Gender of Respondents

	Teachers		**Principals**		**Students**	
	Freq	%	Freq	%	Freq	%
Male	39	40.0	34	70.8	211	54.8
Female	58	60.0	14	29.2	173	45.2
Total	**97**	**100.0**	**48**	**100.0**	**384**	**100.0**

4.3.2 Position Held by Respondent Teachers in the School

On the responsibility assigned to individual teachers, most of them were class teachers of either form four or form three 56 (58%) while 41 (42%) of the teachers were class teachers and also HODs as presented in Figure 4.1. This indicated that the distribution of responsibilities to teachers was fair across most schools empowering the teachers in managerial skills by the school administrators. This was useful to this study since teachers had the experience and answered the questions in the questionnaire on the selected school infrastructure and how it influenced academic performance in public secondary schools in Uasin Gishu County.

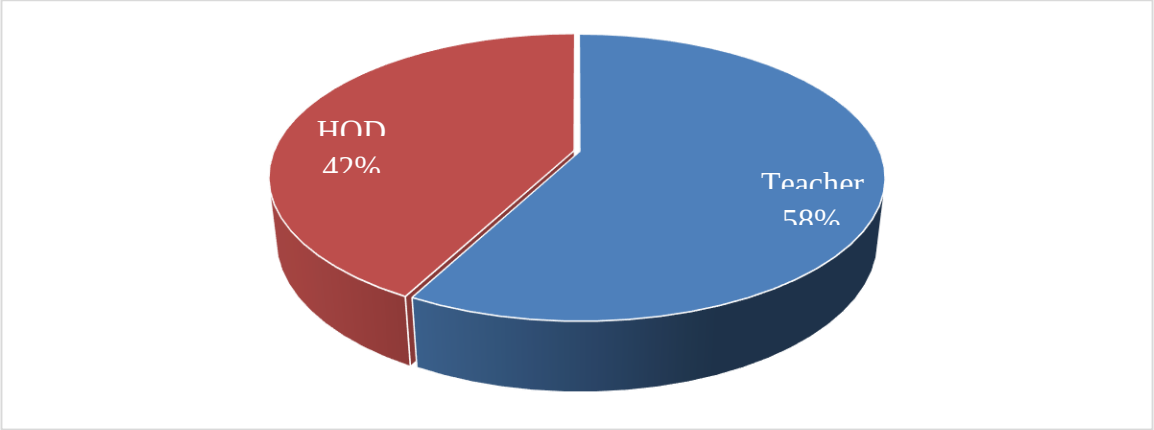

Figure 4.1 Responsibility of Teachers in the School

4.3.4 Age Bracket of Teachers and Principals

Concerning age, majority of the teachers 54(55.6%) were in the age bracket of 31 and 41 years, with 30(31.1%) aged below 30 years' bracket, and 5 (5.2%) aged above 46 years, 8(8.2%) were aged between 36- and 45-year's bracket as shown in Table

4.2. Most of the principals 36(75%) were in the age bracket of above 46 years, with 4(8.33%)aged between 31 and 41 years and 6 (12,50%) aged between 36 and 45years'

bracket, while a few 2 (4.16%) were below 30 years of age The findings implied that most of the teachers and principal's respondents were aged above 31 years and had enough experience to response to the questions in the questionnaire concerning how utilization of school infrastructure promoted academic performance in public secondary schools in Uasin Gishu County.

Table 4.2 Age Bracket of Teachers and Principals

Teachers	Principals	Freq	%	Freq	%
<30 years	30		31.1	2	4.16
31-41 years	54		55.6	4	8.33
36-45 years	8		8.2	6	12.50
>46 years	5		5.2	36	75.00
Total	97		100.0	48	100.0

4.3.5 Age of Students

Majority of the students 219 (57%) aged between 18 and 20 years, with 134 (35%) aged below 17 years, while 31 (8%) aged above 20 years as shown in Figure 4.2. The findings implied that most students were aged above 18 years. Age was used as one of the demographic characteristics of the respondents to show variation in their views

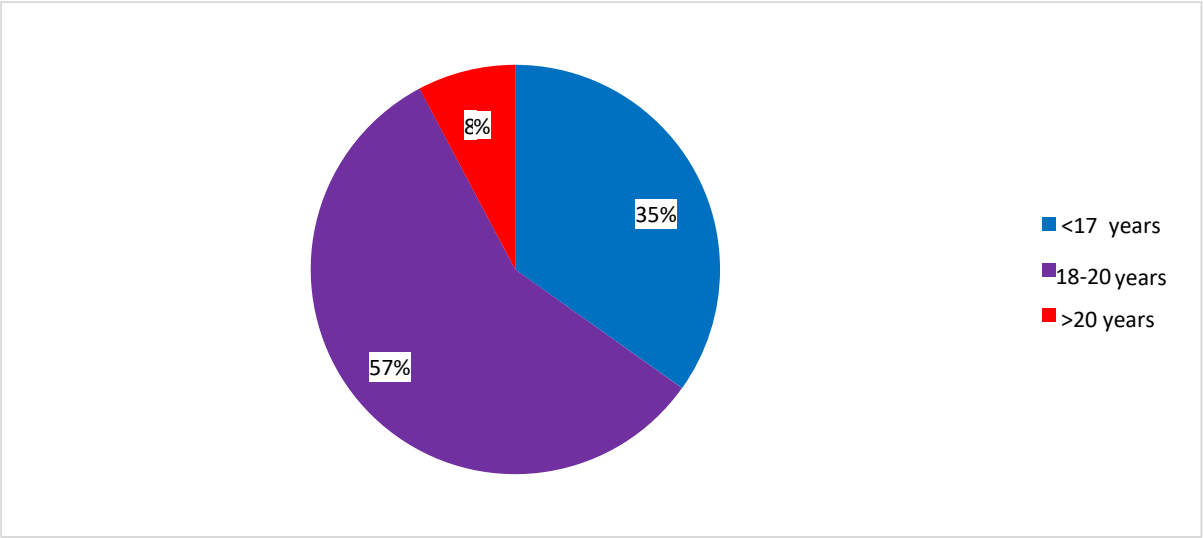

Figure 4.2 Age of Students

4.3.6 Professional Qualifications

Majority of the teachers 83 (85.6%) and principals 34 (70.8%) had Bachelor's degrees in education, with 8 (7.8%) teachers and 1 principal representing 2.8% had diploma while 6 (6.7%) teachers and 12 (25%) principals had masters respectively as their highest professional qualification as shown in Table 4.3. The finding indicated that most of the teachers and principals were qualified and, therefore would respond adequately to the questionnaire concerning how utilization of school infrastructure influenced academic performance in Sub County level secondary schools in the County.

Table 4.3 Professional Qualifications

	Teachers		Principals	
	Freq	**%**	**Freq**	**%**
Diploma	8	7.8	1	2.1
Bachelors	83	85.6	34	70.8
Masters	6	6.7	12	25.0
PhD	0	0	1	2.1
Total	**97**	**100.0**	**48**	**100.0**

4.3.7 Teaching Experience

Majority of the principals 43 (89%) had more than 10 years of teaching experience, with 5 (11%) having between 5- and 9-year's teaching experience as shown in Figure 4.3. The finding showed that most of the principals had enough experience that was relevant in the study on how utilization of school infrastructure influenced academic performance in Sub County level secondary schools in Uasin Gishu County.

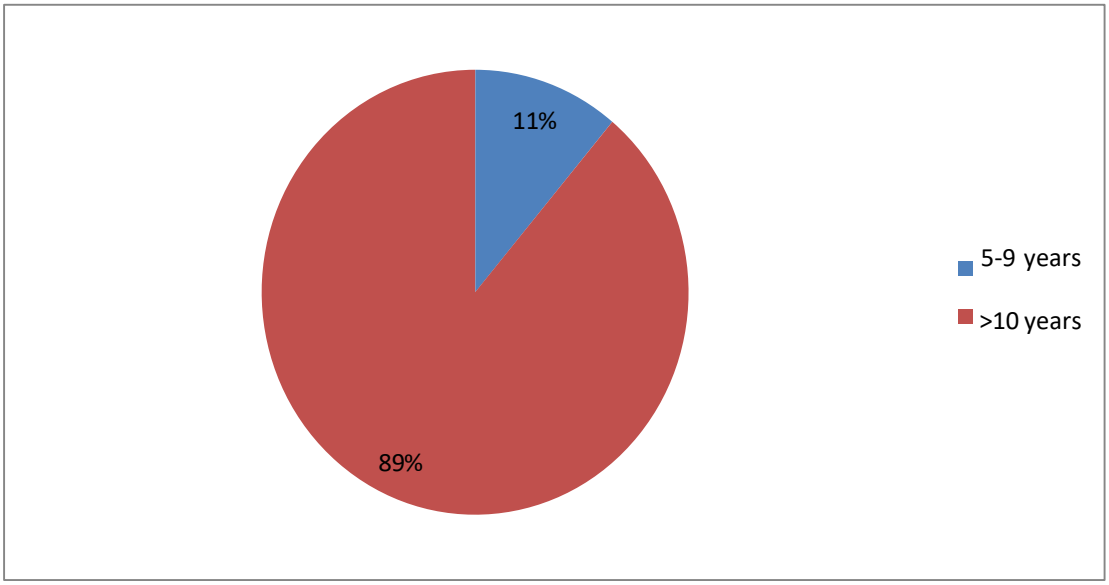

Figure 4.3 Teaching Experience

4.3.8 Level of Study of Student Respondents

The number of the students who studied in forms four and form three respectively was as shown in Table 4.4 below. This indicated that most of the students involved in the study had stayed longer in the school and were conversant with the utilization of school infrastructural facilities being investigated.

Table 4.4 Level of Study of Student Respondents

Form	Gender	Frequency	Percentage(%)
Three	Male	86	22.4
	Female	91	23.7
Four	Male	125	32.5
	Female	82	21.4
Total		**384**	**100%**

4.4 Utilization of Classroom on Students' Performance

The first objective was to investigate how the utilization of classroom influenced academic performance in Sub County secondary schools in Uasin Gishu County. This was achieved by obtaining the views of the teachers, students and principals on the utilization of classrooms.

4.4.1 Student Responses on Classroom Utilization

The Table 4.5 below presents students' perceptions regarding how classroom spacing influences utilization and learning in Sub County secondary schools in Uasin Gishu County. Responses are based on a 5-point scale. The analysis of student feedback on

classroom utilization offers detailed insight into instructional practices and their perceived impact on academic achievement.

Table 4.5 Student Responses on Classroom Utilization

Statement	Never	Rarely	Sometimes	Often	Always	M	SD
Teachers utilize classroom time fully for academic activities.	10 (2.6%)	18 (4.7%)	51 (13.3%)	202 (52.6%)	103 (26.8%)	4.00	0.85
The classroom is used effectively for both group and individual learning.	12 (3.1%)	22 (5.7%)	52 (13.5%)	198 (51.6%)	100 (26.0%)	3.92	0.89
Teachers make use of learning corners, displays, or wall charts.	15 (3.9%)	30 (7.8%)	66 (17.2%)	184 (47.9%)	89 (23.2%)	3.79	0.96
The classroom layout is rearranged based on the lesson/activity.	18 (4.7%)	33 (8.6%)	73 (19.0%)	170 (44.3%)	90 (23.4%)	3.73	1.01
Students are actively engaged during classroom activities.	8 (2.1%)	20 (5.2%)	45 (11.7%)	208 (54.2%)	103 (26.8%)	3.98	0.86
Use of classroom space helps understanding of lessons.	7 (1.8%)	16 (4.2%)	40 (10.4%)	213 (55.5%)	108 (28.1%)	4.04	0.81
Classrooms are used beyond normal lessons (e.g., group study).	20 (5.2%)	32 (8.3%)	55 (14.3%)	184 (47.9%)	93 (24.2%)	3.78	0.99
Classroom setup supports interactive learning.	14 (3.6%)	26 (6.8%)	60 (15.6%)	195 (50.8%)	89 (23.2%)	3.83	0.93
All students have equal opportunity due to classroom use.	12 (3.1%)	24 (6.3%)	62 (16.1%)	187 (48.7%)	99 (25.8%)	3.88	0.91
Classroom utilization improves performance in assessments.	10 (2.6%)	18 (4.7%)	58 (15.1%)	194 (50.5%)	104 (27.1%)	3.95	0.88

For the statement, “Teachers utilize classroom time fully for academic activities,” 93 students (24.2%) strongly agreed, and 208 (54.2%) agreed, representing a combined positive response of 78.4%. Only 7 students (1.8%) strongly disagreed and 23 (6.0%) disagreed, while 53 (13.8%) remained neutral. With a mean of 3.93 and standard deviation (SD) of 0.91, the data suggest that instructional time is perceived as being maximized, aligning with pedagogical standards that advocate time-on-task as a determinant of learning outcomes (Scheerens, 2016).

The second item, “The classroom is used effectively for both group and individual learning,” recorded a high level of agreement, with 206 students (53.6%) agreed and 86 (22.4%) strongly agreed, while 10 (2.6%) strongly disagreed and 24 (6.3%) disagreed. The neutral stance was taken by 58 students (15.1%). The resulting mean of 3.86 (SD = 0.95) indicates general endorsement of differentiated instruction and flexible learning environments. These findings are consistent with Vygotsky’s sociocultural theory, which emphasizes both collaborative and individualized scaffolding as critical to knowledge construction.

With respect to “Teachers make use of learning corners, displays, or wall charts,” 89 (23.2%) strongly agreed and 196 (51.0%) agreed, with dissenting responses remaining minimal (7.8% disagreed; 3.1% strongly disagreed). The neutral rate of 14.8% may point to inconsistency in visual resource use across classrooms. A mean of 3.84 (SD = 0.96) reinforces the pedagogical value of environmental print and structured displays as visual scaffolds, contributing to multimodal learning (Mayer, 2009). In terms of spatial flexibility, the item “The classroom layout is rearranged based on the type of lesson/activity” elicited 97 (25.3%) strong agreements and 192 (50.0%) agreements. With only 10 students (2.6%) strongly disagreed and 27 (7.0%) disagreed, the mean

score of 3.91 (SD = 0.93) reflects adaptive pedagogical approaches that optimize classroom configurations in line with learner-centered paradigms.

The fifth statement, “Students are actively engaged during classroom activities,” was affirmed by 101 students (26.3%) strongly agreed and 195 (50.8%) agreed. The minority responses—disagreed (5.7%) and strongly disagreed (2.3%)—combined with a mean of 3.87 (SD = 0.94) illustrate a predominantly positive perception of student engagement, which is essential to constructivist teaching and participatory learning models (Fredricks et al., 2004). Regarding the utilization of physical space to enhance comprehension, “The use of available classroom space helps in better understanding of lessons” showed the highest mean score at 4.00 (SD = 0.97), with 109 students (28.4%) strongly agreed and 209 (54.7%) agreed. This 83.1% cumulative agreement underscores the direct cognitive benefits students associate with an optimized physical learning environment.

The item classrooms are used beyond normal lessons (e.g., for revision or group study) was also positively received: 24.7% strongly agreed, 52.6% agreed, and only a combined 7.3% disagreed or strongly disagreed. The mean score of 3.87 (SD = 0.93) highlights that students view the classroom not only as an instructional space but also as a resource hub for extended academic activities, which is crucial in the context of holistic curriculum delivery. The current classroom setup supports interactive learning yielded similarly favorable outcomes, with 24.7% strong agreement and 52.9% agreement. With a mean of 3.90 (SD = 0.91), the data point to the prevalence of interaction-facilitating layouts and teaching methods, consistent with contemporary collaborative learning approaches (Johnson & Johnson, 2009). Equity in participation was addressed in the item “All students in class have an equal opportunity to participate due to classroom use,” with 96 students (25.0%) strongly agreed and 196 (51.0%)

agreed. The mean of 3.88 (SD = 0.94) reflects a broadly inclusive classroom atmosphere, although 8.1% of dissenting views indicated that there was room for improvement in learner accessibility and engagement equity.

Finally, the statement “Classroom utilization improves my performance in exams and assessments” attracted strong agreement from 101 students (26.3%) and agreement from 197 (51.3%). With a mean of 3.91 and SD of 0.94, this item illustrates the perceived link between environmental factors and academic achievement, echoing Bronfenbrenner’s ecological systems theory which recognizes the learning environment as a microsystem influencing development and performance. This agreed with Suleman & Hussain (2014) that a conducive classroom environment comprised of various components like room size, lighting, temperature, walls, ventilation, whiteboards, mats, seats, floor, PCs and other materials that prove fruitful in promoting students’ learning. Further, it agreed with Umar (2017) who stated that, an unconducive classroom environment consisted of small classroom size, inappropriate ventilation, high classroom temperature, lack of ICT instructional teaching aids, inappropriate desks, improper seating arrangements, lack of fresh air and overcrowded classrooms prove negative impact on students’ performance.

4.4.2 Student Responses on Classroom Spacing

The Table 4.6 presents the descriptive statistics for students’ responses regarding classroom spacing and its impact on the utilization of learning space in Sub County public secondary schools in Uasin Gishu County. The analysis includes frequency counts, percentages, means, and standard deviations for each item, based on a 5-point Likert scale (1 = Never to 5 = Always). This assessment aimed to explore the extent to which spatial arrangements in classrooms support effective teaching and learning. The

results highlight areas of strength and concern in how classroom spacing contributes to or hinders the optimal utilization of learning environments.

Table 4.6 Student Responses on Classroom Spacing

Statement	Never	Rarely	Sometimes	Often	Always	M	SD
I find the space between desks and chairs adequate for learning.	15 (3.9%)	30 (7.8%)	99 (25.8%)	132 (34.4%)	108 (28.1%)	3.71	1.10
I can move around the classroom without disturbing others.	18 (4.7%)	26 (6.8%)	100 (26.0%)	140 (36.5%)	100 (26.0%)	3.65	1.12
The classroom is arranged in a way that supports group activities.	25 (6.5%)	34 (8.9%)	120 (31.3%)	120 (31.3%)	85 (22.1%)	3.48	1.18
I face difficulty seeing the board or hearing the teacher due to crowded seating.	45 (11.7%)	35 (9.1%)	99 (25.8%)	110 (28.6%)	95 (24.7%)	3.69	1.23
The spacing allows the teacher to walk around and reach all students.	12 (3.1%)	28 (7.3%)	109 (28.4%)	145 (37.8%)	90 (23.4%)	3.79	1.04
The current seating arrangement helps me stay focused.	20 (5.2%)	30 (7.8%)	109 (28.4%)	130 (33.9%)	95 (24.7%)	3.67	1.14
The classroom is overcrowded, affecting how well it is used for learning.	28 (7.3%)	36 (9.4%)	80 (20.8%)	140 (36.5%)	100 (26.0%)	3.75	1.15
Teachers adjust classroom layout depending on the lesson or activity.	20 (5.2%)	40 (10.4%)	109 (28.4%)	125 (32.6%)	90 (23.4%)	3.57	1.17
Poor spacing causes distractions during lessons.	18 (4.7%)	34 (8.9%)	92 (24.0%)	135 (35.2%)	105 (27.3%)	3.81	1.10

Majority of the students reported positively regarding spacing adequacy, with 132 (34.4%) indicating “Often” and 108 (28.1%) selecting “Always.” A smaller proportion selected “Never” 15 (3.9%) and “Rarely” 30 (7.8%), indicating minimal concern. The calculated mean was 3.71, with a standard deviation of 1.10, suggesting that the space between desks and chairs was generally perceived as adequate, but with variability across classrooms. Positive responses were dominant, with 140 (36.5%) students indicating “Often” and 100 (26.0%) said “Always.” On the lower end, 18 (4.7%) selected “Never” and 26 (6.8%) “Rarely.” move around the classroom without disturbing others. The mean rating of 3.65 (SD = 1.12) implied moderate satisfaction with movement ease, though some limitations were still noted.

