INFLUENCE OF PRINCIPALS' MANAGEMENT STRATEGIES ON PROVISION OF INFORMATION COMMUNICATION TECHNOLOGY INFRASTRUCTURE IN PUBLIC DAY SECONDARY SCHOOLS IN KAMUKUNJI SUB COUNTY, KENYA

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A Research Project Submitted in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Education in Educational Administration

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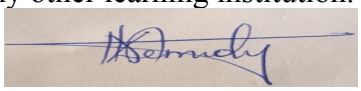
DECLARATION

This research project is my original work and has never been submitted for a degree or any award in any other learning institution.



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DEDICATION

This academic work is highly dedicated to my beloved wife Felista Mwongeli, my son Francis Mbithi and daughter Edith Mwende who have been the source of my happiness, encouragement, tolerance, inspiration, advice, guidance and financial support throughout the period of my absence in the family to scale the heights of education in the University of Nairobi.

Finally, and most importantly, I dedicate this scholarly work to my beloved parents Pius Mulwa and Agnes Mwende for their financial and moral support. You instilled in my life the vital virtues of hard work, commitment, patience, honesty and humility which has kept me moving. Be blessed.

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TABLE OF CONTENT

DECLARATION ii
DEDICATION iii
ACKNOWLEDGEMENT iv
TABLE OF CONTENT v
LIST OF TABLES ix
LIST OF FIGURES xi
LIST OF ABBREVIATIONS AND ACRONYMS xii
ABSTRACT xiv

CHAPTER ONE
INTRODUCTION

1.1 Background of the study 1
1.2 Statement of the Problem 11
1.3 Purpose of the study 13
1.4 Objectives of the Study 13
1.5 Research questions 14
1.6 Significance of the study 15
1.7 Delimitations of the study 15
1.8 Limitations of the study 15
1.9 Basic Assumptions of the study 16
1.10 Definition of Significant terms 17

CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1 Introduction 20
2.2 Concept of provision of ICT infrastructure in public secondary schools 20
2.3 Principals' mobilization of resources and provision of ICT infrastructure 30
2.4 Principals' capacity building of staff and provision of ICT infrastructure 34
2.5 Principals' stakeholder involvement and provision of ICT infrastructure 38
2.6 Principals' involvement of staff in decision-making and provision of ICT infrastructure 41
2.7 Summary of Literature 43
2.8 Theoretical framework 44
2.9 Conceptual framework 46

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction 48
3.2 Research design 48
3.3 Target Population 48
3.4 Sample size and sampling technique 49
3.5 Research instruments 50
3.5.1 Questionnaires 50
3.5.2 Document analysis 50
3.5.3 Observation checklist 50
3.6 Validity of the research instruments 51

3.7 Reliability of the research instruments 51
3.8 Data collection procedures 52
3.9 Data analysis techniques 53
3.10 Ethical considerations 54

CHAPTER FOUR
DATA ANALYSIS, INTERPRETATIONS AND DISCUSSIONS

4.1 Introduction 55
4.2 Response Rate 56
4.3 Socio-Demographic information of the Respondents 56
4.4 Influence of principals' mobilization of resources on provision of ICT infrastructure. 60
4.5 Influence of principals' capacity building of staff on provision of ICT infrastructure 62
4.6 Influence of principals' stakeholder involvement on provision of ICT infrastructure 64
4.7 Influence of principals' involvement of staff in decision-making on provision of ICT Infrastructure 66
4.8 Provision of ICT infrastructure 68
4.9 Bivariate analysis of Influence of Principals' Management Strategies on Provision of Information Communication Technology Infrastructure in Public Day Secondary Schools 72
4.10 Regression analysis 81

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction 85
5.2 Summary of the Study 85
5.3 Summary of findings of the study 85
5.4 Conclusions 89
5.5 Recommendations 91
5.6 Suggestions for Future Research 95
REFERENCE 97
APPENDICES 101
Appendix I: Letter of Transmittal 101
Appendix II: The ICT teachers' Questionnaire 102
Appendix III: middle managers' (HODs) questionnaire 108
Appendix IV: Deputy principals' questionnaire 114
Appendix V: Principals' questionnaire 120
Appendix VI: The QASO'S questionnaire 126
Appendix VII: The SCDE'S questionnaire 132
Appendix VIII: Observation checklist 138
Appendix IX: Letter of introduction from the university 139
Appendix X: Research permit 140
Appendix XI: Research authorization letter 142

LIST OF TABLES

Table 3.1: Sample representation of respondents in the Sub County 49
Table 3.2: Reliability statistics of the items in the questionnaires 52
Table 4.1: Distribution of the respondents by gender 57
Table 4.2: The age distribution of the respondents 58
Table 4.3: Distribution of Academic level of the respondents 60
Table 4.4: Responses on the influence of principal on mobilization of financial resources 61
Table 4.5: Responses on the influence of principals' capacity building of staff 63
Table 4.6: Responses on the influence of principals' stakeholder involvement 65
Table 4.7: Responses on the influence of Principals' involvement of staff in decision making 67
Table 4.8: Responses on the influence of principals on provision of ICT infrastructure. 69
Table 4.9: Responses on the availability and adequacy of ICT infrastructure. 71
Table 4.10: Relationship between Principals' management strategies of resource mobilization and provision of ICT infrastructure 73
Table 4. 11: The relationship between principals' management strategies and capacity building of staff on provision of ICT infrastructure 76
Table 4.12: The relationship between principals' management strategy of stakeholder and involvement on provision of ICT infrastructure 78
Table 4.13: The relationship between principals' management strategy of involvement of staff in decision-making and provision of ICT infrastructure 80
Table 4. 14: Model summary 82
Table 4.15: Analysis of Variance (ANOVA) 82
Table 4. 16: Coefficient of regression 83