However results showed that 120 (31.3%) chose “Often” the classroom was arranged in a way that supports group activities, and 85 (22.1%) said “Always,” while 25 (6.5%) noted “Never” and 34 (8.9%) “Rarely.” The mean score was 3.48 (SD = 1.18), indicating that although group-friendly arrangements are common, they are not universally implemented across schools. On the statement that students face difficulty seeing the board or hearing the teacher due to crowded seating item showed that 110 (28.6%) students marked “Often” and 95 (24.7%) “Always,” indicating that many learners experienced challenges related to overcrowding. Meanwhile, 45 (11.7%) selected “Never.” The item had a mean of 3.69 (SD = 1.23), highlighting a considerable concern about spatial crowding impeding classroom communication and visibility.

The spacing allows the teacher to walk around and reach all students. With 145 (37.8%) indicating “Often” and 90 (23.4%) “Always,” most students perceived teacher mobility as supported by the classroom layout. Very few selected “Never” 12 (3.1%). The mean was 3.79 (SD = 1.04), suggesting a generally good level of facilitation for teacher interaction with all students. A total of 130 (33.9%) selected “Often” that the

current seating arrangement helps me stay focused, 95 (24.7%) “Always” stated that the current seating arrangement helps me stay focused. Conversely, 30 (7.8%) marked “Rarely” and 20 (5.2%) “Never.” The mean score was 3.67 (SD = 1.14), showing that most students found the seating arrangement supportive of concentration, albeit with some variation in experience.

Results showed that 140 (36.5%) students responding had “Often” said that the classroom is overcrowded, affecting how well it is used for learning. This negative statement and 100 (26.0%) “Always,” suggesting that overcrowding remains a widespread issue. The mean score stood at 3.75 (SD = 1.15), indicating that perceived overcrowding substantially impacts classroom utilization and learning effectiveness. Teachers adjust classroom layout depending on the lesson or activity. With 125 (32.6%) choosing “Often” and 90 (23.4%) “Always,” the findings suggested that dynamic adjustment is practiced, although 40 (10.4%) selected “Rarely.” The mean of 3.57 (SD = 1.17) reflects moderate use of layout adaptation based on instructional needs.

Poor spacing causes distractions during lessons. High agreement was observed here, with 135 (35.2%) indicating “Often” and 105 (27.3%) “Always.” Fewer than 10% chose “Never” or “Rarely.” The mean was 3.81 (SD = 1.10), reinforcing the view that inadequate spacing was a significant source of distraction in many classrooms. The analysis of spacing-related utilization revealed that while many students report positively on aspects such as teacher mobility and desk arrangement, issues such as overcrowding and visibility distractions remain prevalent. Mean scores for most items ranged between 3.48 and 3.81, suggesting moderate to high agreement with utilization concerns and practices. These findings underscore the importance of investing in classroom spatial design and flexible use strategies to optimize learning environments

and improve academic performance in Sub County public secondary schools in Uasin Gishu County.

4.4.3 Frequency of Classroom Use

The students were requested to rate the following statements that seek to assess how often classrooms were utilized for various academic and extracurricular activities throughout the school day and beyond. Please indicate your level of agreement with each statement by selecting the option that best describes the frequency of classroom use as shown in the Table 4.7.

Table 4.7 Frequency of Classroom Use

	Always		**Often**		**Sometimes**		**Rarely**	
	F	%	F	%	F	%	F	%
The classroom is used for lessons every school day.	52	13.5	57	14.8	233	60.6	42	11.0
The classroom is used for extra lessons or remedial classes outside normal school hours.	22	5.8	114	29.7	159	41.3	89	23.2
The classroom is used for co-curricular activities such as clubs, debates, or meetings.	15	3.9	94	24.5	67	17.4	208	54.2
The classroom is available and used during break times or free periods.	35	9.0	104	27.1	169	43.9	76	20.0

The analysis of students' responses on the frequency of classroom use revealed that classrooms were not fully utilized every school day for lessons, with 60.6% of students

indicating they are only used sometimes, and just 13.5% reporting daily (always) utilized. Extra lessons or remedial classes outside normal hours occur moderately, as 41.3% said sometimes and 29.7% often, though 23.2% noted they rarely happen. Classrooms are rarely used for co-curricular activities such as clubs or meetings, with over half of the students (54.2%) reporting infrequent use for these purposes. Additionally, classroom use during break times and free periods was moderate, with 43.9% indicating sometimes and only 9% stating always. Overall, these findings suggested that while classrooms are primarily used for lessons, there is notable underutilization during some periods, particularly for co-curricular activities and breaks, highlighting potential opportunities to optimize classroom usage and enhance resource efficiency in the school.

The underutilization of classrooms, especially during break times and for co-curricular activities, suggested that the school was not maximizing its available learning spaces. This inefficiency led to overcrowding during peak times and missed opportunities for enriching students' learning experiences through extracurricular engagement. To improve academic performance and overall student development, school management should consider revising classroom scheduling, encouraging more use of classrooms for diverse activities, and optimizing time slots to ensure more consistent and effective utilization of classroom resources. This agreed with Koroye (2016), that the school's physical environment consisted of physical infrastructures and facilities which included school buildings, classrooms, furniture, equipment, instructional materials, laboratories, libraries, and playgrounds among others required to be positioned correctly for effective utilization.

4.4.3 Rating the Spacing of Learners' Lockers and Chairs in the Classroom

Majority of the teachers 50 (51.1%) and149 (38.7%) students rated the spacing of lockers to be inadequate, with 44 (44.9%) teachers and 210 (54.8%) students rating them to be adequate, while 4 (4%) teachers and 25 (6.5%) students rated the spacing between lockers as extremely inadequate as shown in Figure 4.6 below. Most of the students rated the spacing of learners' lockers to be adequate.

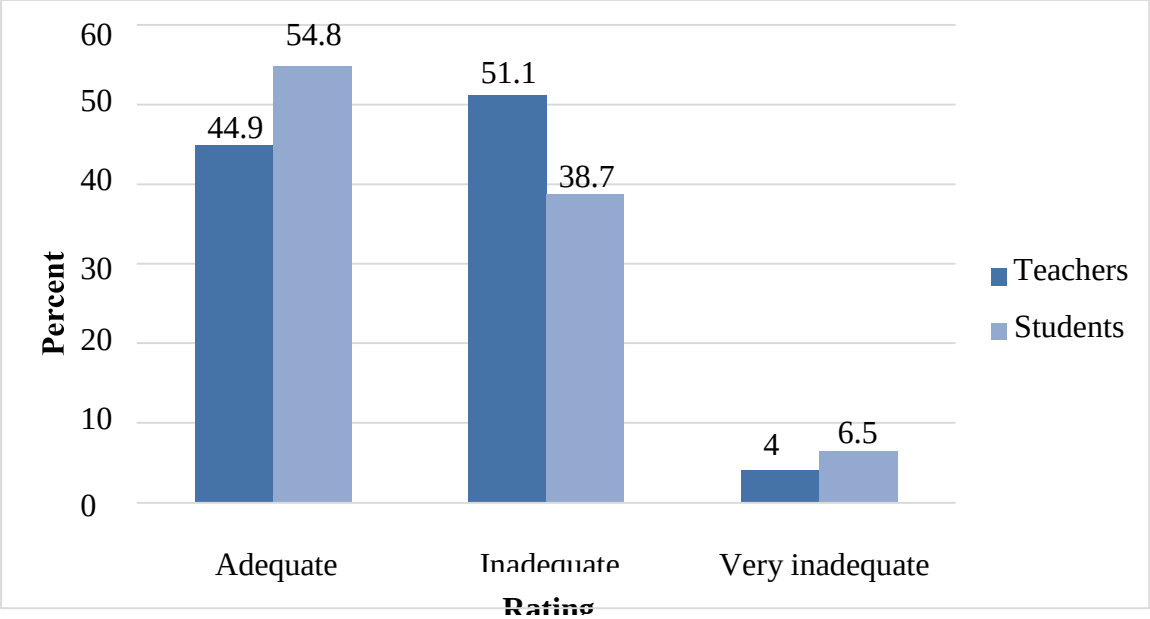

Figure 4.4 Rating the Spacing of Learners' Lockers and Chairs

This implied that the spacing of learners' lockers and chairs in classes in sub-county schools in the County were adequate. In consideration of the crucial role that school infrastructure plays in achieving the desired learning outcomes, the improved academic performance of students required additional resources that included; materials, informational resources, physical resources, and enough textbooks per student. This agreed with the World Bank (2016) that the enrolment of secondary schools increases from year to year, which is not proportionate to the existing school

infrastructure to accommodate the increasing enrolment leading to overcrowding in the classrooms where one class has more than 74 students. Well-organized, equipped, and facilitated classroom environment had a positive effect on the academic achievement of students (Suleman, Aslam & Hussain, 2014).

4.4.5 Utilization of Classroom in Relation to Students' Academic Performance

The principals were requested to rate the utilization of classroom in relation to students' academic performance and their responses were summarized in Table 4.8.

Table 4.8 Utilization of Classroom in Relation to Students' Academic Performance

	SA	A	UD	D	SD	M	SD
Adequate classroom utilization leads to improved student academic performance.	20 (41.7%)	18 (37.5%)	6 (12.5%)	3 (6.3%)	1 (2.1%)	4.21	0.93
Overcrowded classrooms negatively affect student learning outcomes.	28 (58.3%)	14 (29.2%)	4 (8.3%)	2 (4.2%)	0 (0.0%)	4.42	0.76
Effective classroom scheduling improves performance in national exams.	18 (37.5%)	20 (41.7%)	7 (14.6%)	3 (6.3%)	0 (0.0%)	4.10	0.87
Underutilized classrooms represent wasted learning opportunities.	15 (31.3%)	19 (39.6%)	10 (20.8%)	3 (6.3%)	1 (2.1%)	3.92	0.99
Specialized classrooms enhance academic performance when optimally used.	22 (45.8%)	17 (35.4%)	6 (12.5%)	2 (4.2%)	1 (2.1%)	4.19	0.95
Adequate classrooms reduce teacher workload and improve teaching quality.	19 (39.6%)	18 (37.5%)	6 (14.6%)	3 (6.3%)	1 (2.1%)	4.06	0.99
Poor classroom utilization contributes to low academic performance.	17 (35.4%)	15 (31.3%)	10 (20.8%)	4 (8.3%)	2 (4.2%)	3.86	1.11

When principals were asked whether adequate classroom utilization leads to improved academic performance, 20 (41.7%) strongly agreed and 18 (37.5%) agreed, totaling 79.2% agreement, while 6(12.5%) remained neutral, 3(6.3%) disagreed, and 1(2.1%) strongly disagreed. The mean (M = 4.21, SD = 0.93) points to broad support, albeit with a small proportion expressing dissent, possibly due to differing interpretations of what constitutes “adequate” utilization. Findings from the Table 4.8 indicated that a significant majority of principals affirmed that overcrowded classrooms negatively affect student learning outcomes, with 28 (58.3%) strongly agreed and 14 (29.2%) agreed, representing a combined 87.5% agreement. Only 4 (8.3%) were neutral, while 2 (4.2%) disagreed and none strongly disagreed. The high mean score (M = 4.42, SD = 0.82) reflects a strong consensus with minimal variability, underscoring that class size management is widely perceived as a key determinant of academic achievement.

However, the statement that effective classroom scheduling improves national examination results was supported by 18 (37.5%) who strongly agreed and 20 (41.7%) who agreed, for a combined 79.2%. About 7(14.6%) of respondents remained neutral, while 3(6.3%) expressed disagreement. The average score (M = 4.10, SD = 0.87) shows that most participants associated timetabling efficiency with better student performance, though some were less convinced. When asked whether underutilized classrooms amounted to lost learning opportunities, 15 principals (31.3%) strongly agreed and 19 (39.6%) agreed, giving a total agreement of 70.9%. About 10 (20.8%) were neutral, while 4 (8.4%) disagreed. The mean score (M = 3.92, SD = 0.99) reflects moderate consensus, but the relatively high number of neutral responses suggests that some principals view issues like overcrowding as more pressing than underutilization

Similarly, most principals agreed that optimal use of specialized classrooms such as laboratories enhances academic performance, with 22 (45.8%) strongly agreed and 17

(35.4%) agreed, for a total of 81.2% agreement. Neutral views accounted for 6 (12.5%), and a small 3(6.3%) disagreed. The mean score (M = 4.19, SD = 0.95) still indicates high agreement, though the slightly larger spread in responses may reflect variations in access to such facilities across schools.

On the question of classroom adequacy, most principals felt that sufficient classrooms reduce teacher workload and improve teaching quality. Nineteen principals (39.6%) strongly agreed, and another 18 (37.5%) agreed, making up more than three-quarters of the group. Around 6(14.6%) were undecided, while 4(8.4%) disagreed. The mean score (M = 4.06, SD = 0.99) supports this general agreement, but the spread suggests that some principals also weigh other factors in influencing teaching quality.

Finally, on the statement that poor classroom utilization contributes to low academic performance, 17 principals (35.4%) strongly agreed and 15 (31.3%) agreed, giving a total agreement of 66.7%. However, 10 (20.8%) remained neutral, and 6(12.5%) expressed disagreement to varying degrees. The mean score (M = 3.86, SD = 1.11) and the higher standard deviation indicate more divergent views, implying that while many principals recognize a link between classroom use and performance, others believe that poor academic results are influenced by a broader set of factors. This finding agreed with Awan (2018) that school facilities like school buildings, electricity, natural/artificial lighting and ventilation in classrooms, drinking water, wash rooms and playground were the main attributes to improve students' learning.

4.4.6 Administrative Practices in Classroom Utilization

The researcher sought to examine administrative practices in classroom utilization and their perceived influence on academic performance in Sub County secondary schools in Uasin Gishu County. The principals were asked to indicate their level of agreement

with five statements relating to how school leadership manages and supports optimal classroom use. Responses were measured on a five-point Likert scale ranging from Strongly Agree (SA) to Strongly Disagree (SD). Table 4.9 presents the distribution of responses in terms of frequency (F) and percentage (%), alongside the mean (M) and standard deviation (SD) for each item.

Table 4.9 Administrative Practices in Classroom Utilization

	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree	Mean	SD
The school administration regularly monitors classroom usage to ensure efficiency.	20 (41.7)	17 (35.4)	6 (12.5)	4 (8.3)	1 (2.1)	4.07	0.96
The timetable is designed to maximize use of all available classrooms.	18 (37.5)	20 (41.7)	5 (10.4)	4 (8.3)	1 (2.1)	4.04	0.94
Classroom allocation considers the number of students and subject requirements.	19 (39.6)	18 (37.5)	6 (12.5)	4 (8.3)	1 (2.1)	4.04	0.95
The administration provides adequate resources to facilitate optimal classroom use.	15 (31.3)	21 (43.8)	7 (14.6)	4 (8.3)	1 (2.1)	3.94	0.97
Data on classroom utilization is reviewed regularly to improve academic performance.	14 (29.2)	20 (41.7)	8 (16.7)	5(10.4)	1 (2.1)	3.85	0.95

A significant number of principals reported that their school administration regularly monitors classroom usage to ensure efficiency. Among the principals surveyed, over three-quarters 37 (77.1%) agreed that regular monitoring is an essential part of school administration, with 20(41.7%) strongly agreed and 17 (35.4%) agreed. A small proportion remained neutral, and very few disagreed. The mean score (M = 4.07, SD = 0.96) indicates widespread acceptance of monitoring, though a few principals suggested room for improvement.

Regarding classroom timetabling, 38 principals (79.2%) agreed that schedules are structured to maximize classroom use, with 18(37.5%) strongly agreed and 20 (41.7%) agreed. About 10% were neutral, and fewer than 10% disagreed. The mean score (M = 4.04, SD = 0.94) reflects strong support for effective timetabling. When asked whether classroom allocation considers student numbers and subject requirements, 37(77.1%) agreed, nearly evenly split between strong agreement (39.6%) and agreement (37.5%), while 12.5% were neutral. The mean score (M = 4.04, SD = 0.95) indicates general endorsement, though some principals noted that allocations could occasionally be better aligned with actual class needs. On the provision of resources for classroom use, 36(75.1%) of principals agreed, with 15(31.3%) strongly agreed and 21(43.8%) agreed, showing broad support for adequate resource availability. Fourteen percent were neutral, and about one in ten disagreed. The mean score (M = 3.94, SD = 0.97) shows that while most respondents view available resources as sufficient, there was a sense that further investment would enhance utilization.

Finally, on the statement that data on classroom utilization is regularly reviewed to boost academic performance, 14 principals (29.2%) strongly agreed and 20 (41.7%) agreed, totaling 70.9% agreement. Neutral responses stood at 8(16.7%) while 5(12.5%) disagreed in varying degrees. The mean score (M = 3.85, SD = 1.00) and slightly higher

variability suggest that although many schools engage in data-driven review, its application may not be consistent across all institutions.

4.4.7 Description on Classroom Utilization Practices

The study sought to assess how teachers utilize classroom space, time, and resources in support of academic activities. The items explore the frequency of various instructional strategies and classroom management practices related to utilization. Teachers are requested to indicate how often they engage in each practice using the scale provided influenced students' performance in sub-county secondary Schools in Uasin Gishu County. A total of 10 statements were used to establish the teacher's views on the status of classroom conditions and their responses elicited on a 5-point Likert scale, shown in Table 4.10.

Table 4.10 Description on Classroom Utilization Practices by Teachers

Statement	Always		Often		Sometimes		Rarely		Never		Mean	SD
	F	%	F	%	F	%	F	%	F	%		
I effectively utilize available classroom space to accommodate my teaching strategies.	3	3.3	2	2.2	15	15.6	48	49.1	29	30.0	4.00	0.92
I rearrange classroom furniture where necessary to support learning activities.	0	0	1	1.1	10	10.3	49	50.0	37	37.8	4.20	0.82
I use classroom walls for displaying learning materials, student work, or charts.	1	1.1	2	2.2	6	6.6	50	51.5	38	38.9	4.20	0.85
I plan lessons with full utilization of classroom resources (e.g., chalkboard, models, maps).	2	2.2	11	11.0	22	22.4	40	41.0	22	22.4	3.66	1.04
Overcrowding limits how effectively I utilize the classroom for quality instruction.	2	2.2	1	1.1	15	15.6	50	52.0	29	29.9	3.99	0.92
I use flexible seating or group arrangements to improve classroom utilization.	1	1.1	1	1.1	18	19.0	55	57.8	22	22.4	3.98	0.76
Well-utilized classrooms improve learner behavior and participation.	2	2.2	2	2.2	18	18.1	49	50.0	26	26.3	3.89	0.99
I collaborate with colleagues to improve classroom utilization practices.	25	25.8	30	30.9	20	20.6	15	15.5	7	7.2	3.53	1.23
I receive support from school administration to improve classroom utilization.	20	20.6	28.	28.9	25	25.8	14	14.4	10	10.3	3.36	1.26
Mean											3.99	0.58

On the effective utilization of available classroom space to accommodate my teaching strategies (48; 49.1%) agreed and (29; 30%) strongly agreed, with (15; 15.6%) undecided and (5; 5.5%) disagreed as indicated by a mean of (M=4.0; SD=0.92). Most of the teachers (49; 50%) agreed (37; 37.8%) strongly agreed, with (10; 10.3%) undecided and (1; 1.1%) disagreed that they rearrange classroom furniture where necessary to support learning activities as indicated by a mean of (M=4.20; SD=0.82). On if the teachers use classroom walls for displaying learning materials, student work, or charts (50; 51.5%) agreed and (38; 38.9%) strongly agreed, with (6;

6.6%) undecided and (3; 3.3%) disagreed as indicated by a mean of (M=4.20; SD=0.85).