LIST OF FIGURES

Figure 2.1: Conceptual framework showing the influence of principals' management strategies and provision of ICT infrastructure. 45

LIST OF ABBREVIATIONS AND ACRONYMS

AIDC: Automatic Identification and Data Capture Systems
BOM: Board of Management
CCTVS: Closed-Circuit Televisions
CBC: Competence Based Curriculum
CESA: Continental Education Strategy for Africa
EFA: Education for All
EJCSIT: European Journal of Computer Science and Information Technology
EMIS: Education Management Information Systems
GoK: Government of Kenya
ICT: Information Communication Technology
IGAD: Intergovernmental Authority on Development
KICD: Kenya Institute of Curriculum Development
MCA: Member of County Assembly
M & E: Monitoring and evaluation
MP: Member of Parliament
MOE: Ministry of Education
MOOCs: Massive Open Online Courses
NACOSTI: National Commission of Science, Technology and Innovation
NEMIS: National Education Management Information System
NESSP: National Education Sector Plan
NGCDF: National Government Constituencies Development Fund
ODeL: Open Distance and e-Learning
OER: Open Educational Resources
PA: Parents association
PEOU: The Perceived Ease of Use
PU: Perceived Usefulness
PPMC: Person Product Moment correlation coefficient
QASO: Quality Assurance and Standards Officer
REB: Rwanda Education Board
SDG: Sustainable Development Goal
SCDE: Sub County Director of Education
SPSS: Statistical Package for Social Sciences
STEM: Science Technology Engineering and Mathematics
TAM: Technology Acceptance Model theory
TSC: Teacher Service Commission
TTI: Teacher Training Institutes
TVET: Technical Vocational Education and Training
TPD: Teacher Professional Development
UNESCO: United Nations Educational, Scientific and Cultural Organization
UNESCO KFIT: United Nations Educational, Scientific and Cultural Organization- Korea Funds-in-Trust joint initiative for ICT transformation in education in Africa.

ABSTRACT

The study sought to determine the influence of principals' management strategies on provision of Information Communication Technology infrastructure in public day secondary schools in Kamukunji Sub County, Kenya. The research questions and objectives were based on the variables of study. The specific objectives of the study were: To determine the influence of principals' management strategies of mobilization of financial resources, to examine the influence of principals' management strategies on capacity building of staff, to assess the influence of principals' management strategy of stakeholder involvement and to examine the influence of principals' management strategy of involvement of staff in decision-making on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya. The study was guided by the ICT Theory whose proponents are Davis, Bagozzi & Warshaw of 1989. This is due to increase in the extent of use of ICT in schools for classroom instruction and for school administration and management. The study used the descriptive survey research design which helped the researcher to collect and compare data from the phenomenon at the same time in the study. The study used census sampling technique to cover the entire study population. The research instruments used were document analysis, questionnaires as well as observation checklists. The target population was all the four public day secondary schools. The total respondents of the study were 40, consisting of one SCDE, one QASO, 4 principals, 5 deputy principals, 6 ICT teachers and 23 HODs. Piloting was randomly conducted in one day school and all the possible deviations and ambiguities from the expected research responses realized, was eliminated and corrected by consulting the research supervisors. SPSS version 29.0 was used in testing the reliability of the measurement items and Cronbach's Alpha reliability coefficient of 0.942 across a number of 36 items was obtained. This was an excellent test of reliability since the value obtained was above 0.80, meaning that the scale used was fine and satisfactory according to Mugenda (2003). The ethical considerations were observed during data collection as the researcher administered questionnaires and checklists to the respondents of the study. The quantitative data obtained from the study, was analyzed using SPSS and the measures of central tendency like the mean was obtained. Similarly, calculation of standard deviation was done to determine the measure of variability of the obtained data. The value of the weighted mean was used in making decisions using the perceptions of the respondents on particular measurement items. The results of the study revealed that principals had provided ICT infrastructure in their schools but they were not adequate. The capacity building of staff was not adequate as some teachers lacked essential ICT skills. There was stakeholder involvement in provision of ICT resources but it had not been fully actualized. Further, the study found that some principals involved teachers in decision making processes but were not involved in setting of school ICT goals and in school ICT tendering projects. There was also a low perception that teachers were involved in monitoring and evaluating ICT projects provided by principal. The schools did not have tracking devices for ICT infrastructure provided. The study concludes that most of the principals have not practiced better management practices for provision of ICT infrastructure. The study made several recommendations and among them was that, the MOE should design policies that support provision of ICT in all secondary schools.