On the statement that they plan lessons with full utilization of classroom resources (e.g., chalkboard, models, maps) majority of the teachers (50; 52.0%) agreed (29; 29.9%) strongly agreed, with (15; 15.6%) undecided and (3; 3.3%) disagreed as indicated by a mean of (M=3.99; SD=0.92). Most of the teachers (40; 41.0%) agreed and (22; 22.6%) strongly agreed, with (22; 22.4%) undecided and (13; 13.2%) disagreed that the overcrowding limits how effectively they utilize the classroom for quality instruction as indicated by a mean of (M=3.66; SD=1.04). On the statement that teachers use flexible seating or group arrangements to improve classroom utilization majority of the teachers (49; 50%) agreed (26; 26.3%) strongly agreed, with (18; 18.1%) undecided and (4; 4.4%) disagreed as indicated by a mean of (M=3.89; SD=0.99). Most of the teachers (55; 57.8%) agreed and (22; 22.4%) strongly agreed, with (18; 19.0%) undecided and (2; 2.2%) disagreed that well-utilized classrooms improve learner behavior and participation. as indicated by a mean of (M=3.98; SD=0.76).

For the statement *"I collaborate with colleagues to improve classroom utilization"*, 25 teachers (25.8%) reported "Always", 30 (30.9%) "Often", 20 (20.6%) "Sometimes",

15 (15.5%) “Rarely”, and 7 (7.2%) “Never”. The mean score of 3.53 (SD = 1.23) indicates that collaboration among colleagues is generally frequent, although a minority of teachers report minimal collaboration. The findings suggest that teacher collaboration plays a significant role in optimizing classroom utilization, with a substantial majority engaging in peer-based improvement practices. This implies that professional learning communities and peer mentoring could be leveraged to further enhance utilization strategies

Results on the statement *“I receive support from school administration to improve classroom utilization”*, most of the teachers 28 (28.9%) “Often”, 25 (25.8%)

“Sometimes”, 20 teachers (20.6%) selected “Always”, 14 (14.4%) “Rarely”, and 10 (10.3%) “Never”. The mean score of 3.36 (SD = 1.26) suggests that teachers perceive moderate administrative support, with slightly higher variability in responses compared to peer collaboration. However, the slightly lower mean for administrative support indicates a need for school leadership to strengthen structures, resources, and policy backing for classroom optimization. For the study, these results stress the importance of examining not only teacher-driven initiatives but also the administrative framework that supports them. Improving both peer collaboration and administrative support could contribute to more efficient learning environments, ultimately influencing student performance.

The study’s findings showed that the 10 statements used to describe classroom utilization practices had an overall mean of 3.99 and a standard deviation of 0.58, indicating that most teachers agreed with the statements. Specifically, teachers acknowledged that having adequate classroom furniture—such as chairs, desks, and boards—helped students feel comfortable and remain focused during lessons. They also noted that maintaining an appropriate class size improved students’ attention and

engagement in learning activities. Additionally, the availability of spacious, well-ventilated classrooms contributed to a conducive learning environment, which in turn positively influenced students' academic performance. These results align with the findings of Namusis (2015), who reported that well-designed classrooms improved students' progress in reading, writing, and mathematics by 16%.

4.4.8 Students' Performance in Sub County Public Secondary Schools in Uasin Gishu County

The study aimed to assess students' academic performance in sub-county public secondary schools in Uasin Gishu County. To gather teachers' perspectives on this, ten statements were presented, and responses were recorded using a 5-point Likert scale, as summarized in Table 4.11.

Table 4.11 Students' Performance

	Strongly disagree		Disagree		Undecided		Agree		Strongly Agree		Mean	SD
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**		
Classroom arrangement, seating positions and space management, in general, has a more significant impact on the students' level of understanding, and consequently, their academic performance	4	4.4	4	4.4	17	17.8	42	43.3	30	31.1	3.94	0.99
Classroom arrangement affects the core of teaching and learning – communication	0	0	7	6.7	16	16.7	53	55.6	21	21.1	3.91	0.80
Student's grades improve when they are involved in extracurricular activities.	3	3.3	5	5.6	14	14.4	45	46.7	30	31.1	3.99	0.94
Participation in extracurricular activities has a positive effect on academic performance among students	3	3.3	5	5.6	14	14.4	43	44.4	32	33.3	4.01	0.95
Participation in athletics improve academic performance	3	3.3	13	13.3	26	26.7	37	37.8	18	18.9	3.56	1.05
Participation in musical performance improve academic performance among the student	4	4.4	13	13.3	31	32.2	37	37.8	12	12.2	3.40	1.01
There were improved grades by students	3	3.3	11	11.1	26	26.7	41	42.2	16	16.7	3.58	1.01
There is improved students' termly scores	3	3.3	11	11.1	29	30.0	39	40.0	15	15.6	3.53	1.00
There is improved class participation	1	1.1	8	7.8	21	22.2	53	54.4	14	14.4	3.73	0.85
There is improved scores in class assignments by students	2	2.2	9	8.9	20	21.1	51	52.2	15	15.6	3.70	0.92
Mean											**3.74**	**0.65**

The statement that classroom arrangement, seating positions and space management, in general, had a more significant impact on the student's level of understanding and consequently their academic performance as shown in Table 4.9 above, (72; 74.4%) agreed, with (17;17.8%) undecided and (8; 8.8%) disagreed as indicated by a mean of (M=3.94; SD=.99). Most of the teachers (74; 76.7%) agreed, with (16; 16.7%) undecided and (7; 6.7%) disagreed that classroom arrangement affected the core of teaching and learning – communication as indicated by a mean of (M=3.91; SD=.80). The student's grades improved when they were involved in extracurricular activities, majority of the teachers (75; 77.8%) agreed, with (14; 14.4%) undecided and

(8; 8.9%) disagreed as indicated by a mean of (M=3.99; SD=0.94). Most of the teachers (75; 77.7%) agreed, with (14; 14.4%) undecided and (8; 8.9% disagreed that participation in extracurricular activities had a positive influence on academic performance among students as indicated by a mean of (M=4.01; SD=0.95). On the statement that participation in athletics improved academic performance, majority of the teachers (55; 56.7%) agreed, with (26; 26.7%) undecided and (16;16.6) disagreed as indicated by a mean of (M=3.56; SD=1.05). On participation in musical performance improved academic performance among the student, majority of the teachers (49; 50%) agreed, with (31; 32.2%) undecided and (17; 17.7%) disagreed as indicated by a mean of (M=3.40; SD=1.01). On the statement that there were improved grades of students, majority (57; 58.9%) agreed, with (26; 26.7%) undecided and (14; 14.4%) disagreed as indicated by a mean of (M=3.58; SD=1.01).

Most of the teachers (54; 55.6%) agreed, with (29; 30%) undecided and (14; 14.4%) disagreed that there was improved students' termly scores as indicated by a mean of (M=3.53; SD=1.00). There was improved class participation, since majority of the teachers (67; 68.8%) agreed, with (22; 22.2%) undecided and (8; 8.9%) disagreed as

indicated by a mean of (M=3.73; SD=.85). Most of the teachers (66; 67.8%) agreed, with (20; 21.1%) undecided and (11; 11.1%) disagreed that participation in extracurricular activities had a positive effect on academic performance among students as indicated by a mean of (M=3.7; SD=0.92).

From the findings of the study, the 10 statements used to explain the students' performance had an overall mean of 3.74 and a standard deviation of 0.65. These showed that majority of the teachers agreed on the statements that promoted academic performance of students. The classroom arrangement, seating positions and space management, had significant impact on the students' level of understanding, and consequently, their academic performance. The classroom arrangement affected the core of teaching and learning interactions. The student's grades had improved due to involvement in co-curricular activities. Participation in extracurricular activities had a positive effect on academic performance among students. Participation in athletics improves academic performance. There were improved grades and students' termly scores and class participation. These findings agreed with Qamar et al., (2018) in their study found that conducive classroom environment helped both teachers to teach effectively and students learnt with ease and perform better academically. Therefore, proper utilization of available teaching and learning resources in classrooms enhanced the learning outcomes of students.

4.4.9 Overall Influence of Infrastructural Facilities on Student Academic Performance

The students were requested to rate the overall influence of infrastructural facilities on their academic performance and their responses were summarized in Table 4.12 below. Most of the students (174; 45.2%) rated the learning facilities (classroom) to averagely influence academic performance, with (119; 31%) rating high and (91; 23.9%) rating

low as shown in Table 4.12. The library facilities were rated by most students (250; 65.2%) to lowly influence academic performance, while (48; 12.4% rated average and (86; 22.5%) rated highly influenced academic performance. Computer facilities rated (292; 76.1%) as having low influence, some rated (57; 14.8%) as averagely influenced academic performance and (35; 9.1%) rated as highly influenced academic performance. The co-curricular facilities were rated at (208; 54.2%) as having a low effect on academic performance, and average influence was rated at(146;38.1%) and (30; 7.8%) as a highly influenced academic performance This implied that the library facilities, computer facilities and co-curricular facilities in this category of schools had a low overall influence on academic performance.

Table 4.12 Overall Influences of Infrastructural Facilities on Student Academic Performance

	Low		***Very low***		***Average***		***High***		***Very high***	
Facilities	F	%	F	%	F	%	F	%	F	%
Classroom	49	12.9	42	11.0	174	45.2	94	24.5	25	6.5
Library facilities	148	38.7	102	26.5	86	22.5	33	8.5	15	3.9
Computer facilities	248	64.5	45	11.6	57	14.8	15	3.9	20	5.2
Playground infrastructure	109	28.4	99	25.8	145	38.1	25	6.5	5	1.3

Suleman & Hussain (2014) found that various components like room size, lighting, temperature, walls, ventilation, whiteboards, mats, seats, floor, PCs and other material proved fruitful on students' learning. It had a positive impact on improving students' learning. Ikegbusi, Eziamaka and Iheanacho (2021) in support of the study, explained

that a good school building structure, location, safety, accommodation, classrooms and furniture affect learning and had an influence on pupils' academic achievement.

4.4.10 Relationship between Classroom Utilization and Academic Performance of Students'

Majority of the principals 78% agreed that classroom utilization positively influences academic performance of students and 22% disagreed as shown in Figure 4.10. This showed that the classroom utilization influenced the academic performance of students. This agreed with Awan, (2018) that school facilities like school buildings, electricity, natural/artificial lighting and ventilation in classrooms, drinking water, washrooms and playground were the main attributes to improve students' learning.

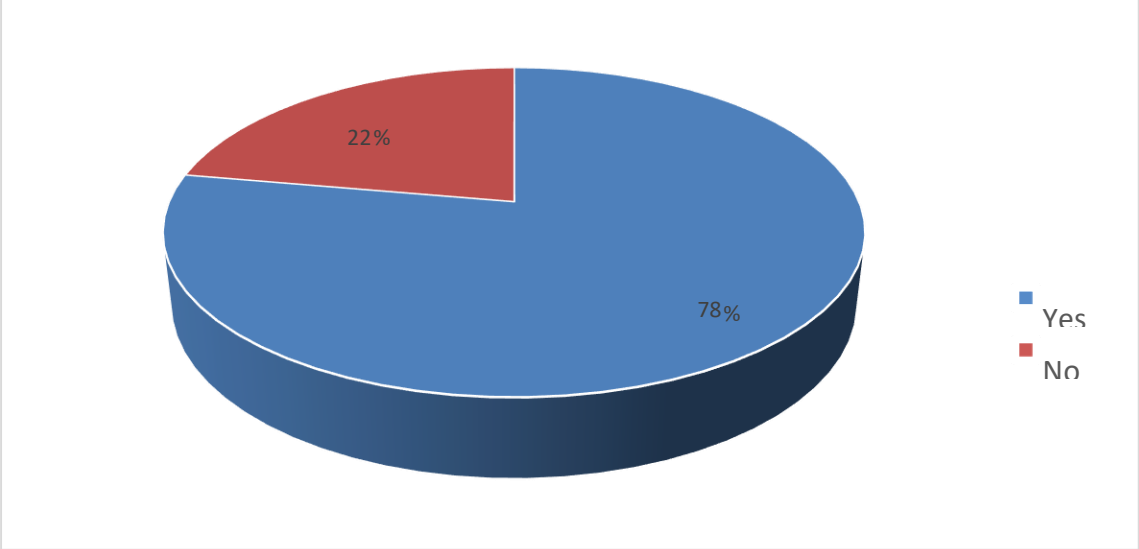

Figure 4.5 Relationships between Classroom Utilization and Academic Performance

The results obtained from the interview schedule with the County Quality Assurance and Standards Officer revealed that; Physical facilities were fairly adequate in the sub county schools in the county, and on item number two the QASO was able to comment

that physical facilities directly influenced educational objectives, since if not available or inadequate, learners crowd and learning process would not take place effectively. Funding from the Government helped to facilitate the establishment of necessary infrastructure in public schools in the county and this influenced performance positively. This was his response to the third item in the interview schedule. On item number four, the responses was classroom conditions required to be more attractive and comfortable for learners to concentrate on the subject matter well hence better participation in learning.

4.4.11 Correlation Analysis between Classroom Utilization and Academic Performance

The correlation analysis was conducted to determine the relationship between variables. Correlation results of the study (Table 4.13) showed that there was a significant positive and average relationship between classroom utilization and student performance (r= 0.426, p =0.000).

Table 4.13 Correlation Analysis Between Classroom Utilization and Academic Performance

		Student Performance	Classroom environment
Student	Pearson Correlation	1	.426**
Performance	Sig. (2-tailed)		.000
Classroom	Pearson Correlation	.426**	1
Utilization	Sig. (2-tailed)	.000	

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

The adequacy of infrastructure or facilities and good school management contributed to better performance in this category of secondary schools. This result concurred with

the findings by Duruji (2014) and Madiba (2016) whose studies revealed that physical structure in a learning environment influenced pupils' and students' academic achievement in such schools. These findings also resonate with the conclusion by Olufemi and Olufemi (2018) that student's related factors; parental background, school factors as well as teachers' factors had serious influence on students' academic performance.

4.4.12 Regression Analysis on Classroom Utilization and Student Performance

Regression analysis is a statistical approach used to explore how one or more factors (independent variables) relate to an outcome (dependent variable). Researchers often apply it when the intention is to predict outcomes or to understand how strongly each factor contributes to variations in the dependent variable (Kothari, 2014). In its simplest form, regression considers one predictor and one outcome, but the method can be extended to handle multiple predictors simultaneously.

In the present study, both univariate and multivariate regression techniques were used. The univariate model examined the influence of each factor individually, while the multivariate model considered several predictors together to capture their combined effect. A linear regression model was applied in particular to test how the use of classrooms was associated with student performance. The R^2 value indicated the proportion of variability in student performance that could be explained by classroom utilization. From the model, $R^2 = 0.182$ shows that utilization of classroom accounted for an 18.2% variation in student performance. The utilization of classroom predictor used in the model captured the variation in student performance as shown in Table 4.14. The adjusted R square of 0.172 depicted that the utilization of classroom explained the variation in student performance by 17.2%.

Table 4.14 Model Summary on Utilization of Classroom and Student Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.426[a]	.182	.172	.58801

a. Predictors: (Constant), utilization of classroom

4.4.13 Analysis of Variance on Classroom Environment and Student Performance

The study used Analysis of variance to check whether the model could forecast the result better than the mean, as shown in Table 4.15. The ANOVA model that used utilization of classroom as a predictor was important (F=19.55, p value =0.000), indicating that utilization of classroom had a substantial impact on student performance. Therefore, this finding indicated that the utilization of classroom had a significant impact on academic performance.

Table 4.15 Utilization of Classroom and Student Performance Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.760	1	6.760	19.551	.000[b]
	Residual	30.426	88	.346		
	Total	37.186	89			

a.Dependent Variable: Student Performance

b.Predictors: (Constant), Utilization of classroom

The study results from this variable were also in agreement with the earlier findings of Okechukwu and Oboshi (2021) who explained that overcrowded classrooms had a

negative impact on pupils' academic achievement and negatively affect the delivery of instruction as teachers find it difficult to measure pupils' level of achievement in overcrowded classrooms. This finding was consistent with studies done by Koroye (2016), who investigated the extent to which physical school environment influenced students' academic performance in secondary schools. The study revealed that the school infrastructural facilities influenced academic achievements. Koroye's study also found that school equipment and instructional materials had a greater influence on student's academic achievements. Adewuyi (2012), elicited that conducive learning environment can affect both the attitudes and achievement of students. He further added that a positive learning environment was found to be a very important factor in school effectiveness. Akomolafe and Adesua (2016) finding corroborates with this study findings who found in their study that classroom facilities had a significant relationship with students' academic performance. The result also agreed with the result by Ojuok, Gogo and Olel (2020) that quality classrooms had a significant (although weak) relationship with students' academic performance.

The findings of Oluwatayo & Oyeboade (2016), Eike (2018) and Anbalagan (2017) agree this the findings of this study where significant relationship between classroom environment and performance in biology was established in their independent studies on a classroom environment and performance of secondary school students in biology in Ibadan North and Ibadan South-West Local Government Areas Oyo State as well as Markurdi District of Benue respectively.

4.5 Utilization of Library Facility as a Learning Resource and Its Influence on Academic Performance

The second objective was to determine the utilization of library facilities on academic performance in Sub County public secondary schools in Uasin Gishu County. This was achieved by obtaining the views of the teachers, students and principals on library facility as a learning resource.

4.5.1 Utilization of Library Facility in the School

Majority of the principals (28; 58%) disagreed and (20; 42%) agreed that there was a library in their school. This showed that the Sub County public secondary schools in Uasin Gishu County had no library as shown in Figure 4.11. This agreed with Yeloye (2012) that in terms of the utilization of the libraries as one of the school facilities, a great number of secondary schools had no functional libraries, and where some libraries were found, there were no new or current books that are relevant to the current secondary school programs. From the observation schedule, the researcher noted that about 21 (44%) of schools which participated in the study had a Library of which 16 were in good condition while 5 of them were not.

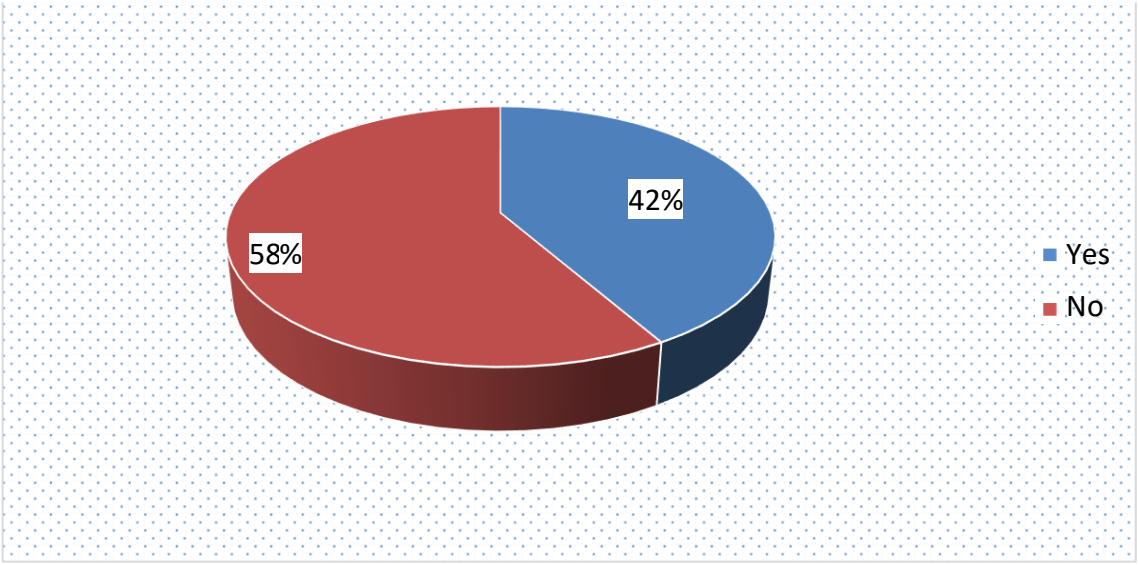

Figure 4.6 Utilization of Library as a Learning Resource

4.5.2 Accessibility of the School Library

Majority of the students 70% disagreed that they accessed the school library at any time when free and 30% agreed as shown in Figure 4.11. This implied that most students do not access the school library at any time when they were free for individual studies. This disagreed with Fawcett (2013) that school library facility in secondary schools must be accessible for all members of the community. This would be an eye opener for all education stakeholders to invest more resources in establishment of library facilities.