CHAPTER ONE
INTRODUCTION

1.1 Background of the study

In an effort to realize Education for All (EFA), there is increased demand for education among people across the world. This has led to emergence of educational management as a discipline of study in the university. School management, leadership and governance issues are crucial to achieving institutional change for better performance (Garrison & Vaughan, 2013). School administration and management has become effective through use of ICT in school management and in education systems. The systems are essential tools for decision-making and in offering e-leadership in education management and administration. The use of information communication technology has contributed greatly to management of education. This calls the need for management and leadership strategies that influence provision of ICT infrastructure (Mbaka, 2014).

The government of Kenya has made effort to provide quality education towards achieving of the Vision 2030. The government is investing heavily in education through budget allocations to schools to ensure that all learners have access relevant to education. It has ensured equity in allocation of other physical and human resources in education. Scholars have acknowledged the role of information communication in education in service delivery and in classroom instructions. This has helped in investing in provision of ICT infrastructures in education. Similarly, the role of ICT in education towards achieving the sustainable development goal number four has been supported and acknowledged by the National Education Sector plan (NESSP) of 2018 to 2022. It has greatly contributed to curriculum designs, innovation and development, curriculum implementation, monitoring and evaluation as well as in the development of educational management information systems (Ministry of education, 2021)

The competence Based curriculum (CBC) recommends use of ICT in education to promote digital literacy among the learners and teachers as core competence skill in the 21st century. This call for mobilization of resources, capacity building of teachers and principals, stakeholder involvement and involvement of staff in decision making to provide the ICT resources required in schools. As a result, the government through the MOE in conjugation with the ministry of ICT has developed Education Management Information Systems (EMIS) for data management in the schools which has helped educational managers in decision making. The national ICT policy, which is all-inclusive in nature and scope has continued to promote equity and sustainability in the use of ICT in research and innovations, trainings and in education management (Ministry of education, 2021) .

Further, the national ICT policy framework of 2021, recommends capacity building of stakeholders to bridge the knowledge gap in digital literacy for effective curriculum instruction and educational management. The teacher training institutes are required to provide training programs for ICT integration

in education, to increase the frequency of teacher trainings and ensure that teacher provisional development contact hours are enough across all levels. This management strategy is aimed at ensuring equitable access and provision of functional, sustainable and adequate ICT infrastructure in all the schools (Ministry of education, 2021) .

Ultimately, the successful implementation of the national ICT policy and the Basic education act, 2013 requires concerted efforts and stakeholder involvement in decision making and in provision of ICT infrastructure. Principals as education managers, providers and implementers should provide schools with an opportunity for a well-coordinated management strategies for to mobilization of financial resources to meet the increasing demand for ICT infrastructure in education (Ministry of education, 2021).

The principal's management strategies can influence provision of ICT resources for teaching, learning and other administrative purposes. School principals should strive to bring changes in the management through use of ICT. Such changes involves mobilization of resources, capacity building of staff, stakeholder involvement, and involvement of staff in decision making on provision of ICT infrastructure. Provision of ICT infrastructure entails: the procurement and installation of ICT hardware and software, setting up ICT laboratories and classrooms, ensuring there is reliable internet connectivity and implementing security measures in ICT infrastructure (Ministry of education, 2021) .

ICT Infrastructure are the electronic devices such as smart phones, tablets, computer desktops, laptops, CCTVs, projectors, printers, scanners, fax machines, telephones, mobile phones and internet infrastructure, social media platforms necessary in the school management. Mobilization and provision of these resources is crucial in improving the education system. School principals participate in resource mobilization as they are the core of the national education system. They lead education institutions towards the achievement of the strategic objectives of the Continental Education Strategy for Africa (CESA 16-25), Sustainable Development Goal, (SDG 4) and the Education Agenda 2030 (Muhu, 2017)

In the United States of America, mobilization of financial resources shows that school principals require capacity building on resource mobilization and budget allocation for ICT funding sources. U.S.A educational reforms calls for diversity in providing finances to education (Eleonore, 2017). That managers need to be aware of school ICT budget allocation from the government as well as internet connectivity. This helps principals in controlling, directing, securing and budgeting of finance after mobilization. The U.S government has made commitment to mobilization of public revenue to provide for its citizens to meet demand for education and for their sustainable development (Muli, 2013).

The United Kingdom is a major donor agency in resource mobilization education systems in the world. It conducts the needs assessment of the school system and then provides the financial resources to school heads based on their level of financial accountability and transparency. In Canada, the education system has achieved a lot through support by federal government in resource mobilization. Schools have received support from local communities and political good will in provision of resources. School managers are encouraged by the federal government to prepare education budgets so that they can receive funding in each financial year. Budgeting leads to increased accounting and reporting on how public money has been spent. These are strategies used by Canadian school for resource mobilization to encourage transfer as well as sharing resources among practitioners in education (Lavin & Jie, 2013).

A study by Suella and Paula (2018) on the perspective of Malaysia on capacity building of staff on provision of ICT infrastructure indicates increased promotion provision and use of new ICT facilities in education. It recommends the frequency of training as the day to day school-based teacher training programs (regular basis) by their experienced peers throughout out their career. Managers should carry out in-service training of staff to be able to adopt to changes in technology during the school holidays to increase the professional development hours to 144 hours and 5 hours for Distance Learning (DL) preparations. This training period should last for 24days(UNESCO Office & Regional Bureau for Education in Asia, 2016).

Malaysia encourages budgeting, planning and bulk financing by policy makers in education to train staff improve ICT competencies of staff. The Asia Pacific countries recommends the need by Policy makers to design and implement TPD programs for professional development of teachers. This makes them able to emerge, apply and infuse technology using ICT infrastructure available and transform education system (Suella & Paula, 2018). A study on the perspectives from teachers in Shanghai in China in Asia, on e-leadership has revealed that, Principals' management strategies influence provision of ICT infrastructure and ICT use for transformation in school across different stages (Wu & Yu, 2019).

School principals in Malaysia have adopted use of ICT infrastructure in school management since it makes parent-principal communication, stakeholder involvement and community engagement easy. They use emails and short messages (SMS) to pass information through technology in school website, learning portals and in mobile phones that are readily available and affordable to all stakeholders. They are all familiar with computer application software and can use word processors to prepare send or receive documents for purposes of communication. The internet connectivity of schools by the principals has this this management practice effective. It is therefore clear that infusion of information communication technology in management of school systems made it easy to send, receive or report information more conveniently and effectively (Suella & Paula, 2018).

The policy frameworks on ICT use in education in South Africa department of education requires that school managers should identify and implement ICT projects in their schools. A report on review of ICT projects published on the Review Panel Framing Paper 2013/2014 showed that over 26% of the schools in South Africa had inadequate basic ICT infrastructure computers in that period. This called for government initiatives, through the MOE of in South Africa to corporate in mobilization resources for provision of ICT facilities in schools. The principals were mandated to implement strategies like parental involvement, teacher involvement in decision making, setting goals and implementation of ICT projects. Schools also started engaging the community, business and private organizations in provision of finances and in capacity building of school ICT champions or computer coordinators (Otundo, 2014).

A regional perspective in the Federal state of Nigeria in a study by Ibara (2014) on principals' stakeholder involvement in mobilization of resources indicates that; the government through the MOE, non-governmental organizations, parents, local communities, Banks and Teacher training institutes (TTI) are key people/bodies in providing ICT infrastructure in schools and in capacity building of staff. Their involvement contributes to creativity and innovation in education. The TTI develops computer hardware and software as well as providing ICT curriculum. The local government builds and maintains the ICT labs and provides schools with internet connectivity while Banks help schools in financing and the installation of ICT tools. The parents associations provide a safe environment to school infrastructure as community engagement in management of infrastructure. Principals communicates fees levies with parents using ICT tools. Philanthropists are involved in purchasing stand-by power generators for operating ICT tools. The stakeholders are key in forming school advisory committees in the BOM (Ibara, 2014).

In the East African context, a study by Sika (2014) on principals' involving staff in decision-making in Tanzania and Uganda shows that, teachers feel motivated and recognized when involved in making decisions about ICT projects in a school. Principals should frequently involve teachers in setting ICT goals for students and the school, involve them in coming up with the school ICT policies. Teachers and other staff should also be involved in the planning and implementation of ICT strategies in the school(Sika et al., 2014).

In Kenya, the Kenya Institute of Curriculum Development (KICD) has developed a comprehensive framework in line with the National ICT policy, to ensure that curriculum instruction, development, implementation, innovation and evaluation incorporates ICT to make education more efficient and effective. This calls for the need to provide ICT infrastructure to the schools. Provision of ICT resources in classroom instruction, principals help teachers in content delivery and in stimulating learners for learning (Mbaka, 2014).

School Principals have provided Closed-Circuit Television (CCTV cameras in schools to better their management strategies in monitoring job performance

and for security purposes (Babalola, 2020). Stakeholder involvement has increased collaboration in the mobilization of ICT resources as school advisory committees play a major role in budgeting, planning and looking for alternative sources of finance. Principals support frequent capacity building of staff by teacher training institutes for TPD recommended by TSC (Odhiambo & Omoro, 2015).

The Government of Kenya (2013) as outlined in the Basic Education Act of 2013, states that education research and training are key contributor to the national, social, economic, political, cultural and religious transformation. This saw the need for an ICT enabled system of education in order to increase access to quality basic education for all children in Kenya (Nawate, 2017). In this regard, the Ministry of education (MOE) through Kenya Institute of Curriculum Development (KICD) has initiated curriculum reforms, as guided by the Kenya Institute of Curriculum Development Act of 2013 (Government of Kenya, 2013).

According to the Science, Technology and Innovation Act of 2013, school managers should ensure that education, research and training emphasize acquisition of national values and competencies through provision of ICT resources. This will promote integration of science, creativity and innovation in schools. The National ICT policy of 2019, requires that the government should provide schools with ICT tools, digital content, avail training resources, e- security structure and as well as sustainable ICT funding mechanisms in the education and ICT sector. The policy outlines a strategy for capacity building of teachers and school managers which is ICT oriented to expose learners to alternative pathways in life (GoK, 2021).This is also outlined in the sessional paper NO. 1 of 2019, as a national policy document that proposes an education system and training that is ICT complacent (Ministry of Education, 2019).