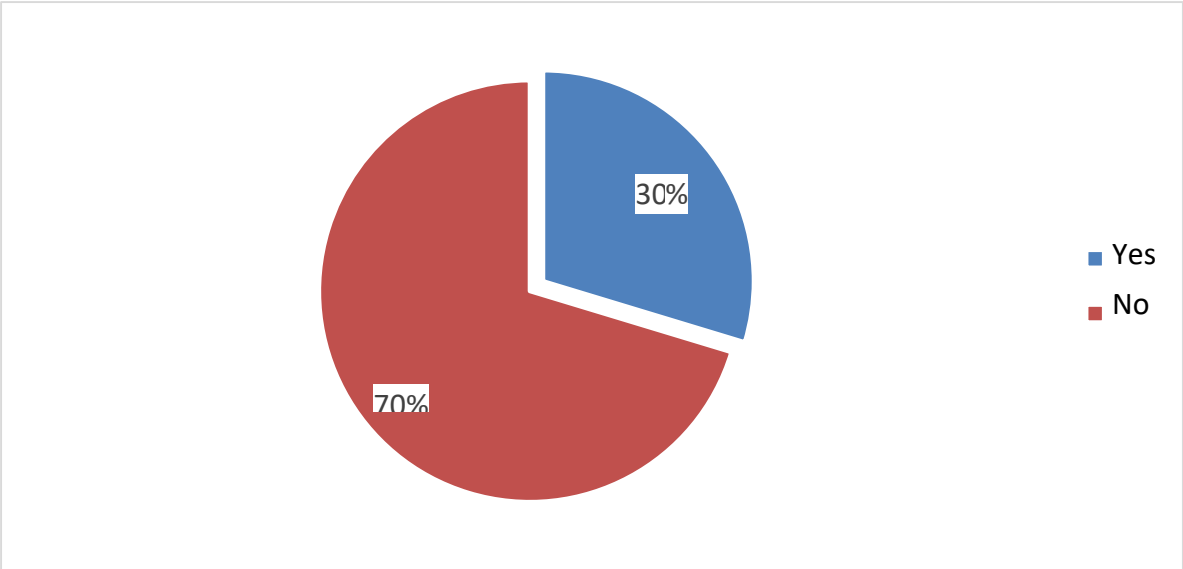

Figure 4.7 Accessibility of School Library

4.5.3 Adequacy of Teaching /Learning Resources in the School Library

Majority of the principals 40 (83%) disagreed and 8(17%) agreed that the Teaching /Learning resources were enough in the school library. This showed that the Teaching /Learning resources were not enough in most of the school libraries in the County. This agreed with the work of Keinan and Karugu (2018), on textbooks and school library provision in secondary education in Sub-Sahara Africa which they found out that textbook and libraries were not only inadequate but unevenly distributed among rural and urban schools. Inadequacy of resources can seriously compromise effective teaching and therefore, lack of quality performance in national examinations.

4.5.4 Library Services and its Influence on Students' Performance

The study sought to determine how library services influenced students' performance in public secondary schools in Uasin Gishu County. A total of 9 statements were used to establish the teacher's views on library services and their responses were elicited on a 5-point Likert scale as shown in Table 4.16.

Table 4.16 Library Services and Students' Performance

	Strongly disagree		Disagree		Undecided		Agree		Strongly Agree		Mean	SD
	F	%	F	%	F	%	F	%	F	%		
Students frequently use the school library for research and study purposes	9	8.9	26	26.7	13	13.3	30	31.1	19	20.0	3.27	1.30
The library resources are easily accessible to all students	6	6.5	13	13.3	28	28.9	32	33.3	18	18.9	3.47	1.11
The library is well stocked with relevant textbooks and reference materials	3	3.3	16	16.7	15	15.6	40	41.1	23	23.3	3.64	1.11
I encourage students to use the library to support their learning	5	5.6	9	8.9	10	10.0	42	43.3	31	32.2	3.88	1.13
The library is well stocked with relevant textbooks and reference materials.	11	11.1	5	5.6	12	12.2	36	36.7	33	34.4	3.78	1.29
I encourage students to use the library to support their learning.	20	21.1	23	23.3	19	20.0	22	22.2	13	13.3	2.83	1.35
I regularly integrate library resources into my lesson plans and assignments.	1	1.1	5	5.6	14	14.4	43	44.4	33	34.4	4.06	0.90
The availability of library services positively influences students' academic results.	5	5.6	6	6.7	13	13.3	38	38.9	35	35.6	3.92	1.12
Students who use the library perform better academically than those who do not.	8	7.8	12	12.2	23	23.3	33	34.4	21	22.2	3.51	1.19
Mean											**3.60**	**0.60**

On the statement that students frequently use the school library for research and study purposes, the majority of the teachers (49; 51.1%) agreed, with (13; 13.3%) undecided and (35; 35.6%) disagreed as indicated by a mean of (M=3.27; SD=1.3). Most of the teachers (50; 52.2%) agreed, with (28; 28.9%) undecided and (19; 18.9%) disagreed that the library resources are easily accessible to all students as indicated by a mean of (M=3.47; SD=1.11). On the statement that the library is well stocked with relevant textbooks and reference materials (73; 75.5%) agreed, with (10; 10%) undecided and (14; 14.5%) disagreed as indicated by a mean of (M=3.88; SD=1.13).

On the statement that, I encourage students to use the library to support their learning, where majority of the teachers (69; 71.1%) agreed, with (12; 12.2%) undecided and (16; 16.7%) disagreed as indicated by a mean of (M=3.78; SD=1.29). On the statement that teachers regularly integrate library resources into my lesson plans and assignments, majority of the teachers (43; 44.4%) disagreed, with (19; 20%) undecided and (35; 35.5%) agreed as indicated by a mean of (M=2.83; SD=1.35). Further, on the statement the availability of library services positively influences students' academic results, majority of the teachers (63; 64.4%) agreed, while (15; 15.6%) were undecided and (19; 20.0%) disagreed with a mean of (M=3.64; SD=1.11). Most of the teachers (76; 78.8%) agreed, with (14; 14.4%) undecided and (6; 6.7%) disagreed that students who use the library perform better academically than those who do not as indicated by a mean of (M=4.06; SD=0.90).

On the statement that students face challenges accessing or using the library resources, majority of the teachers (73; 74.5%) agreed, with (13; 13.3%) undecided and (11; 12.3%) disagreed as indicated by a mean of (M=3.92; SD=1.12). On the statement that the library staff provide adequate support to students and teach, majority of the teachers (54; 56.6%) agreed, with (23; 23.3%) undecided and (20; 20%) disagreed as

indicated by a mean of (M=3.51; SD=1.19). From the findings of the study, the statements used to explain the library services had an overall mean of 3.60 and a standard deviation of 0.60. This showed that majority of the teachers agreed on the statements explaining library services. Majority of the teachers agreed that students frequently use the school library for research and study purposes. Similarly, Musyoka, Cheloti and Maithya (2018) ascertained that adequacy of teacher resources positively influenced learners' academic performance.

Most of the teachers agreed that students to use the library to support their learning. Schools without a library performed relatively low than a school with a library as students got enough time to search for information from the library. This result concurred with findings by Jean (2021) who showed that when libraries were not adequate, it leads to disinterest and low reading culture by students thus leading to poor academic performance. However, enough books, reference materials and other resources in the library motivated learners to carryout self-study and it eventually enhanced their academic achievements. These results agreed with Mogaka, Kariuki and Ogeta (2019) whose findings showed that adequacy and effective use of reference books positively enhanced learner performance.

4.5.5. The Library Site within the School Compound

Majority of the teachers 50 (51.1%) agreed that the library is located in a strategic place to offer services to learner and 47 (48.9%) disagreed that it was located strategically. This showed that majority of the schools had established the library in a good place to serve the students' needs. Beyond simply being a place to store books, a school library functions as a central hub of knowledge where both teachers and students can access resources that support learning, teaching, and research (Ainon & Rosmarzura, 2018). Researchers widely recognize that libraries are an essential component of the

educational experience, providing not only information but also guidance to their users (Ayaz, Ali, Khan, Ulah & Uilah, 2017). Therefore, the location of a library in a school should be accessible to the users (teachers and learners).

4.5.6 Utilization of Reference Materials in the Library

The principals were requested to rate the utilization of reference books in the library and their responses were summarized in Table 4.17 below. Most of the principals agreed that the reference books 23 (47.2%), past exam papers 19 (38.9%) and maps24 (50%) were fair as shown in Table 4.17. This implied that the school utilized the reference materials in public school libraries and they were fairly adequate.

Table 4.17 Utilization of Reference Materials in the Library

	No idea		**Poor**		**Fair**		**Good**		**Excellent**	
	F	%	F	%	F	%	F	%	F	%
Reference books	4	8.3	8	16.7	23	47.2	13	27.8	0	0
Past exams papers	4	8.3	8	16.7	18	38.8	15	30.6	3	5.6
Maps	4	8.3	8	16.7	24	50.0	9	19.4	3	5.6

4.5.7 Students Rating the Aspects of School Library

The students were requested to rate the various aspects of school library and their responses were summarized in Table 4.18. Most of the students 141 (36.8%) rated the books to be inadequate. The reading space, tables for reading and chairs were rated as inadequate with 265 (69.1%), 280 (72.9%) and 245(63.8%) respectively as shown in the Table 4.18 below. This indicated that the reading space, tables for reading and chairs were inadequate in this category of schools.

Table 4.18 Students Rating the Aspects of School Library

	Very inadequate		*Inadequate*		*Average*		*Adequate*		*Very adequate*	
	F	%	F	%	F	%	F	%	F	%
Reading space	119	31.0	146	38.1	35	9.0	49	12.9	35	9.0
Tables for reading	116	30.3	164	42.6	35	9.0	47	12.3	22	5.8
Chairs	111	29.0	134	34.8	27	7.1	79	20.6	33	8.5
Books	42	11.0	99	25.8	109	28.4	82	21.3	52	13.5

4.5.8 Rating Utilization of Reference Materials in School Library

On the utilization of reference books majority of the students 176 (45.8%) rated it to be fair, with 30 (7.7%) being good, 12(3.2%) excellent and 166 (43.2%) had no idea as shown in Figure 4.12. This implied that the students utilized the reference books were in the school library.

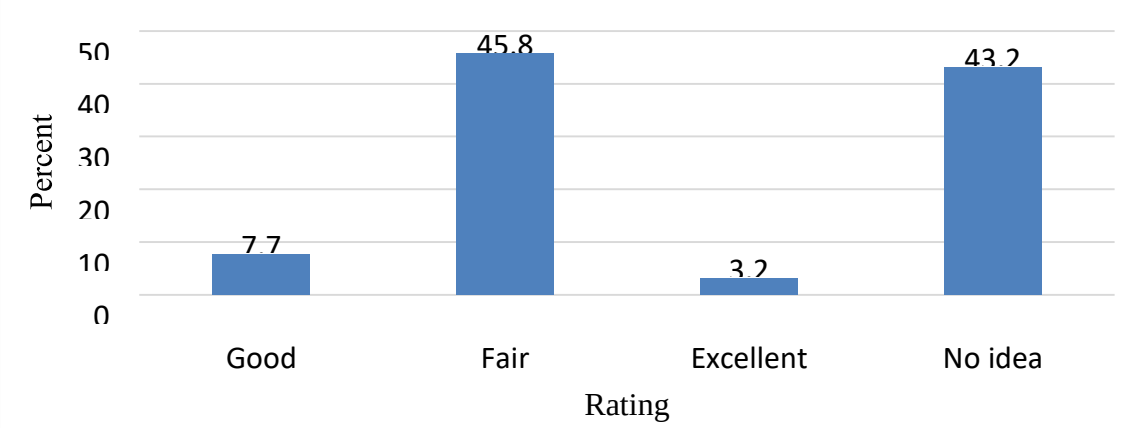

Figure 4. 8 Utilization of Reference Books in School Library

4.5.9 Teachers Rating the Aspects of School Library

The teachers were requested to rate the various aspects of the school library and the responses are summarized in Table 4.19. Most of the teachers 44.4% rated the books to be adequate. The reading space, tables for reading and chairs were rated to be inadequate with 38.9%, 51.1% and 42.2% respectively as shown in Table 4.17 below. This implied that the reading space, tables for reading and chairs were inadequate in public sub-county schools.

Table 4.19 Teachers Rating the Aspects of School Library

	Not able to rate		***Very inadequate***		***Inadequate***		***Adequate***		***Very adequate***	
	F	%	F	%	F	%	F	%	F	%
Reading space	29	30.0	17	17.8	20	21.1	23	23.3	8	7.8
Tables for reading	38	38.9	21	22.2	28	28.9	7	6.7	3	3.3
Chairs	39	40.0	21	21.2	20	21.1	12	12.2	5	5.5
Books	19	20.0	9	8.9	26	26.7	31	32.2	12	12.2

However, the QASO was able to respond to the questions related to the utilization of library facilities in the Sub-County secondary schools and made the following remarks;

> *"The Government buys course books and even set books for learners today, maybe schools can only add some revision books and other reference material to their Library".*
>
> (QASO July, 2022)

Furthermore, on item number eight, the QASO agreed that library services contribute to better performance of learners since it enables students' carry out individual studies and research on their own. He also confirmed that books are available and well utilized, but reading space is limited and tables are very few in most schools.

4.5.10 Correlation Analysis between Library Service and Student Performance

There was a significant positive relationship between library services and student performance (r= .453, p =0.000) (Table 4.20). This finding indicated that an improvement in library services has led to an increase in student performance.

Table 4.20 Correlation Analysis Between Library Service and Student Performance

		Student Performance	Library service
Student Performance	Pearson Correlation	1	.453**
	Sig. (2-tailed)		.000
Library service	Pearson Correlation	.453**	1
	Sig. (2-tailed)	.000	

**. Correlation is significant at the 0.01 level (2-tailed). b. Listwise N=90

This finding was in agreement with Lance and Hofschire (2012) that effective library service influences students' academic achievement and therefore necessary for the academic advancement of the students. In schools, where they had provided library services, it increased the reading habits of students, thus making a positive impact on

students' academic achievement. It concurred with the findings by Goodall and Pattern (2011) that showed a positive relationship between the use of library and academic achievement. A reasonable provision of library services was a predictor of students' ac ademic achievement.

4.5.11 Regression Analysis on Library Services on Student Performance

The study used a linear regression model to explore the influence of library services on student performance. The R^2 represented the measure of variability in student performance that library services accounted for. From the model, ($R^2 = 0.205$) showed that library services account for 20.5% variation in student performance. The library services predictor used in the model captured the variation in the student performance as shown in Table 4.21.

Table 4.21 Library Services Regression Analysis Model Summary

Model	*R*	*R Square*	*Adjusted R Square*	*Std. Error of the Estimate*
1	.453[a]	.205	.196	.57963

a. Predictors: (Constant), Library services

4.5.12 ANOVA on Library Services and Student performance

The ANOVA was used to check whether the model could forecast the result better than the mean, as seen in Table 4.22. The ANOVA model that used library services as an indicator was significant (F=22.68, p value =0.000), indicating that library services had a significant impact on student performance.

Table 4.22 ANOVA on Library Services and Student Performance

Model		*Sum of Squares*	*Df*	*Mean Square*	*F*	*Sig.*
1	Regression	7.621	1	7.621	22.684	.000[b]
	Residual	29.565	88	.336		
	Total	37.186	89			

a. Dependent Variable: Student Performance

The linear regression model and the analysis of variance both indicated that utilization of library facilities had positive statistical significance on academic performance. This was in line with the view of Olisa Metu (2015) on the relevance of library in schools as an essential facility that must be present in schools to facilitate students' study and improve their academic achievement. The result revealed that the teachers from both private and public schools generally agreed that: library facilities provided a conducive environment for reading, thus improving students' performance, library capacity was in relation with the student ratio encouraged reading habits among students, provision of required books and other learning materials in the curriculum helped students in their academic performance, library books were consistently used in learning and were regularly maintained amongst other aspects of library facilities that influenced academic performance.

4.6 Influence of Utilization of Computer Facilities on Students' Performance

The third objective was to determine the influence of computer facilities on students' performance in Sub County public secondary schools in Uasin Gishu County. This was achieved by obtaining the views of the teachers, students and principals on the

utilization of ICT facilities. The study sought to determine how utilization of library services influenced students' performance in public secondary schools in Uasin Gishu County.

4.6.1 Utilization of Computer Laboratory in the School

Majority of the students 250 (65%) disagreed that they utilized the computer laboratory in their school and 134 (35%) agreed as shown in Figure 4.9. This implied that most of the schools had no computer laboratories. The finding was in line with a study by Ngeze (2017) which revealed that schools had not acquired enough ICT devices for effective integration of ICT in Teaching/Learning process. Furthermore, among those students with computer laboratories in their school, majority of them 90(67%) had not been taught computer packages or lessons and only 44 (33%) had been taught. This implied that most of the schools had not integrated ICT in teaching/learning process due to lack of ICT devices, computer laboratory and network connectivity among others.

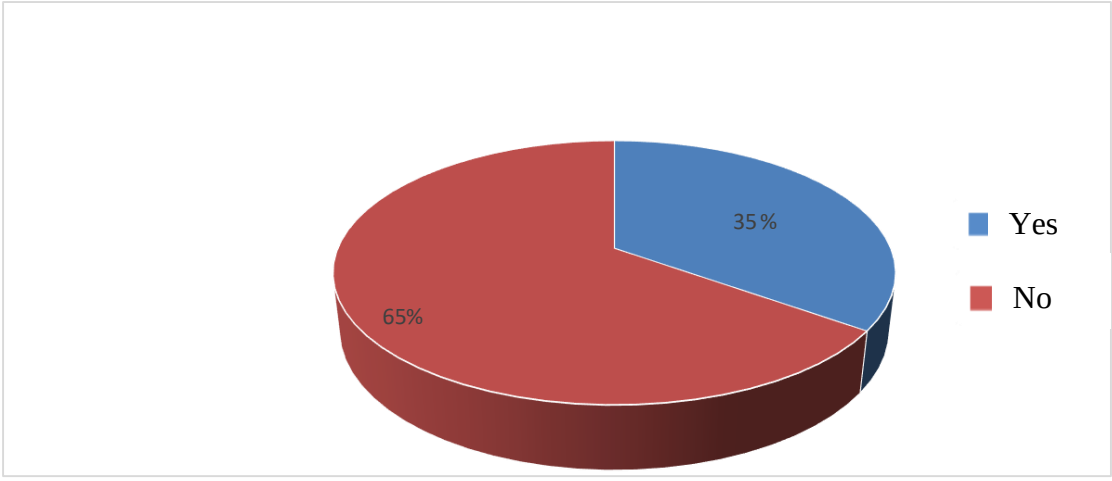

Figure 4.9 Utilization of Computer Laboratory

4.6.2 Computer Studies Lessons Taught

Majority of the teachers 72 (74%) disagresed that they did not offer computer studies, 25 (26%) agreed that they offered computer studies as shown in Figure 4.10. This implied that computer studies were not offered in most schools. This finding agreed with Khalid, Nawawi, and Roslan (2019) whose study revealed that the majority of teachers were dissatisfied with the utilization of ICT resources. The teachers expressed that most schools had not procured adequate number of computers, internet connectivity, projectors, and other resources. The unavailability of resources hampered efforts to integrate ICT in teaching and learning process.