According to Briggs (2013), school administration and management can be made more effective through use ICT. ICT promotes digital teaching and learning among the teachers and learners. ICT is becoming increasingly available in schools and has led to diversification of learning environments. Learners in remote and marginalized areas can access education through use of ICT. Social media platforms like WhatsApp, Facebook, twitter, cloud computing, video conferencing through zoom or Google meetings are ICT tools used by principals in their administration and management styles. The crowdsourcing, tablets and mobile learning apps as well as digital portfolio facilities has helped in searching and sharing of information among staff and students.

The principals have embraced an ICT management strategy of ensuring that science teachers and students are provided with and have access to virtual labs for simulations, demonstrations and experiments. More effective principals allow staff and learners to collaborate, share and work together by use of online resources like Wikipedia, podcasts as well as blogs. Teachers can use

3D printing techniques to prepare teaching and learning aids such as maps, models and charts (Muli, 2013)..

The principals should facilitate teachers to enroll and participate in massive open online courses (MOOCs) for career growth and professional development available in Kenya Education Management Institute (KEMI) and other institutions. In conclusion, the influence of principals' management strategies on provision of information communication resources are important. School administrators who provide effective support and provides adequate resources helps to ensure that, technology is integrated effectively into teaching and learning. This leads to improved student outcomes and prepares students to cope with challenges of the digitalization. Similarly, ICT skills promotes critical thinking and problem solving among leaders to enable them manage the challenges in administration and management such as inadequate infrastructures.

Therefore, the study sought to investigate the influence of principals' management strategies on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya. Public schools in Nairobi County including Kamukunji Sub County lacks adequate ICT infrastructure. These are resources necessary for administrative, teaching and learning purposes. This is greatly influenced by principal's strategies of management towards providing and maintaining the ICT infrastructure in his/her school. Majority of the schools have inadequate basic ICT infrastructure like Computers, slow or no internet connectivity, inadequate projectors and other relevant ICT infrastructures (Chepkonga, 2015).

1.2 Statement of the Problem

Data from the Kamukunji Sub County education office indicates that sixty three percent of the schools in Kamukunji Sub County are County day schools, which are characterized with low populations of students from low-income earning families. This directly influences the schools fee collection and negatively affects the school financial resources, as the school catchments is slam areas such as Mathare slams, Baba dogo, Korogosho, Dandora, Majengo, Bahati and ShauriMoyo slams, Mr. Osano (2023) the Sub County QASO. Since parents are key stakeholders in provision and mobilization of financial resources, the Sub County lags behind in provision of ICT infrastructure as most have shortage of basic ICT facilities with inadequate ICT personnel. Therefore, the study aimed at determining the influence of Principals' management strategies on provision of ICT infrastructure in all the public day secondary schools in Kamukunji Sub County, Kenya.

In Nairobi City County, Kamukunji Sub County lags behind in the level of availability and accessibility of ICT infrastructure despite the efforts made by the principals. In Westlands Sub County, a case of two national schools each with a population of 2000 students, each has an average of 200 computers. In another case, an Extra-county school with a population of 1200, has an average of 60 computers. Each school in Starehe Sub County has at least an

active internet connectivity and some projectors according to the Kamukunji Sub County QASO, Mr. Osano, 2023.

This statistics are in tandem with and Kibra Sub County where a case of two national schools in Starehe Sub County with an approximate population of 1800 students have an average of 100 computers and at least one active internet connection and a projector. In Kibra Sub County, two extra-county schools with an approximate population of 1400 students, have an average of 60 computers each and at least one active internet connectivity and working projectors. This is according to the Nairobi county education office, 2023. Therefore, it is in the public domain that many schools in Kamukunji and especially the County day schools have touching shortage of basic ICT infrastructure like Computers, slow or no internet connectivity and inadequate projectors. They face financial constraints, inadequate ICT personnel, negative perception on ICT use as well as, lack of capacity building of staff as well as insufficient technical support. Further, the existing ICT facilities are not well maintained (Chepkonga, 2015).

1.3 Purpose of the study

The study sought to determine the influence of principals' management strategies on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya.

1.4 Objectives of the Study

The study was guided by the following objectives: -

i) To determine the influence of principals' management strategies of mobilization of financial resources on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya.
ii) To examine the influence of principals' management strategies on capacity building of staff on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya.
iii) To assess the influence of principals' management strategy of stakeholder involvement on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya.
iv) To examine the influence of principals' management strategy of involvement of staff in decision-making on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya.

1.5 Research questions

The study sought to answer the following questions:-

i) What is the influence of principals' management strategy of mobilization of financial resources on the provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya?
ii) To what extent has the principals' management strategy of capacity building of staff influenced the provision of ICT infrastructure in public secondary day schools in Kamukunji Sub County, Kenya?
iii) How does the principals' management strategy of stakeholder involvement influence the provision of ICT infrastructure in public secondary schools in Kamukunji Sub County, Kenya?

iv) Does principals' involvement of staff in decision-making influence the provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya?

1.6 Significance of the study

The findings of this study may be used to guide policy makers in education in understanding the influence of principals' management strategies on provision of ICT infrastructure in public secondary schools in Kenya. The study was also geared towards providing better insights on challenges and intervention strategies facing provision of ICT infrastructure in education. Data obtained may help to know the level and adequacy of provision of ICT facilities and this may help the MOE improve in provision of ICT facilities. It can help the government to improve the school ICT budget allocation and capitation. The principals may in turn become more accountable and transparent to ICT resources at their disposal. The study may help the TSC to improve on the capacity building of teachers for TPD.

Finally, the study aimed at filling the gaps in research in Kamukunji Sub County to help educational scholars and other researchers on studies related to ICT in the field of education and in other sectors for the betterment of the country at large.

1.7 Delimitations of the study

The study was covering the entire Kamukunji Sub County in the Nairobi County, Kenya. The study only focused on all the public day secondary schools namely: Eastleigh High school, Zawadi secondary school, Kamukunji secondary school and St. Teresa's Boys secondary school.

1.8 Limitations of the study

The study was confined to Kamukunji Sub County yet there are many Sub Counties Nairobi County and hence the results of the study may not be generalized to the entire Nairobi County. It was limited to the public day secondary schools only. Some of the respondents did not have facts on management strategies that influence provision the ICT infrastructure. Clarification of concepts was given by the researcher when administering the instruments of research. Some research instruments took time for respondent to complete. The respondents were given enough time to fill the questionnaires. The researcher ensured that questions were brief and to the point. Due to busy schedules of the QASO and SCDE, the interviews schedule was converted to questionnaires to so that they provide the required information at their convenience. Some information required in the study was not available to every respondent. Finally, triangulation of study was done using multiple instruments to reduce research bias that comes from using a single method.

1.9 Basic Assumptions of the study

The main assumption of the study was that the Principals' management strategies influences provision of ICT infrastructure which further influences ICT use and service delivery in the school administration and management. It was assumed that study respondents would give very reliable and correct information to the research questions and interviews. It was also assumed that

the SCDE and the QASO would provide documents for analysis that was assumed to provide a clear background and significance of the study.

1.10 Definition of Significant terms

Access refers to the right for the teachers, support staff and the principals have to use ICT infrastructure acquired in the schools for curriculum instruction or administrative purposes.

Administration refers to the process through which the Principal plans, organizes and assigns tasks, duties and responsibilities to teachers, support staff as well as students. He or she directs them to that the school is effective and efficient in its day to day operations while providing the financial support required.

Also, refers to a manager, a leader of institution, a disciplinarian to staff and students, an evaluator and a facilitator of human relations in the School.

Provision refers to the process of availing, giving or supplying the required ICT resources for use to the teachers and students by the principal.

Curriculum refers to all that which the learners go through while in the schools in the sub-county, whether planned or unplanned, including their interaction with ICT infrastructure which helps to bring social, emotional, physical and intellectual development of the students.

Education refers to that which helps learners to acquire the right competencies, skills, knowledge, values and attitudes after the teaching and learning process or through sharing of individual experiences and practices.

ICT Infrastructure refers to the electronic devices such as smart phones, tablets, computer desktops, laptops, CCTVs, projectors, printers, scanners, fax machines, telephones, internet and social media platforms.

ICT refers to information communication technology applied in management of schools. It is also the use of electronic devices such as smart phones, tablets, computer desktops, laptops, CCTVs, projectors, printers, scanners, fax machines, telephones, mobile phones, internet and social media platforms like Facebook, WhatsApp, twitter, Youtube and instagram for accessing, sending or receiving digital content for administrative purpose or classroom instructions.

Infrastructure refers to the physical facilities or resources necessary for day to day operation of the school administration and management as well as for classroom instructions.

Management refers to the process or the way in which principals and other educational managers run or operate the schools so that the teachers, support staff and the students can work well towards achieving the school mission and vision using ICT infrastructure and other resources provided to them.

Management strategies refers to the possible ways of enhancing provision, mobilization and access of ICT infrastructure by the principals.

Principal refers to the head of the school and the person who is in charge of policy and decision making to guide the teachers, support staff and the students in curriculum implementation.

Public day schools refers to schools maintained by the government to offer subsidized basic secondary education to the children of the community who commute daily from home to school to pursue education.

Respondents refers to the people or stakeholders in the education sector such as ICT teachers, heads of departments, deputy principals, school principals, QASO and the SCDE who provided information and answers to the research questions.

Strategies refer to the possible ways of providing ICT resources by principals to enhance access and use of ICT by students and teachers.

Teacher refers to person who facilitates learning, a counsellor, a motivator, a disciplinarian, assessor and a supervisor, an evaluator of learners to foster acquisition of knowledge, skills, the right morals, values and attitudes necessary in the life of students.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter gives a review of the literature related to the variables that guided the study. It provides a detailed information on the influence of Principals management and administrative strategies on provision of ICT infrastructure. It gives an overview of the dependent and independent variables of the study. This chapter concludes by describing the theoretical and conceptual framework that was used to guide the study.