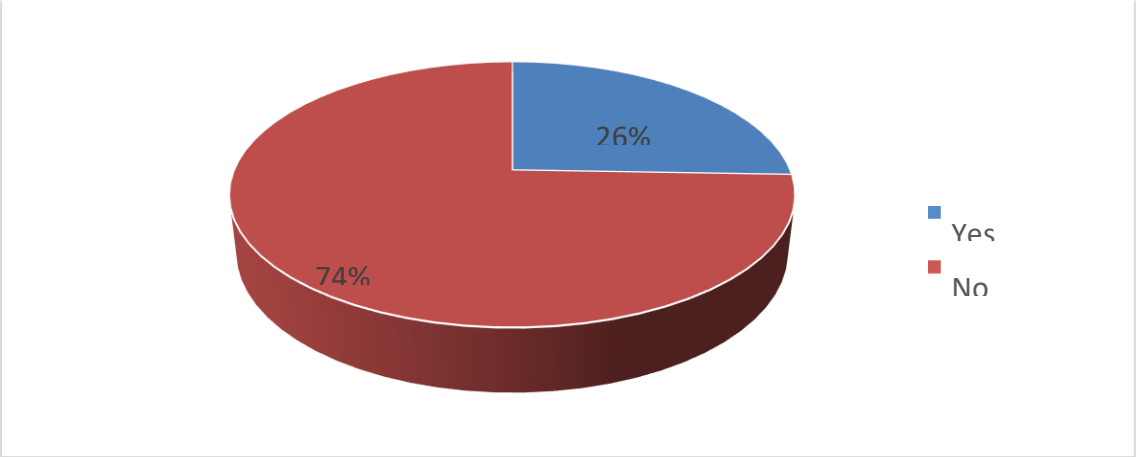

Figure 4.10 Computer Studies Lessons Taught

4.6.3 Computer Literacy of Teachers

Most of the teachers 54 (55.6%) and principals 25 (52.8%) agreed that all the teachers were computer literate, 43 (44.4%) and 23 (47.2%) disagreed respectively that teaching staff were computer literate as shown in Table 4.21. This implied that teachers teaching in most schools in the County were computer literate. This finding disagreed with Ndibalema (2014) that many teachers in secondary schools do not have sufficient knowledge and skills on the use of ICT in teaching and learning. The teachers were requested to provide information whether their schools had a computer

or ICT expert and most of them 66(68%) agreed that there was a computer or ICT expert in their school and 31 (32%) disagreed. This implied that most secondary schools in the County had computer or ICT expert.

Table 4.23 Computer Literacy of Teachers

	Teachers		Principals	
	Frequency	**Percent**	**Frequency**	**Percent**
Yes	54	55.6	25	52.8
No	43	44.4	23	47.2
Total	97	100.0	48	100.0

4.6.4 Frequency of Computer Use in Teaching

The teachers were requested to rate how often computers were used in teaching and their responses were summarized in Figure 4.15 below. Most of the teachers 49(50.5%) rated they rarely used computers in teaching, with 26(26.7%) regularly, 14(14.1%) often and 8(8.7%) not at all as shown in Figure 4.15. The information given by the teachers can be an eye opener for decision makers in the Ministry of Education to organize teacher training on ICT integration for effective utilization. This implied that teachers in public schools sometimes used computers in teaching. This agreed with study finding by Nwasinachi and Bernadette (2014) which revealed that ICT facilities were not fully available in many schools. This hindered the adoption of ICT in teaching and learning, or ICT integration.

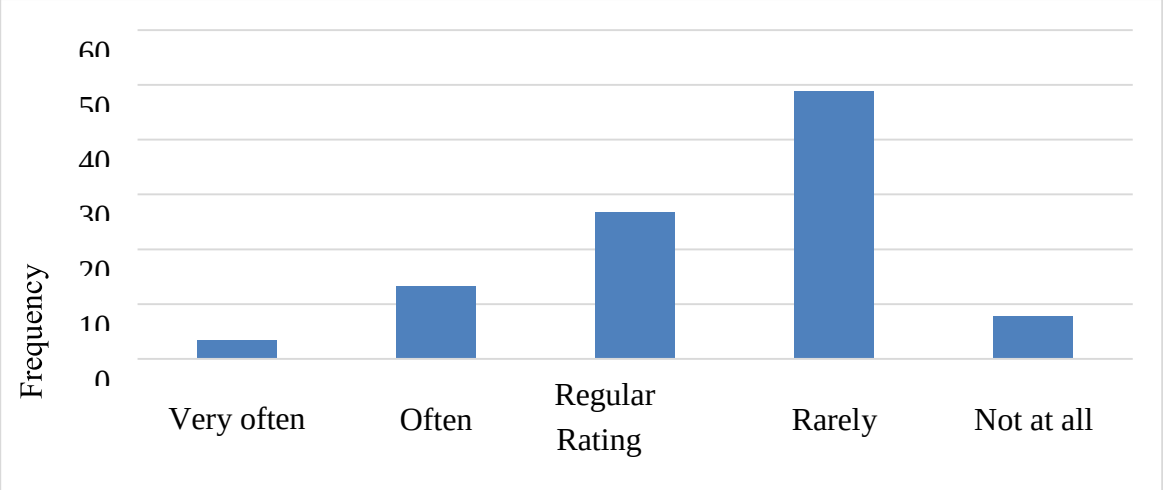

Figure 4.11 Frequency of Computers Use in Teaching

4.6.5 ICT Integration in School

Most of the principals 40(83%) agreed that there was ICT integration done in their schools and 8(17%) disagreed as shown in Figure 4.16. This implied that in most secondary schools in the County there was ICT integration. From this information it means Education stakeholders in the County are keen to implement Government policies on the significance of ICT in Teaching/Learning activities through its well-developed Education Sector Support Program (KESSP).This was demonstrated by the introduction of the National ICT Education and Training Strategy (Oluoch, 2016).

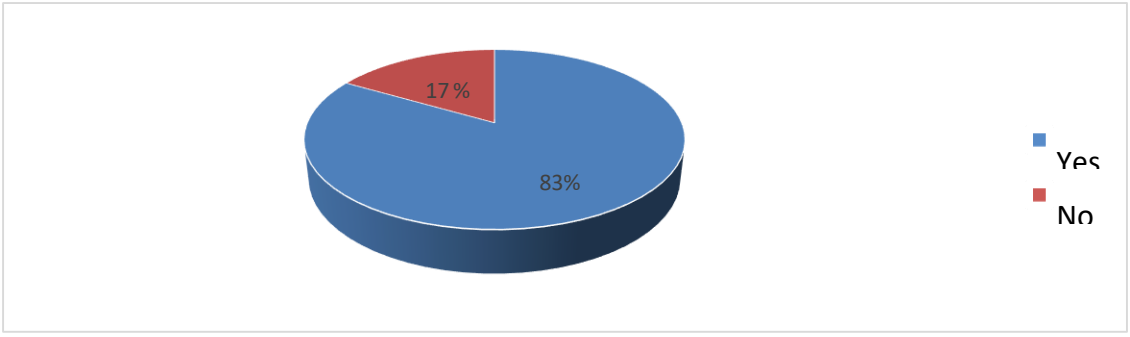

Figure 4.12 ICT Integration in School

4.6.6 Use of Computers in Teaching/Learning Process

The students were requested to rate the frequency of use of computers or ICT in learning and the responses are summarized in Table 4.24. Most of the students, 201 (52.3%), rated integrating ICT in learning was rarely used, with 166 (43.3%) often used. On the use of the internet majority of the students, 208 (54.2%), rated rarely used and 159 (41.3%) often used. On the PowerPoint presentation majority of the students, 225 (58.7%), rated rarely and 136 (35.5%) often used it. This implied that the frequency of utilization of computers or ICT in learning was rarely used in public secondary schools. This agreed with Chepkwony (2022), whose study sought to establish a relationship between ICT Utilization and Students' academic performance in Chemistry in Kesses Sub County, and found that the mean of sub-county secondary schools was 2.3 compared to extra county and private schools with 4.7 and 4.6 respectively, the study concluded that difference in performance depends on availability and utilization of the stated facility.

Table 4.24 Use of Computers or ICT in Learning **Rarely** **Regular** **Often** **Very Often**

	F	%	F	%	F	%	F	%
Integrating ICT in learning	201	52.3	17	4.5	119	31.0	47	12.3
Use of internet	208	54.2	17	4.5	134	34.8	25	6.5
Power point presentation	225	58.7	22	5.8	89	23.2	47	12.3

4.6.7 ICT Integration on Teaching Process

The study sought to determine how ICT integration influenced the teaching process in public secondary schools in Uasin Gishu County. A total of 12 statements were used

to establish the teacher's views on ICT integration in the teaching process and their responses elicited on a 5-point Likert scale, shown in Table 4.23. On the statement that ICT enhanced understanding during lesson presentation, 72 (74.5%) agreed, with 19 (20%) undecided and 5 (5.5%) disagreed as indicated by a mean of (M=3.96; SD=.91). Most of the teachers 77 (78.9%) agreed, with 13 (13.3%) undecided and 8 (7.8%) disagreed that ICT makes teaching more interesting for learners and as indicated by a mean of (M=4.1; SD=.95). On the statement that ICT had made lesson preparation easy and faster, majority of the teachers 77 (78.9%) agreed, with 14 (14.4%) undecided and 6(6.6%) disagreed as indicated by a mean of (M=3.94; SD=.92). On the statement that the ICT improved presentation of materials in their lessons, majority of the teachers 77 (78.9%) agreed, with 15.6% undecided and 5.5% disagreed as indicated by a mean of (M=4.08; SD=0.93).

Most of the teachers, 66(67.8%), agreed, with 22 (22.2%) undecided and 10(10%) disagreed that ICT had given them more confidence when teaching as indicated by a mean of (M=3.79; SD=1.07). On the statement that ICT positively changed relationship between teachers and students, majority of the teachers, 65 (66.7%), agreed, with 20 (21.1%) undecided and 12 (12.2%) disagreed, as indicated by a mean of (M=3.77; SD=1.04).

Table 4.25 ICT Integration on Teaching Process

	Strongly Disagree		*Disagree*		*Undecided*		*Agree*		*Strongly Agree*		*Mean*	*SD*
	F	%	F	%	F	%	F	%	F	%		
ICT enhance understanding during lesson presentation.	2	2.2	3	3.3	19	20.0	44	45.6	28	28.9	3.96	0.91
ICT makes teaching more interesting for me and learners.	1	1.1	7	6.7	13	13.3	3	38.9	39	40.0	4.10	0.95
ICT makes preparation of lessons to be easy and faster.	3	3.3	3	3.3	14	14.4	52	53.3	25	25.6	3.94	0.92
ICT improves the presentation of material in my lessons.	2	2.2	3	3.3	15	15.6	41	42.2	36	36.7	4.08	0.93
ICT has given me more confidence when teaching	5	5.6	4	4.4	22	22.2	40	41.1	26	26.7	3.79	1.07
ICT positively changes the relationship between me and my students	3	3.3	9	8.9	20	21.1	40	41.1	25	25.6	3.77	1.04
ICT integration saves time making it possible to meet deadlines.	3	3.3	1	1.1	17	17.8	47	48.9	28	28.9	3.99	0.91
ICT integration enhances in-depth analysis to be done in teaching process.	4	4.4	1	1.1	17	18.9	42	43.3	31	32.2	3.98	0.98
E-learning enable you to work alone at your own pace.	5	5.6	5	5.6	16	16.7	41	42.2	29	30.0	3.86	1.09
E-learning enable you to engage in enquiry-based activities.	4	4.4	1 1	11.1	29	28.9	38	38.9	16	16.7	3.52	1.04
E-learning enable one to participate in assessing his/her work.	4	4.4	1	1.1	26	26.7	46	46.7	20	21.1	3.79	0.94
ICT Integration enhances faster syllabus coverage there by better performance.	3	3.3	4	4.4	27	27.8	42	43.3	20	21.1	3.74	0.95
Mean											**3.88**	**0.98**

Most of the teachers 77 (79.8%), agreed, with 17 (17.8%) undecided and 4 (4.4%) disagreed that ICT integration saved time making it possible to meet deadlines as indicated by a mean of (M=3.99; SD=.91). On the statement that E-learning enabled them to work alone at their own pace, majority of the teachers 70 (72.2%) agreed, with 16 (16.7%) undecided and 11(11.2%) disagreed as indicated by a mean of (M=3.86; SD=1.09).

Most of the teachers 54 (55.6%) agreed, with 29 (28.9%) undecided and 5 (5.5%) disagreed that E-learning enabled them engage in inquiry-based activities as indicated by a mean of (M=3.52; SD=1.04). On the statement that E-learning enabled one participate in assessing his/her work, majority of the teachers 67.8% agreed, with 26.7% undecided and 5.5% disagreed as indicated by a mean of (M=3.79; SD=.94). On the statement that ICT Integration enhanced faster syllabus coverage hence better performance, majority of the teachers 63 (64.4%) agreed, with 27 (27.8%) undecided and 7 (7.7%) disagreed as indicated by a mean of (M=3.74; SD=.95). From the findings of the study, the 12 statements used to explain the ICT integration on teaching process had an overall mean of 3.88 and a standard deviation of 0.98. The results indicated that most teachers supported the use of ICT in the teaching and learning process. They reported that it improved their lesson delivery, deepened their understanding of content, and made classroom interactions more engaging for both teachers and learners. In addition, ICT was found to simplify and speed up lesson preparation while improving the clarity of instructional materials.

Teachers also noted that technology boosted their confidence during teaching and helped build a more positive relationship with students. By saving time, ICT allowed them to meet academic deadlines more effectively. E-learning platforms further supported individualized learning, encouraged inquiry-based activities, and gave

teachers the opportunity to reflect on and assess their own work at their own pace. ICT Integration enhanced syllabus coverage hence better performance y learners. This finding concurred with Lin, Chen and Liu (2017), who ascertained that adequacy and utilization of digital learning resources enhanced learners' academic achievement.

4.6.8 Frequency of Utilization of ICT in School Management

The principals were requested to rate how often ICT was used in management and their responses were summarized in Table 4.24. Most of the principals 29 (61.1%) used ICT in the management of staff, with 26 (55.5%) used while doing communication with parents, 29 (61.1%) during curriculum implementation & evaluation, 37 (77.8%) while keeping learners records and 31 (63.9%) while making budgets. These implied that principals in public schools utilized ICT in their management activities. According to Ngeze (2017), ICT enhanced the day-to-day management in organizations and enables schools to improve their efficiency and cope with the rapidly changing world thus it concurred with the findings of this study.

Table 4.26 Frequency of ICT Utilization in School Management

	Not at all		***Rarely***		***Often***		***Very often***	
	F	%	F	%	F	%	F	%
Management of staff	11	22.2	8	16.7	20	41.7	9	19.4
Communication with parents	4	8.3	17	36.1	15	33.3	11	22.2
Curriculum implementation & evaluation	4	8.3	14	30.6	21	44.4	8	16.7
Learners' records	1	2.8	9	19.4	23	47.2	14	30.6
Budgets	5	11.1	12	25.0	19	38.9	12	25.0

4.6.9 Influence of ICT Utilization on Academic Performance of Students

Majority of students 330 (86%) disagreed that computer availability influenced their academic performance and only 54(14%) agreed, as shown in Figure 4.22.

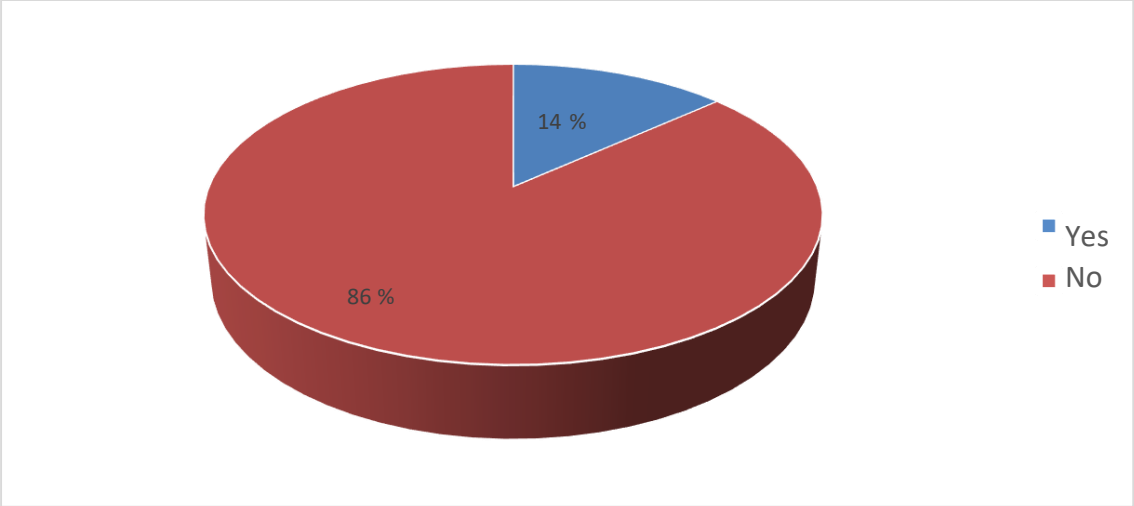

Figure 4.13 Influence of ICT Utilization on Academic Performance of Students

This implied that most of the schools had no computer facilities hence; learners were unable to link it with their academic performance. These findings agreed with the National Center for Education Statistics (2018), which showed that computers and other digital learning resources were unavailable, which lead to an inability for students to utilize them. This result agreed with Chepkwony (2022) whose study revealed that the performance of chemistry in Extra County and Private schools had a higher mean of 4.7 and 4.6, respectively, while Sub-County secondary schools had a mean of 2.3. These results showed a difference in performance between the various categories of schools depending on the availability and utilization of stated facilities in schools.

The QASO also agreed that schools with computer laboratories had projectors and hence used PowerPoint to highlight content in their subject area; other schools had computers only in specific offices like the secretary's office for typing and printing

examinations, Accounts clerk office for fees records, Principal's and Deputy Principals' offices. He also stated some of the importance of ICT facility included; made teacher's work easier, for example, analysis of exams, preparation of schemes of work, lesson plans, lesson notes and presentation of content to learners. It improved performance because learners were excited and active as they manipulated Computers or Smartphone in the teaching /learning process.

4.6.10 Correlation Analysis between ICT and Student Performance

The correlation analysis between utilization of ICT and academic performance showed that there was a positive relationship. There was a significant positive and average relationship between ICT and student performance (r= 0.494, p =0.000) as shown in Table 4.25. This finding implied that an increase in the utilization of ICT led to improved academic performance.