2.2 Concept of provision of ICT infrastructure in public secondary schools

The government of Kenya demonstrates a commitment to advancing information and communication technology (ICT) infrastructure by actively promoting local manufacturing and assembly of ICT equipment. By encouraging the production of ICT hardware within the country, the government not only supports the growth of the domestic technology industry but also ensures a more sustainable and self-reliant approach to meeting the technological needs of various sectors, including education. This initiative aligns with broader economic goals, fostering innovation and creating job opportunities within the technology sector.

In addition to promoting local ICT manufacturing, the Kenyan government employs a strategic approach to enhancing ICT facilities in schools. Recognizing the pivotal role of ICT in education, the government provides incentives to school principals, encouraging them to prioritize and integrate ICT resources within their institutions. This multifaceted support extends beyond hardware provision, encompassing software development educational programs. By investing in software development, the government empowers educational leaders to leverage cutting-edge tools and platforms, enhancing the overall ICT ecosystem in schools and facilitating a more technologically adept student body (Ibara, 2014).

Moreover, the government's commitment to the integration of ICT in education is evident in its efforts to address infrastructural challenges. Rural electrification projects targeted at schools ensure a stable energy supply, critical for powering ICT equipment. Additionally, the government focuses on maintaining and improving road conditions to enhance accessibility to schools. These initiatives collectively contribute to creating an environment where the benefits of ICT in education can be fully realized, bridging the digital divide and promoting inclusive technological development across the nation (Oluoch, 2016).

A report dated 3-4 September, 2018 by UNESCO team working on ICT use in Education in order to develop a Master Plan or ICT policy for Mozambique, points out that educational mangers who harness all their potentials on provision of ICT infrastructure in education, can easily help the country to achieve the SDG4, (Aurora & Tererai, 2018). This is in accordance with the Vision 2030 Agenda for Sustainable Development in the Kenya. The policy outlines that there is need for Principals to device strategies to provide and

create a safe school-based ICT infrastructural learning and teaching environment. The provision of OER (Open Educational Resources) and relevant digital contents by educational managers to teachers, students and the public at large to improved quality of education (Tulowitzki & Gerick, 2022).

According to the European Journal of Computer Science and Information Technology (EJCSIT) of 2013, there is increased use of technology in the schools for instructional and administrative purpose. This is a wake-up call for the principals to come up with management strategies that influence provision of ICT infrastructure to enhance service delivery in their administration and management of the schools. The principals' management strategy of provision of financial resources for creation of school websites as portals for learning and marketing, has increased collaboration and communication in schools (Taddeo & Barnes, 2016).

Since the government launched the national ICT Integration and Innovation Centre at the University of Nairobi at the Kenya Science Campus, there has been increased use of ICT by principals in the administration and management of schools, leading to improvement in the quality of services offered. The influence of principals' support and management practices on information and communication technology integration in educational management, has been widely studied and documented. Effective ICT integration in schools requires a strong commitment from school leaders, particularly principals, to support and implement practices that encourage and facilitate mobilization of resources.

According to UNESCO, 2018, a report on the use of ICT in transforming the education sector in AFRICA, the main beneficiaries of provision of ICT infrastructure are educational administrators who in turn foster human and social development by positively influencing the way their staff and students work in the institution. Principals who provide ICT support through effective management practices like budget allocation, identifying funding sources, mobilizing resources for internet connectivity and establishing functional and sustainable ICT classrooms, have been found to have a significant positive impact on ICT integration in schools (Aurora & Tererai, 2018).

Principals, as key educational leaders, emerge as significant contributors to the successful implementation of ICT in schools. Effective management practices, such as strategic budget allocation, identification of funding sources, and resource mobilization for internet connectivity, are instrumental in establishing functional and sustainable ICT classrooms. The research conducted by Aurora and Tererai in 2018 underscores the importance of principals in shaping the trajectory of ICT integration. Those who actively provide support and leadership in these areas are found to have a substantial positive impact on the overall success of ICT initiatives within their schools. By assuming a proactive role in ensuring the availability and sustainability of ICT resources, principals contribute not only to the technological advancement

of their institutions but also to the broader development of students who are better prepared for the challenges of a digitally connected world.

Furthermore, the involvement of principals in fostering ICT integration goes beyond infrastructure provision. Principals serve as catalysts for change by fostering a culture of innovation and technological literacy among both educators and students (Aurora & Tererai, 2018). They play a crucial role in promoting professional development opportunities for teachers to enhance their digital skills and pedagogical approaches. By championing continuous learning in the realm of technology, principals contribute to the creation of an educational environment where teachers can effectively leverage ICT tools to enhance the quality of instruction. This commitment to ongoing professional development not only ensures that educators stay abreast of the latest technological advancements but also empowers them to create engaging and adaptive learning experiences that align with the demands of the modern world (Aurora & Tererai, 2018).