Table 4.27 Correlation Analysis between ICT and Student Performance

		Academic Performance	**ICT**
Student Performance	Pearson Correlation	1	.494**
	Sig. (2-tailed)		.000
ICT	Pearson Correlation	.494**	1
	Sig. (2-tailed)	.000	

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

Listwise N=90

Schools are expected to have a particular concern regarding integrating ICT into classroom teaching, Schmid and Petko (2019) in their study stated that technical devices such as computers, laptops, tablets and mobile phones should be included

wisely in adolescent education. This study was motivated mainly by the actual pandemic context and the important role technology had in the academic achievement.

4.6.11 Regression Analysis on ICT on Academic Performance

A linear regression model was applied to examine the effect of ICT on student performance. The coefficient of determination (R^2) indicated how much of the variation in performance could be explained by ICT use. The results showed that $R^2 = 0.244$, meaning that ICT accounted for approximately 24.4% of the variation in student performance. This demonstrates that while ICT had a meaningful influence, other factors beyond technology also contributed to performance outcomes, as summarized in Table 4.28.

Table 4.28 Model Summary on ICT and Student Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.494[a]	.244	.235	.56521

a. Predictors: (Constant), ICT

4.6.12 ANOVA on ICT and Student's Performance

The study used Analysis of variance to check whether the model could forecast the result better than the mean, as seen in Table 4.28. The regression model that used information and communication technology as a predictor was important (F=28.40, pvalue =0.000), indicating that information and communication technology had a significant influence on student performance.

Table 4.29 ICT and Student Performance Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.073	1	9.073	28.401	.000[b]
	Residual	28.113	88	.319		
	Total	37.186	89			

a. Dependent Variable: Student performance

b. Predictors: (Constant), ICT

From Table 27 above, ICT as an independent variable had a positive significant influence on academic performance (F=28.4%), when there is more utilization of ICT facilities, learners can achieve better scores.

4.7 Effective Utilization of Co- curricular Facilities on Students' Performance The fourth objective was to establish the extent to which utilization of co-curricular activities influenced students' performance in Sub County public secondary schools in Uasin Gishu County. This was achieved by obtaining the views of the teachers, students and principals on the co- curricular activities.

4.7.1 Utilization of Playground for Co- Curricular Activities in the School Most of the teachers 87 (90%) and principals 39 (80.6%) agreed that their schools utilized the playground or field for co-curricular activities, with 10 (10%) and 9

(19.4%) disagreed respectively as summarized in Table 4.30. Majority of students 253 (65.8%) agreed that their school had a playground or field for co-curricular activities and 131 (34.2%) disagreed. This implied that most schools in the County had a

playground or field for co-curricular activities. This finding was in line with the policy recommendation from the Kenya Institute of Curriculum Development (2017), which stated that children need to be given activities from three categories to ensure they develop satisfactorily and most importantly, physically.

Table 4.30 Utilization of Playground for Co- Curricular Activities in the School

	Teachers		Principals		Students	
	Freq	**%**	**Freq**	**%**	**Freq**	**%**
Yes	87	90.0	39	80.6	253	65.8
No	10	10.0	9	19.4	131	34.2
Total	97	100.0	48	100.0	384	100.0

4.7.2 Frequency of Utilization of Playground for Co- Curricular Activities

The respondents were requested to rate how often students utilized the playground for co-curricular activities and their responses were summarized in Table 431. Most of the teachers 45 (46.7%) and principals 19 (38.9%) rated they regularly utilize, with 36 (36.7%) and 28 (58.3%) rated often respectively, while 16 (16.7%) and 4 (8.3%) rated rarely utilize the playground. This implied that students in public secondary schools utilized the playground for co-curricular activities as per Ministry of Education guidelines.

Table 4.31 Frequency of Utilization of Playground for Co- Curricular Activities

	Teachers		Principals	
	Frequency	**Percent**	**Frequency**	**Percent**
Very often	10	10.0	9	19.4
Often	26	26.7	19	38.9
Regular	45	46.7	16	33.3
Rarely	16	16.7	4	8.3
Total	**97**	**100.0**	**48**	**100.0**

4.7.3 Utilization of Co- curricular Activities in the School

Most of the teachers 65 (66.7%) and principals 27 (55.6%) agreed that co- curricular activities in their school adequately served students interests, with 32 (33.3%) and 21 (44.4%) disagreed respectively as shown in Table 4.32. This indicated that most schools in the County had co-curricular activities that were adequately utilized serving students interests.

Table 4.32 Utilization of Co-curricular Activities in the School

	Teachers		***Principals***	
	Frequency	**Percent**	**Frequency**	**Percent**
Yes	65	66.7	27	55.6
No	32	33.3	21	44.4
Total	**97**	**100.0**	**48**	**100.0**

4.7.4 Utilization of Co-Curricular Facilities

The students were requested to rate the how they utilized co-curricular facilities within the schools. The responses are summarized in Table 4.33. Most of the students 206 (53.6%) stated that they adequately utilized the field, with 124 (32.3%) rating the playing field they inadequately utilized. The game's equipment was rated to be inadequately utilized by 225 (58.7%) of the students, and 126 (32.9%) rated it to be adequately used. On music rooms, majority of the students 203 (52.9%) rated it to be inadequately used. This implied that the Games equipment and music rooms in public secondary schools were inadequately used and the playground was adequately utilized.

Table 4.33 Utilization of Co-Curricular Facilities

	Unable to rate		**Very inadequate**		**Inade equate**		**Ade quate**		**Very inadequate**	
	F	%	F	%	F	%	F	%	F	%
Field	54	14.2	37	9.7	87	22.6	164	42.6	42	11.0
Games equipment	32	8.4	35	9.0	191	49.7	104	27.1	22	5.8
Music rooms	151	39.4	116	30.3	87	22.6	22	5.8	7	1.9

4.7.4 Effective Utilization of Co-Curricular Activities and Academic Performance

The principals were requested to rate how co-curricular activities influenced academic performance and the responses were summarized in Table 4.34. Most 23 (47%) of the principals rated the field and games equipment as highly influencing academic performance, while Music rooms was rated very low by 15 (30.6%). This implied that

the fields and games equipment in the public secondary schools influenced academic performance.

Table 4.34 Effective Utilization of Co-curricular Activities on Academic Performance

	Very low		Low		Moderate		High		Very high	
	F	%	F	%	F	%	F	%	F	%
Fields	1	2.8	1	2.8	23	47.2	19	38.9	4	8.3
Games equipment	1	2.8	3	5.6	24	50.0	15	30.6	5	11.1
Music rooms	15	30.6	11	22.2	12	25	5	11.1	5	11.1

4.7.5 Participation of Students in Co-curricular Activities

The study sought to determine how participation of students in co- curricular activities in Sub County public secondary schools in Uasin Gishu County influenced academic performance. A total of 6 statements were used to establish the teacher's views on participation of students in co- curricular activities and their responses elicited on a 5point Likert scale, shown in Table 4.35.

On the statement that the school had enough facilities and equipment for music 78(80%) disagreed, with 8(7.8%) undecided and 12(12.3%) agreed as indicated by a mean of (M=1.81; SD=1.21). Most of the teachers 41(42.2%) agreed, with 16(16.7%) undecided and 40(41.1%) disagreed that functional playing fields were adequate for co-curricular activities as indicated by a mean of (M=2.99; SD=1.23).

Table 4.35 Participation of Students in Co- Curricular Activities

	Strongly disagree		Disagree		Undecided		Agree		Strongly Agree		Mean	SD
	F	%	F	%	F	%	F	%	F	%		
My school has enough facilities and equipment's for music.	56	57.8	22	22.2	8	7.8	5	5.6	6	6.7	1.81	1.21
The functional playing fields are adequate for co-curricular activities.	12	12.2	28	28.9	16	16.7	31	32.2	10	10.0	2.99	1.23
The availability of effective playground and equipment, help students to search and develop their talent	5	5.6	10	10.0	12	12.2	39	40.0	31	32.2	3.83	1.15
The administration supports students in selection of co-curricular activities.	8	7.8	12	12.2	13	13.3	46	47.8	18	18.9	3.58	1.16
The school requires a student to participate in any co-curricular activities.	2	2.2	3	3.3	18	18.9	53	54.4	21	21.1	3.89	0.85
The PE teachers are enough for the school requirements for the co-curricular activities.	2	2.2	6	5.7	17	17.8	53	54.4	19	20.0	3.84	0.89
Mean				`							**3.32**	**0.63**

On the statement that the availability of effective playground and equipment helped students to search and develop their talent, majority of the teachers 70(72.2%) agreed, with 12 (12.2%) undecided and 15(15.5%) disagreed, as indicated by a mean of (M=3.83; SD=1.15). On the statement that the administration supports students in the selection of co-curricular activities, majority of the teachers 65(66.7%) agreed, with 13(13.3%) undecided and 19(20%) disagreed, as indicated by a mean of (M=3.58; SD=1.16).

Most of the teachers 73(75.5%) agreed, with 18(18.9%) undecided and 5(5.5%) disagreed that schools required a student to participate in any co-curricular activities as indicated by a mean of (M=3.89; SD=0.85). On the statement that PE teachers were enough for the school requirements for co-curricular activities, majority of the teachers 72 (74.4%) agreed, with 17 (17.8%) undecided and 8 (7.8%) disagreed as indicated by a mean of (M=3.84; SD=0.89).

The six statements used to explain the participation of students in co-curricular activities had an overall mean of 3.32 and a standard deviation of 0.63, where majority of the teachers 78 (80.0%) indicated that their schools had enough facilities and equipment for music. Therefore, this information can be an eye opener for school principals to consider availing co-curricular equipment's, especially music rooms in their schools, for learners to access them.

The availability of effective playground and equipment had helped students to search and develop their talent. This was in line with research findings from Strader (2015), who stated that through the act of playing, children learn social and cultural rules. Play structures and play spaces increase children's cooperative play, social interactions, physical skills and abilities. Young children look at play environments that allow for games and opportunities to play with peers. The teachers were able to demonstrate

that the school administration supported students during the selection of co-curricular activities since it was a requirement that each student should participate in any cocurricular activity offered in the school and PE teachers were enough for the school requirements.

However, the QASO agreed that learners who participate in sports remain active physically and mentally since blood circulation increases during strenuous exercises and such learners remain attentive in class most of the time. On item number fourteen, he responded that the number of fields in a school depends on available space and co-curricular activities offered in the school. On the adequacy of fields, he made the following remarks;

> *''Fields are fairly adequate, but the equipment's for the various sports activities are not enough. This is an area that all stakeholders should cooperate to improve participation of learners in sports activities for better participation in co-curricular activities.*''
>
> (QASO July, 2022)

4.7.6 Highest Level Reached in Co-curricular Activities during Competitions The students were requested to identify the level they were able to reach during sporting activities, and 164(42.6%) were able to reach the county level, while 84 (21.9%) at the sub county level, 65(16.8%) at zonal level, 52(13.6%) at the regional level and the least 20(5.2%) reached national level as shown in Figure 4.23. This is an indication that learners participated in co-curricular activities in the county and were able to compete at different levels. This should be an eye-opener for education stakeholders to invest more resources in co-curricular activities for learners to engage in various activities.

4.7.7 Utilization of Co-Curricular Facilities and its Influence on Overall Performance

Majority of the students, 282 (73.5%) disagreed that their overall performance was influenced by the existing co-curricular facilities and 102 (26.5%) agreed, as shown in Figure 4.14. This implied that most students were unable to link the utilization of existing co-curricular facilities and their academic performance. The finding was contrary to the research finding by Mokaya (2013) in studying the influence of school infrastructure on students' performance in Public Secondary Schools in Kajiado County, who found that the availability of adequate playing fields and necessary equipment is important for talent development. This study also noted that the educational benefits of co-curricular activities included the promotion of cognitive, affective and psycho-motor growth and development, improved self-concept, positive attitude and overall academic achievement.

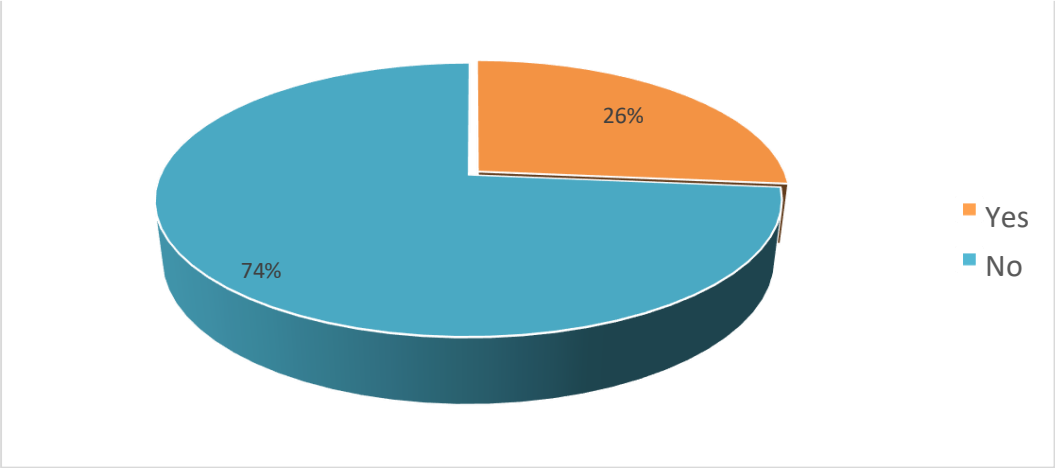

Figure 4.14 Influence of Co-Curricular Facilities on Overall Performance

4.7.8 Correlation Analysis between Utilization of Co-Curricular Activities and Student Performance

There was a significant positive relationship between utilization of co-curricular activities and student performance (r=0.513, p =0.000), as shown in Table 4.36. This finding implied that an increase in use of co-curricular activities has led to an improvement in academic performance. This agreed with Awan (2018) that school facilities like school buildings, electricity, natural/artificial lighting and ventilation in classrooms, drinking water, washrooms, and playgrounds were the main attributes to improve students' learning. This finding also agreed with Perry, Lundie and Golder's (2019) in which their study revealed a positive correlation between institutional resources and the academic achievement of students.

Table 4.36 Correlation Analysis between Utilization of Co-Curricular Activities and Student Performance

		Student Performance	**Co-curricular activities**
Student Performance	Pearson Correlation	1	.513**
	Sig. (2-tailed)		.000
Co-curricular activities	Pearson Correlation	.513**	1
	Sig. (2-tailed)	.000	

**. Correlation is significant at the 0.01 level (2-tailed). b. Listwise N=90

4.7.9 Regression Analysis on Utilization of Co-Curricular Activities and Academic Performance

The study used a linear regression model to explore the influence of utilization of co-curricular activities on student performance. The R2 represented the measure of variability in student performance that co-curricular activities accounted for. The model (R2 = 0.263) indicated that co-curricular activities account for a 26.3% variation in student performance. This agreed with the work of Lazaro and Anney (2016), titled Rethinking the Role of co-curricular in Developing Student Talents in Secondary Schools in Tanzania, which revealed that students who participate in co-curricular activities such as sports and games are more advantageous to develop talents, Language skills and self-confidence hence an improvement in academics. The Co-curricular activities predictor used in the model captured the variation in the student performance, as shown in Table 4.37.

Table 4.37 Utilization of Co-curricular Activities Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.513[a]	.263	.255	.55789

a. Predictors: (Constant), Co-curricular activities

4.7.10 ANOVA on Utilization of Co-Curricular Activities and Student Performance

The study used of ANOVA to check whether the model could forecast the result better than the mean, as seen in Table 4.38. The regression model that used co-curricular

activities as an indicator was significant (F=31.478 p value =0.000), indicating that utilization of co-curricular activities had a significant impact on student performance.

Table 4.38 ANOVA on Utilization of Co-curricular Activities

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	9.797	1	9.797	31.478	.000[b]
	Residual	27.389	88	.311		
	Total	37.186	89			

a. Dependent Variable: Student performance

b. Predictors: (Constant), Co-curricular activities

Co-curricular activities had a significant influence on student performance. The finding indicated that Co-curricular activities were positively and significantly associated with student academic performance, which concurred with the Chiedozie et al. (2018) study, which revealed that high educational performance could as well be achieved through having a pleasant atmosphere and other physical facilities such as washrooms and playgrounds. Good academic performance is closely linked to the presence of adequate school buildings and well-planned facilities, which create an environment conducive to effective teaching and learning. The findings of this study highlight that school infrastructure significantly contributes to students' academic success by fostering confidence through interactions with peers and providing access to essential resources such as laboratories (Nwaka and Ofojebe, 2020)..

4.7.11 Multiple Regression Analysis

Multiple regression analysis was employed to examine how a single dependent variable student performance relates to several predictor variables simultaneously. The multiple regression model yielded a coefficient of determination (R^2) of 0.441, showing that school infrastructure explained about 44.1% of the variation in student performance (Table 4.39). After adjusting for potential bias in the model, the adjusted R^2 dropped slightly to 0.414, meaning that school infrastructure independently accounted for 41.4% of the observed differences in performance. The remaining 58.6% can be attributed to other factors outside the scope of this mode.

Table 4.39 Overall Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.664[a]	.441	.414	.49472

a. Predictors: (Constant), Co-curricular activities, Library service, Classroom utilization, ICT

Analysis of variance (ANOVA) was applied to assess the overall fit of the regression model compared to using the mean alone (Table 4.40). The results indicated that the model was statistically significant ($F = 16.73$, $p < 0.001$), confirming a meaningful association between school infrastructure and student performance.

Table 4.40 Overall ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	16.382	4	4.096	16.734	.000[b]
	Residual	20.804	85	.245		
	Total	37.186	89			

a. Dependent Variable: SP

b. Predictors: (Constant), Co-curricular activities, Library service, Utilization of Classroom, ICT

The findings from the overall ANOVA indicated that the utilization of classroom, library service, ICT and co-curricular activities had a significant relationship with academic performance (F=16.7%). The percentage is lower, giving an insight that academic performance is a complex variable affected by many factors.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

The purpose of this study was to investigate the utilization of selected infrastructure and its influence on academic performance in Sub County public schools in Uasin Gishu County. This chapter presents the summary of the study; conclusion of the research findings and recommendations derived from findings as guided by the specific objectives. The study concluded that the classroom conditions had the lowest significance on the academic performance of students, followed by the utilization of library facilities, whereas utilization of both ICT and co-curricular facilities had significant impact on the academic performance of students. The four independent variables, when combined, had a more significant impact on academic performance than individual variable considered alone.

5.2 Summary of Research Findings

The findings of this study provided insight into the importance of physical facilities in enhancing the academic performance of students. The study suggested that proper utilization of school infrastructure played an important role in promoting academic achievements to some extent since performance can be influenced by many other factors. Therefore, the study focused on the four selected infrastructure and considered each individually. The findings had implications on managers in educational institutions and policymakers in the Ministry of Education in terms of resource allocation for the establishment of these facilities in all institutions of learning to enable learners and teachers to utilize them appropriately.

From the findings on utilization of classroom, frequency of classroom use, occupancy rate, classroom size and capacity and purpose of use played a significant role in enabling the instructional process to take place. The classrooms were frequently used by the students to read; they occupied the classroom when doing their studies hence promoted learning. It was also found that schools with libraries that had enough books, reference material, and a librarian, among other resources, enabled students to carry out self-study, which led to improved reading skills and would perform better than learners from schools without a library facility. ICT integration in the teaching/learning process was found that it had not been enhanced in most schools, which calls for education stakeholders to collaborate in procuring the ICT facility to support teachers and learners. From the findings on co-curricular facilities, it was established that most schools had fewer facilities and equipment for music in this category of schools in the County. However, the availability of adequate playground and equipment had helped students to search and develop their talent.

5.2.1 Utilization of Classroom and Its Influence on Academic Performance

The study found that classroom utilization—considering factors such as frequency of use, occupancy rate, classroom size and capacity, and the purpose of use plays a role in shaping the learning environment and influencing academic performance. Classrooms that were regularly used for lessons and occupied according to recommended capacity provided more structured and engaging setting for students. Adequate classroom size, consistent with Ministry of Education guidelines, supported effective activity-based learning, allowed free movement, and facilitated better interaction between teachers and learners. Additionally, classrooms used for a mix of academic and co-curricular activities offered diverse learning opportunities that helped maintain student engagement.

Despite these positive aspects, the statistical analysis showed only a weak but significant influence of classroom utilization on academic performance. This suggests that while proper use of classrooms contributes to better learning outcomes, additional strategies and resources are necessary to fully enhance student achievement.

5.2.2 Utilization of Library as Teaching/Learning Resource and Its Influence on Academic performance

The study found that only 21 schools had functional libraries equipped with books and reference materials, which promoted self-directed learning, with teachers guiding students on effective library use. In these schools, librarians played a key role in supporting student performance by helping learners locate and use information efficiently. Conversely, schools without functional libraries or library services experienced poor reading habits among students, which negatively affected academic outcomes. Students in such schools often lacked motivation to read, resulting in lower performance.

Overall, the findings indicated a fair but positive impact of library utilization on academic performance. These results have important implications for educational institutions and policymakers, highlighting the need for the Ministry of Education to ensure that all schools establish functional libraries as a prerequisite for registration.

5.2.3 Utilization of Information and Communication Technology and Its Influence on Academic Performance

The research findings from this variable showed that a few schools had well-equipped computer labs, with the majority having computers in the administrative offices only, while other schools had one or two functional computers or Laptops. Most principals agreed that ICT had enhanced their day-to-day management practices, for example,

making budgets, keeping learner records, communicating with parents and curriculum implementation and evaluation. Teachers, on the other hand, pointed out that ICT integration in the teaching process had enhanced lesson presentation and had made teaching more interesting for them and learners, made the preparation of lessons easy and faster, had improved the presentation of content in their lessons and utilization of ICT enabled students work alone at their own pace and engaged in inquiry-based activities. Most learners were unable to link the utilization of ICT and their academic performance since they had not used the ICT gadgets. This information should be an eye-opener to all education stakeholders in facilitating resource allocation to public schools by purchasing ICT devices now that Digital literacy is one of the core competencies in the new Curriculum (CBC). The linear regression model between the variable 'Utilization of ICT 'and its influence on 'academic performance' produced results that showed an average and statistically significant relationship between ICT and academic performance.

5.2.4 Utilization of Co-curricular Facilities and Its Influence on Academic Performance

The availability and effective utilization of co-curricular facilities had helped students search and develop their talents. The teachers demonstrated that the school administration supported students during the selection of co-curricular activities since it was a requirement that each student should participate in any co-curricular activity offered in the school and PE teachers were enough for the school requirements. Participation in co-curricular activities helped learners develop both physically, socially and emotionally as they interact with each other. They also learn social and cultural rules, communication skills and collaboration. The students, teachers and principals agreed that the co-curricular activities offered in their schools were

adequate, while students rated Games equipment and music rooms to be inadequate. The linear regression analysis for utilization of co-curricular facilities and academic performance indicated that this variable contributed significantly to the variation in student performance better than the other three independent variables. This calls for more investment in co-curricular facilities in schools for learners to utilize them.

5.3 Conclusion

First, classroom use was found to slightly boost student performance. This suggests that classrooms that are well-maintained, organized, and functional create a better learning environment, emphasizing the importance of regular upkeep and careful management of classroom spaces.

Second, libraries were observed to have a moderate positive impact on academic outcomes. Schools with well-stocked libraries encourage students to engage in independent study and enhance their research skills. While government-provided textbooks are available, there is often a shortage of reference materials, so students benefit most when they make full use of available resources under teacher guidance.

Third, the use of ICT showed an average positive effect on learning, though its impact was constrained by limited devices and low adoption in some schools. This indicates that ICT can meaningfully improve student performance, but only when schools have adequate equipment and support. Therefore, education stakeholders should prioritize both access to and effective use of ICT resources in teaching and learning.

The fourth conclusion was on the utilization of co-curricular facilities and academic performance. The linear regression model indicated that there was a good positive variation on academic performance regarding utilization of co-curricular infrastructure, which was better than the other three independent variables. . From the

linear regression model, (R2 = 0.263) the co-curricular activities accounted for 26.3% variation in student performance. Therefore, there was a positive significant influence of co-curricular activities on academic performance.

Therefore, the four independent variables were analyzed against a single dependent variable using a multiple regression model which showed that the selected school infrastructure in exclusion of the constant variable explained the variation in student academic performance by 44.4%, the remaining percentage would be explained by other factors excluded from the model.

5.4 Recommendations

Based on the study findings the following recommendations were made:

1. The Ministry of Education in collaboration with County Director of Education should ensure that all infrastructural facilities conform to Moe guidelines on establishment of school facilities. This would ensure proper spacing of learners in classes and teachers would be able to assess learning during lesson presentation. When attention to every learner prevails, learners concentrated more thus promoting academic achievements.

2. The study showed that there was a positive significant relationship between the utilization of library facilities and academic performance therefore principals should ensure that libraries have the required number of books, reference materials, tables and maps among other resources. The Deputy Principal should ensure that in the master timetable, every class has a library lesson to encourage learners to do self-study, thus improving their study skills which would promote academic performance. Class teachers should ensure that their students attend the library lesson as allocated in the timetable, hence proper utilization.

3. The study finding on utilization of ICT and academic performance indicated that there was a positive relationship between the two variables. Therefore, the study recommended provision of ICT facilities to schools to cater for learners' needs through joint efforts of all stakeholders.

4. On the influence of co-curricular facilities and academic performance, the study recommended that Principals should ensure that games equipment's were provided for the learners to utilize them. The games and P.E. teachers should ensure that learners participate in any activity of their choice, and it would enhance active involvement of all learners in co-curricular activities. When learners are active in the field, they also become attentive in class thus improved academic achievements.

5.5 Suggestions for Further Studies

This study sought to determine the influence of selected school infrastructure on academic performance in Sub County secondary schools in Uasin Gishu County, Kenya. Physical facilities play an important role in the teaching/learning process influencing academic performance. Therefore, the study made the following

suggestions for further research.

1 This study focused mainly on physical/ infrastructural facilities on academic performance, future studies may be conducted on other factors affecting academic performance such as; entry behavior of learners, peer pressure, student background and parental involvement.

2 A study to be conducted to investigate the influence of other physical facilities such as Science laboratories and Toilets/washrooms on academic performance in public secondary schools.

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APPENDICES

Appendix I: Letter of Introduction

The Principal

……School

……..Sub-county

Dear Sir/Madam

REF: REQUEST TO PARTICIPATE IN RESEARCH

I am a PhD student at University of Eldoret undertaking a research on Influence of selected school infrastructure on students' academic performance in sub county Sub County public secondary schools in Uasin Gishu County for partial fulfillment for the requirements of award of degree of Doctor of Philosophy in Educational Administration.

Please I'm writing to inform you that your school has been selected to participate in the study, and the researcher wishes to administer questionnaire to the Principal, Teachers and Students. The researcher findings will be used for the study.

Thanks in Advance

Peris Chemweno
PhD student
School of Education
University of Eldoret.

Appendix II: Student Questionnaire

This questionnaire is meant to collect information on influence of selected school infrastructure on student academic performance in sub county Sub County public secondary schools in Uasin Gishu County. Kindly tick the correct responses.

Section A: Demographic Information

1. What is the name of your school?.....
2. Which year of study are you?

   (i) Form III ☐ (ii) Form IV ☐ (iii) Other specify ☐

3. What is your gender? (i) Male ☐ (ii) Female ☐
4. What is your age bracket?

   (i) 15-17 years ☐ (ii) 18-20 years ☐ (iii) Above 20 years ☐

Section B: Classroom Spacing – Utilization Frequency

Instructions: Tick (✓) the response that best describes your experience.

Scale: 1 – Never | 2 – Rarely | 3 – Sometimes | 4 – Often | 5 – Always

Statement	**1**	**2**	**3**	**4**	**5**
I find the space between desks and chairs adequate for learning.	☐	☐	☐	☐	☐
I can move around the classroom without disturbing others.	☐	☐	☐	☐	☐
The classroom is arranged in a way that supports group activities.	☐	☐	☐	☐	☐

I face difficulty seeing the board or hearing the teacher due to crowded seating.	☐	☐	☐	☐	☐
The spacing allows the teacher to walk around and reach all students.	☐	☐	☐	☐	☐
The current seating arrangement helps me stay focused.	☐	☐	☐	☐	☐
The classroom is overcrowded, affecting how well it is used for learning.	☐	☐	☐	☐	☐
Teachers adjust classroom layout depending on the lesson or activity.	☐	☐	☐	☐	☐
Poor spacing causes distractions during lessons.	☐	☐	☐	☐	☐
Classroom space is used in a way that improves my academic performance.	☐	☐	☐	☐	☐

Frequency of Classroom Use

Kindly rate the following statements which seek to assess how often classrooms are utilized for various academic and extracurricular activities throughout the school day and beyond. Please indicate your level of agreement with each statement by selecting the option that best describes the frequency of classroom use

	Always	**Often**	**Sometimes**	**Rarely**
The classroom is used for lessons every school day.				
The classroom is used for extra lessons or remedial classes outside normal school hours.				
The classroom is used for co-curricular activities such as clubs, debates, or meetings.				
The classroom is available and used during break times or free periods.				

Classroom Spacing – Utilization Frequency

The following are students' perceptions regarding how classroom spacing influences utilization and learning in Sub County secondary schools in Uasin Gishu County. Kindly tick (✓) the response that best describes your experience.

Scale: 1 – Never | 2 – Rarely | 3 – Sometimes | 4 – Often | 5 – Always

Statement	Never	Rarely	Sometimes	Often	Always
Teachers utilize classroom time fully for academic activities.	☐	☐	☐	☐	☐
The classroom is used effectively for both group and individual learning.	☐	☐	☐	☐	☐
Teachers make use of learning corners, displays, or wall charts.	☐	☐	☐	☐	☐
The classroom layout is rearranged based on the lesson/activity.	☐	☐	☐	☐	☐
Students are actively engaged during classroom activities.	☐	☐	☐	☐	☐
Use of classroom space helps understanding of lessons.	☐	☐	☐	☐	☐
Classrooms are used beyond normal lessons (e.g., group study).	☐	☐	☐	☐	☐
Classroom setup supports interactive learning.	☐	☐	☐	☐	☐
All students have equal opportunity due to classroom use.	☐	☐	☐	☐	☐
Classroom utilization improves performance in assessments.	☐	☐	☐	☐	☐

Section C: Library Infrastructure

5. Do you access the school library at any time you are free?

   Yes ☐ No ☐

   Explain your answer.

6. How would you rate the adequacy of the following Library infrastructure in your school?

   Key: 5 Very adequate 4 adequate 3 Average 2 Inadequate 1 Very inadequate

Facilities	5	4	3	2	1
a) Reading space					
b) Tables for reading					
c) Chairs					
d) Books					

7. How is the arrangement of books in the shelves in the library?.....
8. Suggest what needs to be improved in the library so that you can realize good results in the school……
9. In your own opinion, are there enough text books in your school library?

   .....

   .....

10. How would you rate the availability of reference books in your school library?

    Good (1) Fair (2) Excellent (3) No Idea (4)

11. What challenges do you face in accessing the library facilities?

……

……

12. Suggest ways in which the above mentioned challenges can be addressed by the school management

……

……

Section D: Availability of Computers & ICT Infrastructure

13. Do you utilize computer laboratory in your school?

Yes ☐ No ☐

14. If yes are you taught computer packages or lessons? Yes☐ No ☐

15. How would you rate the frequency of use of computers or ICT in learning and how would it affect learners' academic performance?

4 – Adequate 3 – Inadequate 2- very adequate 1- Not sure

Facilities	4	3	2	1
Integrating ICT in learning				
Use of internet				
Power point presentation				

16. In your own opinion what are the challenges of integrating ICT in learning in your school?.....

17. In your own opinion does computer availability in this school affect academic performance of students? Yes or No. If yes please explain.

……

……

……

Section E: Utilization of playground Infrastructure

18. Does your school utilize the playground or field for sports activities?

Yes☐ No ☐

Please explain your answer

……

……

19. How would you rate the adequacy of the following co- curricular facilities in your school

Key: 5 –Very adequate 4---Adequate 3—Inadequate 2---Very inadequate 1—Unable to rate

Facilities	5	4	3	2	1
Field					
Games equipment					
Music rooms					
Others					

24. Which co-curricular activities do you participate in this school?.....

……

25 What level have you reached in the competition you participated in?

a) Zonal b) sub-county c) county d) Regional e) National level.

Others specify……..…..……

26 In your own opinion, is the overall performance of this school influenced by the existing co-curricular facilities. Yes ☐ No ☐ .If yes, please explain.

……

……

27 How would you rate the overall influence of the following facilities in regards to academic performance of the school? Rate as follows 5 – very high 4 – high 3 – Average 2 – low 1 – very low

Facilities 5	4	3	2	1
(a) Learning facilities (classroom)				
(b) Library facilities				
(c) Computer facilities				
(c) Playground infrastructure				

Thank you for your response.

Appendix III: Questionnaire for Teachers

Section A: Demographic Information

1. What is your gender? Male ☐ Female ☐

2. What is your position in the school?

(1) Teachers ☐ (2) H.O.D ☐ (3) Deputy Principal ☐

(4) Others …….

3. Indicate your age bracket below

Below 30 years ☐ 31-41 years ☐ 6-45 years ☐ Above 46 years ☐

4. What is your professional qualification?

Diploma ☐ Bed ☐ Med ☐ PhD ☐

Section B: Classroom Utilization as learning infrastructure / facility

The following section presents a set of structured items aimed at assessing how teachers utilize classroom space, time, and resources in support of academic activities. The items explore the frequency of various instructional strategies and classroom management practices related to utilization. Teachers are requested to indicate how often they engage in each practice using the scale provided.

Statement	Always	Often	Sometimes	Rarely	Never
I effectively utilize available classroom space to accommodate my teaching strategies.	☐	☐	☐	☐	☐
I rearrange classroom furniture where necessary to support learning activities.	☐	☐	☐	☐	☐
I use classroom walls for displaying learning materials, student work, or charts.	☐	☐	☐	☐	☐

I plan lessons with full utilization of classroom resources (e.g., chalkboard, models, maps).	☐	☐	☐	☐	☐
Overcrowding limits how effectively I utilize the classroom for quality instruction.	☐	☐	☐	☐	☐
I use flexible seating or group arrangements to improve classroom utilization.	☐	☐	☐	☐	☐
Well-utilized classrooms improve learner behavior and participation.	☐	☐	☐	☐	☐
I collaborate with colleagues to improve classroom utilization practices.	☐	☐	☐	☐	☐
I receive support from school administration to improve classroom utilization.	☐	☐	☐	☐	☐

5. How would you rate the following learning facilities in relation to academic performance of this school?

Key5 –Very Strong 4 – Strong 3- Moderate 2 – Weak 1- Very weak

Facilities	5	4	3	2	1
Classrooms					
Library					
Computer facilities					
Playground					

6. To what extent do you agree with each of the following statement on how Utilization of Classroom influences KCSE performance in your school? On a scale of 1-5, please tick as appropriate to show the extent to which you agree with the statements on the influence KCPE performance in secondary schools.

KEY: Strongly Disagree=1, Disagree =2, Undecided =3 agree =4, Strongly agree=5

Statement	**1**	**2**	**3**	**4**	**5**
The shape and size of classrooms and availability of educational materials change the way through which students participate in school instruction.					
The state of the classroom when in good condition will support the continuity of learning.					
The arrangement of classroom environment plays a significant role in enabling instructional process					
The classrooms have sufficient space and have the convenience for students to move and work.					
The classrooms have convenient seating arrangements suitable for activity-based learning					
The classrooms have sufficient light and ventilation					
Size of the class is according to ministry of education recommendations					
Chair design, height, and hand rest did not affect student concentration					
Direct sunlight into the classroom affects the classroom temperature					
There is adequate desks in the classroom					
Classroom physical environment involve different things like size of classroom, floor, walls, desks, lighting, school structure and school climate					

7. In your own opinion what do you think needs to be done to the existing learning facilities in order to improve academic performance in this school?

……

……

Section D:Library facility

11. Is there a library in your school? Yes ☐ No ☐ .

12. In your own opinion is the library located in a strategic place to save the student's needs . Yes ☐ No ☐ Explain your answer.

13. When do students visit the library in this school? Please give an

explanation……

……

14. What are some of the Teaching/Learning resources in your school

library?.....

.....

15, How would you rate the adequately of the following aspects in the school library? Key 5-very adequate 4-Adequate 3-Inadequate 2-very inadequate 1-Not able to rate.

Facilities	5	4	3	2	1
Reading space					
Tables for reading					
Chairs					
Books					

16. Kindly indicate your level of agreement to the statement below relating to how library services influence KCSE performance in your school by putting a (√) to each statement. Use a scale of 1-5, where; 1= strongly disagree, 2=disagree, 3= neutral, 4= agree, 5=strongly agree.

Statement	**1**	**2**	**3**	**4**	**5**
Students frequently use the school library for research and study purposes					
The library resources are easily accessible to all students					
The library is well stocked with relevant textbooks and reference materials					
I encourage students to use the library to support their learning					
The library is well stocked with relevant textbooks and reference materials.					
I encourage students to use the library to support their learning.					
I regularly integrate library resources into my lesson plans and assignments.					
The availability of library services positively influences students' academic results.					
Students who use the library perform better academically than those who do not.					

17 Suggest improvements that need to be done in the school library in order to improve learners academic performance……

……

18 Please comment on the availability of reference books in your school library

……

Section D: Computer Infrastructure

19 Do you offer computer studies in this school? Yes ☐ No ☐

Explain your answer……..

20 Are all the teachers computer literate in this school? Yes ☐ No ☐

21 Is there a computer or ICT expert in this school? Yes ☐ No ☐

Explain your answer……

22 How often do you use computers or internet in your teaching in this school?

a) Very often ☐ b) Often ☐ c) Regular ☐ d) Rarely ☐ e) Not at all ☐

23 How would you rate the availability and use of computers or ICT in teaching and learning? **Key:** 4 – Adequate. 3 –Inadequate 2- Very adequate 1- Not able to rate

Facilities	4	3	2	1
Integrating ICT in teaching				
Use of internet				
Power point presentation				

24 To what extent do you agree with each of the following statement on how ICT integration influences KCSE performance in your school. On a scale of 1-5, please tick as appropriate to show the extent to which you agree with the statements on the influence of using ICT in the teaching process. **KEY: Strongly Disagree=1, Disagree =2, Undecided =3 agree =4, Strongly agree=5**

Statement	**1**	**2**	**3**	**4**	**5**
ICT enhance understanding during lesson presentation.					
ICT makes teaching more interesting for me and learners.					
ICT makes preparation of lessons to be easy and faster.					

ICT improves the presentation of material in my lessons.					
ICT has given me more confidence when teaching					
ICT positively changes the relationship between me and my students					
ICT integration saves time making it possible to meet deadlines.					
ICT integration enhances in-depth analysis to be done in teaching process.					
E-learning enable you to work alone at your own pace.					
E-learning enable you to engage in enquiry-based activities.					
E-learning enable one to participate in assessing his/her work.					
ICT Integration enhances faster syllabus coverage there by better performance.					
ICT Integration enhances more quality grades					
ICT Integration enhances better understanding leading to few wastage grades					

25 Suggest ways in which Computer infrastructure can be improved in this school in order to enhance academic performance……..

……..……..……..……

Section E: Playground infrastructure

26 Do your school have a playground or field for sports activities Yes ☐ No ☐

Please explain your answer…….....

……

27 In your own opinion are co-curricular activities in this school adequately serve students' interest in this school? Yes☐ No ☐

28 How often do students participate in the co- curricular activities in this school?

(a) Very often (b) often (c) regular (d) rarely (e) not at all.

29 To what extent do the following co- curricular facilities affect the overall academic performance of learners in this school? 5-very high 4-high 3moderate 2-low 1-very low.

Facilities	5	4	3	2	1
Fields					
Games equipment					
Music rooms					
Others					

30 The following are statements related to a variety of co-curricular activities found in Secondary schools in Uasin Gishu County. On a scale of 1-5, please tick as appropriate to show the extent to which you agree with the statements on the influence of co-curricular activities on performance of students. **KEY: Strongly Disagree=1, Disagree =2, Undecided =3 agree =4, Strongly agree=5**

Statement	**1**	**2**	**3**	**4**	**5**
My school has enough facilities and equipment's for music.					
The functional playing fields are adequate for co-curricular activities.					
The availability of effective playground and equipment, help students to search and develop their talent					
The administration supports students in selection of cocurricular activities.					
The school requires a student to participate in any co-curricular activities.					
The PE teachers are enough for the school requirements for the co-curricular activities.					
Certain core subjects are paired with co-curricular activities in school.					
PE teachers are instrumental in student's selection of cocurricular activities to participate.					

My school values participation in football competition in the county.					
My school organizes music competition with the neighbouring schools.					
My school has won several accolades in football competitions at zonal level.					
Athletics is highly regarded in my school.					
Every student is required to take part in cross-country competition held in my school.					

31 What do think needs to be done in relation to the existing co- curricular facilities to boost student's performance in this school?.....

32 Suggest ways in which co-curricular infrastructure can be improved in this school in order to enhance academic performance in your school……..…

Section F: Performance of students in public secondary schools

33 To what extent do you agree with each of the following statement on the effects of school infrastructure on KCSE performance in your school. On a scale of 1-5, please tick as appropriate to show the extent to which you agree with the statements. **KEY: Strongly Disagree=1, Disagree =2,**

Undecided =3 agree =4, Strongly agree=5

Statement	**1**	**2**	**3**	**4**	**5**
Classroom arrangement, seating positions and space management, in general, has a more significant impact on the students' level of understanding, and consequently, their academic performance,					
Classroom arrangement affects the core of teaching and learning – communication					
Students grades improve when they are involved in extracurricular activities.					

Participation in extracurricular activities has a positive effect on academic performance among students					
Participation in athletics improve academic performance,					
Participation in musical performance improve academic performance among the student					
There were improved grades by students					
There is improved students' termly scores					
There is improved class participation					
There is improved scores in class assignments by students					

Thanks for your response.

Appendix IV: Questionnaire of Principals

You are kindly asked to respond to the questions underneath honestly. Please fill in the blank space or tick (√) the appropriate response from among the ones given, the questionnaire is meant for educational purposes only. Any information given was treated with a lot of confidentiality. Please do not write your name

Section A: Demographic Information

1. Indicate your age bracket Below 30 years ☐ 31-41 years ☐ 36 – 40 years ☐ 41 – 45 years ☐ Above 46 years ☐
2. What is your gender? Male ☐ Female ☐
3. What your professional qualification? Diploma ☐ Bed ☐ Med ☐ PhD ☐
4. What your overall teaching experience? 0-4 years ☐ 5-9 years ☐ 10 and above years ☐
5. What is your experience in management position……(years)

Section B: Classroom Utilization Patterns

Scale: 5 = Very High Utilization, 4 = High, 3 = Moderate, 2 = Low, 1 = Very Low

Facilities	**1**	**2**	**3**	**4**	**5**
The level of classroom utilization in my school positively influences student academic performance.					
Overcrowding in classrooms negatively impacts student performance.					
Timetable planning ensures optimal use of classrooms for learning.					
Specialized classrooms (e.g., laboratories, ICT rooms) are effectively utilized to improve subject performance					
Poor classroom utilization has hindered academic achievement in my school.					

Section C: Administrative Practices in Classroom Utilization

Scale: 5 = Always, 4 = Often, 3 = Sometimes, 2 = Rarely, 1 = Never

Facilities	**1**	**2**	**3**	**4**	**5**
I review classroom allocation regularly to enhance learning.					
I collaborate with teachers to ensure optimal classroom use.					
My school monitors classroom utilization through records and reports					
I conduct periodic inspections to ensure classrooms are in good learning condition.					
My school has policies or guidelines on classroom allocation and use.					
Classroom utilization data is used to plan infrastructure development					

6. What strategies has your school implemented to improve classroom utilization?

……

……

7. How would you rate the utilization of the following learning facilities in relation to academic performance of students in this school? Key: 5 – strongly agree, 4 – Agree, 3-Neutral, 2 – Disagree 1 – Strongly Disagree

Facilities	5	4	3	2	1
Classrooms					
Library					
Computer/ICT					
Playground					

8. In your own opinion what do you think needs to be done to the existing learning facilities in order to improve academic performance in this school?.....

   ……

   ……

Section C: Government Policy Adherence

9. In your own opinion is the infrastructure in this school compliant with the

   Ministry of Education guidelines? Yes ☐ No ☐

10. What constraints are faced in this schools when implementing government policies especially in relation to established and design of

    infrastructure……..

11. What challenges are faced in this schools especially during establishment and design of school infrastructure or facilities like Library ,Classroom ,Fields and computer facility

    ……

    ……

Section D: Classroom as a Learning Infrastructure

12. In your own opinion are there enough classrooms in this school? Yes ☐ No ☐

    If your isopinion is no, how to you cope with such issue……

    ……

    How would you describe the spacing of learner's lockers in the classrooms in your school……

    ……

13. Please comment on the following aspects in the classrooms in your school ,

Key , 5—Excellent ,4—Good ,3—Average ,2—Poor ,1—Unable to rate

Aspects of classrooms	5	4	3	2	1
Floor					
Wall					
Boards					
Lighting					
Windows					

13. How can the above aspects be improved in this school?.....

……..

14. In your own opinion, is there a relationship between the above classroom environment and academic performance of students in this school?

Yes ☐ No ☐

If yes please give an explanation……..……

……

Section E: Library Utilization

16. Do you use the library in this school? Yes ☐ No ☐

17. What are some of the Teaching / Learning materials in your school library…?

……

18. Please indicate the source of funds for construction and equipping the school library with Teaching / Learning resources……

…….

19 Are the Teaching /Learning resources enough in the school library Yes ☐ No ☐

If No what plans do you have to improve the situation……

……

……

20. How would you rate the utilization of reference books in your school library,?

Key 5—Excellent 4—Good 3—Fair 2—Poor 1—No idea.

Resources	5	4	3	2	1
Reference books					
Past exams papers					
Maps					

21. In your own opinion, is there a relationship between academic performance of students and availability of library infrastructure in a school……

……

Section F: Computer/ICT Infrastructure

22. Is there ICT integration done in this school? Yes ☐ No ☐

Explain your answer…….

……

Are all the teaching staff in this school computer literate Yes ☐ No ☐

23. If the response is no, what strategies are put in place to ensure that all teachers acquire ICT skills……

……

How often does the school administration use ICT in the following management areas? Please rate Key: 4 – very often, 3 – Often, 2 – Rarely, 1 – Not at all

Areas that require ICT use	**4**	**3**	**2**	**1**
Management of staff				
Communication with parents				
Curriculum implementation & evaluation				
Learners records				
Budgets				

24. Suggest ways in which ICT use in this school can improve student performance in K.C.S.E examination…….

Section G: Playground facility

25. Do your school have a playground or field for sports activities Yes ☐ No ☐

.Please explain your answer……..……

26. In your own opinion are co-curricular activities in this school adequately serve students interest? Yes ☐ No ☐

Explain your answer……

27. How often do students participate in the co-curricular activities in this school? (a) Very often (b) Often (c) Regular (d) Rarely (e) Not at all.

28. To what extent do the following co-curricular facilities affect the overall academic performance at the school?

Key: 5 – Very high, 4 – high, 3 – moderate, 2 – low 1 – very low.

Facilities	5	4	3	2	1
Fields					
Games equipment					
Music rooms					
Others					

29. Suggest ways of improving co-curricular infrastructure in order to enhance improved student academic performance

……

Appendix V: Observation Schedule/Checklist

Facilities	Utilization	Good condition	Not Good
Classroom	48	28	20
Wall	48	27	21
Floor	48	26	22
Desk/lockers	48	25	23
Lighting	45	40	5
Library	21	16	5
Books	48	48	0
Spacing	21	15	6
Reference materials	41	22	19
Librarian	6	6	6
Computer room	2	2	2
Internet	3	3	3
Computer expert	2	2	2
Playground	22	14	8
Games store	9	6	3
Equipment	30	27	3

Appendix VI: Interview Schedule for Quality Assurance and Standards Officer

The following questions guided the researcher during the interview process to obtain information concerning utilization of infrastructure and how it influenced academic performance in public secondary schools in Uasin Gishu County.

1. How would you rate the adequacy of physical infrastructure in schools?

   ……

   ……

2. How does utilization of physical infrastructure affect the school educational achievement?

   ……

   ……

3. How does physical infrastructure funding help in improvement of school academic performance?

   ……

   ……

4. What concerns do teachers express about the utilization of classrooms?

   ……

   ……

5. Which strategies are being taken in establishing libraries in secondary schools?

   ……

   ……

6. What is the effect of a school having a library in terms of student performance?

……

……

7. Do you think poor performance in KCSE related to absence of library services in secondary schools?

……

……

8. What are the concerns among the students in utilizing library services available?

……

……

9. How do schools integrate ICT in their teaching?

……

……

10. How do ICT integration in teaching influences academic performance in public secondary schools?

……

……

11. How does learning influence academic performance in public secondary schools?

……

……

12. How has been the performance of students who participate in co-curricular activities in K.C.S.E been generally?

    ……

    ……

13. In your view, does the performance in KCSE have any effect on students participate in co-curricular activities? (Probe). If so, how?

……

……

14. How many fields do schools have? (Probe). If so, are they designated standard? (Probe).

    ……

    ……

15. In your view, how adequate are the field facilities in the school for full participations practice?

    ……

    ……

Appendix VII: Research Permit

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

RESEARCH LICENSE

This is to Certify that Ms. . PERIS CHEMWENO of University of Eldoret, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev. 2014) in Taita-Taveta on the topic: INFLUENCE OF SELECTED SCHOOL INFRASTRUCTURE ON STUDENTS PERFORMANCE IN SUB COUNTY LEVEL SCHOOLS IN KENYA: A CASE OF CAMPS (2018). for the period ending : 23/November/2023.

Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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Appendix VIII: Introductory Letter (University of Eldoret)

University of Eldoret
flame of knowledge and innovation

P.O. Box 1125-30100,
ELDORET, Kenya
Tel: 053-2063111 Ext. 242

Our Ref: UoE/EMP/POG/33

4th November, 2022

The Executive Secretary,
National Council for Science and Technology & Innovation
P.O. BOX 30623-00100,
NAIROBI.

Dear Sir/Madam,

RE: RESEARCH PERMIT REQUEST FOR PERIS CHEMWENO SEDU/EMP/P/003/20

This is to confirm that the above named Post Graduate Student has completed Course work and has successfully defended her research proposal.

She is currently preparing for a field research work on her proposal entitled:*"Influence of Selected School Infrastructure on Students Performance in: Sub County level Schools in Kenya: A Case of Uasin Gishu County"*. The proposal has been approved by this Institution.

Any assistance accorded her to facilitate successful conduct of the research and the publication will be highly appreciated.

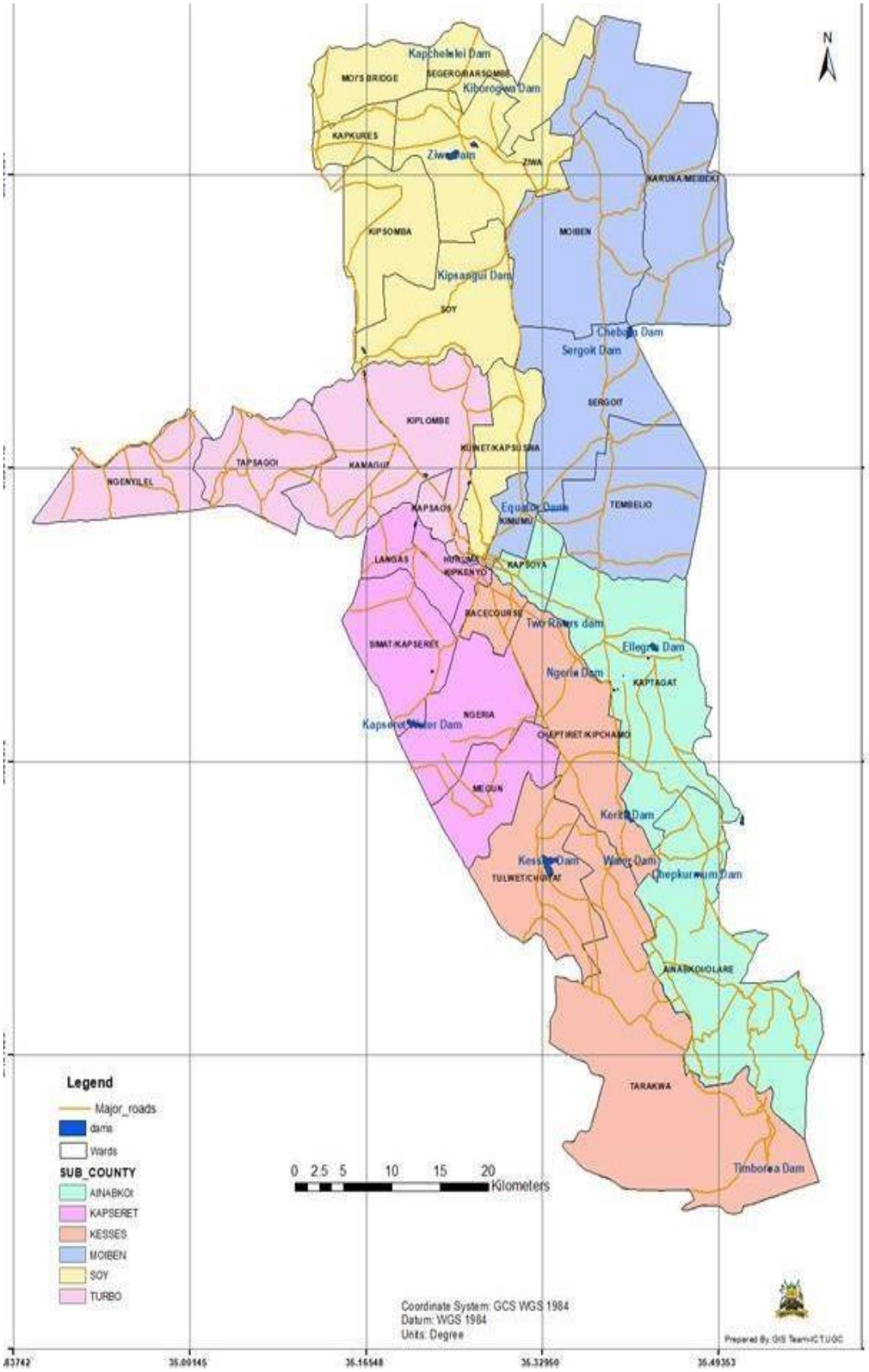
Yours faithfully,

Dept. Of Educational Management
& Policy Studies
UNIVERSITY OF ELDORET

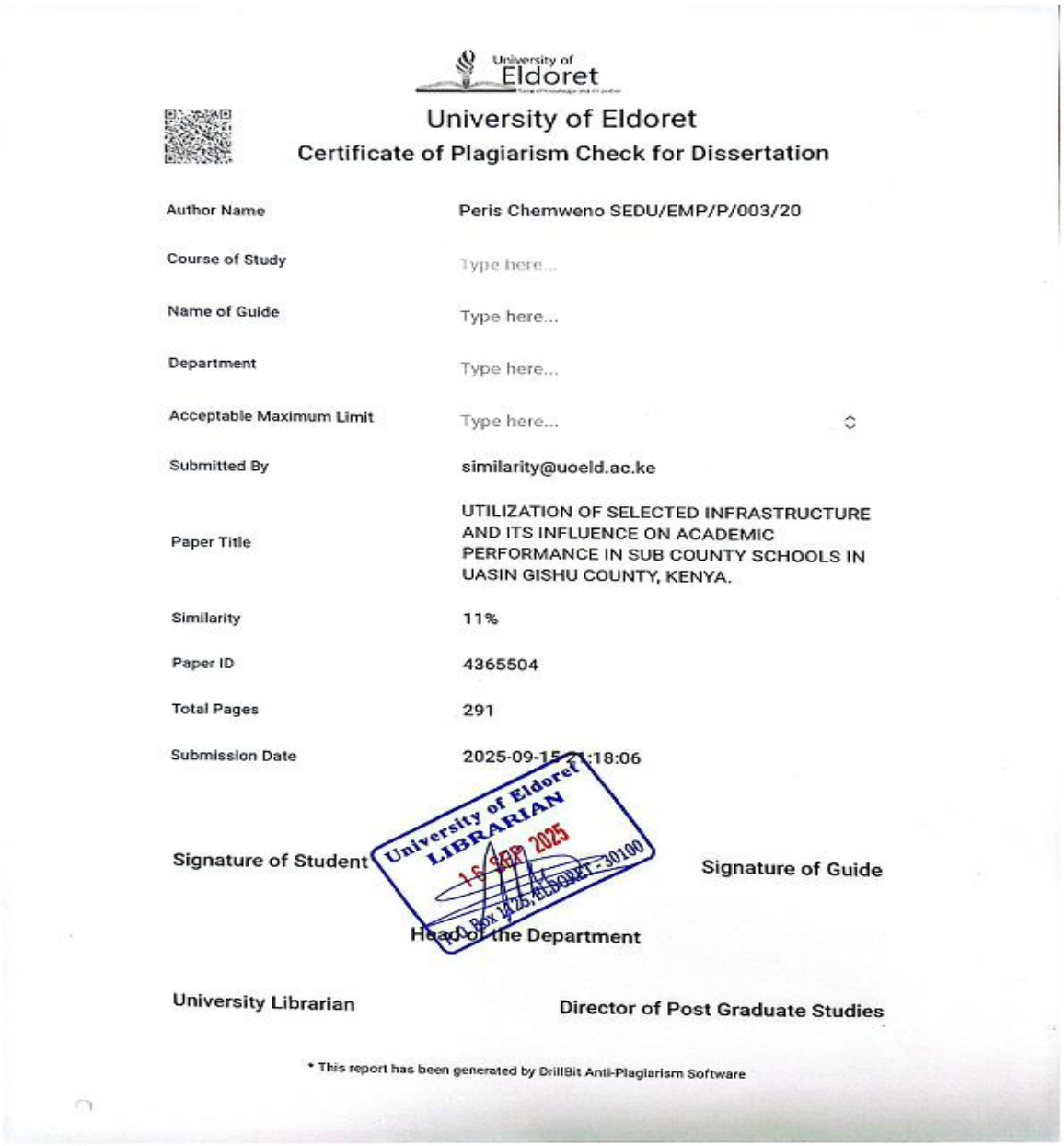
Dr. Lydia Kipkoech
HOD, EDUCATIONAL MANAGEMENT

Copy to: Permanent Secretary,
Ministry of Higher Education, Science & Technology,
P.O. Box 9583-00200 NAIROBI

Appendix IX: Map of Uasin Gishu



Appendix X: Similarity Report



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