Provision of ICT infrastructure plays a pivotal role in shaping the landscape of information security within educational institutions. As emphasized, the need for an effective e-security structure is paramount to safeguard sensitive information and mitigate potential cyber threats. School administrators bear the responsibility of fostering a secure technological environment, and this involves collaborating with relevant ICT organizations. Such partnerships can provide schools with access to the latest security technologies, expertise, and best practices to address evolving cyber threats. In this rapidly changing digital era, where educational institutions increasingly rely on technology for various operations, the establishment of a robust e-security framework is essential not only for protecting data but also for maintaining the trust and confidence of stakeholders (Aurora & Tererai, 2018).

Moreover, the integration of ICT infrastructure and e-security measures aligns with the evolving nature of educational technology and the increasing prevalence of remote learning. As educational institutions continue to adopt digital platforms and cloud-based services, the potential vulnerabilities to cyber threats also grow. Effective e-security practices not only protect against external threats but also address internal challenges such as unauthorized access or data breaches within the school network. The proactive adoption of encryption, secure authentication protocols, and regular security audits become integral components in maintaining the integrity of the educational ecosystem. This forward-thinking approach ensures that as schools embrace technological advancements, they do so with a strong emphasis on safeguarding sensitive data and maintaining the resilience of their digital infrastructure.

Furthermore, the collaborative efforts between school administrators and ICT organizations offer a synergy that extends beyond immediate security concerns. It creates opportunities for knowledge exchange, professional development, and continuous improvement in adapting to emerging

cybersecurity trends. Engaging in partnerships with external ICT experts allows schools to stay abreast of the latest security technologies and industry best practices. This not only enhances the school's ability to respond effectively to existing threats but also positions it strategically to anticipate and mitigate future challenges in the ever-evolving landscape of information security. The collaborative approach underscores the importance of a collective effort in addressing cyber security issues, recognizing that the complexity of modern threats requires a multidimensional and cooperative response.

The assertion that the provision of ICT infrastructure has a profound effect on information security in schools underscores the critical role of technology in education. As schools navigate the digital age, implementing robust e-security measures is not merely a technological necessity but a fundamental commitment to ensuring the safety, privacy, and well-being of students, staff, and institutional data. By embracing proactive security strategies, collaborating with external expertise, and staying vigilant to emerging threats, educational institutions can create a resilient and secure environment conducive to effective teaching and learning in the digital era.

In response to the imperative for information security, many schools are leveraging their ICT infrastructure not only for e-security but also for proactive surveillance and security management. Automatic Identification and Data Capture Systems (AIDC) and Closed-Circuit Television (CCTV) systems are being employed as strategic tools to enhance security measures (Musa & Ogunode, 2022). These technologies contribute to the comprehensive protection of school information, including staff and student bio-data, as well as financial data in school bank accounts. By implementing such advanced security measures, schools are better equipped to thwart cyber threats, ensuring the confidentiality, integrity, and availability of critical information. The utilization of AIDC and CCTVs represents a proactive approach, deterring potential cybercriminals and reinforcing the overall security posture of educational institutions.

Furthermore, the importance of safeguarding school information extends beyond merely protecting against cybercrime. Instances of cyberbullying, which can have severe consequences on students' well-being, are also addressed through these e-security measures (Eden & Heiman, 2013). By implementing a comprehensive ICT infrastructure and e-security framework, schools create an environment where students can confidently engage with digital tools, fostering a safe and supportive online space. This not only aligns with educational institutions' duty of care but also contributes to the broader societal effort to create a secure digital landscape for students to learn and grow. In conclusion, the integration of ICT infrastructure, collaboration with ICT organizations, and the implementation of advanced e-security measures represent crucial steps in fortifying information security within educational institutions and promoting a safe digital learning environment.

The principals' management strategies should ensure that schools are provided with e-security structures for safety of school ICT database. This ensures that teachers and students are protected against cyber bullying and crime. This is in accordance with the Computer Misuse and Cybercrime Act of 2018 which provides information on offences relating to use of ICT to the general public to create awareness on security measures (Ministry of education, 2021).

Principals have influence over financial resources in school. They provide the high cost of e-security structures like antivirus software and firewall for computers and laptops in a school. The schools strategic plans mandates provision of internet infrastructure by the principals. The school budget allows for provision of intranet, internet and extranet connectivity to ICT machines used by teachers, students and staff for academic or administrative work. The classrooms, libraries and laboratories should be equipped with internet to facilitate research. Internet is essential for administrative purposes for communication via email, twitter and other social media platforms in a school. Teachers can access download educational resources for classroom instruction. Financial services like online or mobile banking in the school has been made easy through use of internet. Principals should provide funds for monthly subscriptions to ensure that their schools stay connected for effective and efficient use of ICT infrastructure (Tanui, 2013).

A study on the regional perspective of ICT in Rwanda indicates that, between 2015 and 2016, the Rwanda Educational Board (REB) collaborated with UNESCO to provide ICT infrastructure to schools, monitor and evaluate its teachers' performance. This came after the board had organized a training of teachers on the Rwanda ICT essentials in its education system. This is a good follow-up management strategy, which principals in Kenya, need to embrace

to ensure proper implementation of ICT skills acquired for effective utilization of ICT infrastructures provided. Besides, principals should provide ICT communication tools and social media platforms to the stakeholders in a school. This is because, the use of effective communication and collaboration among stakeholders is important. It improves feedback mechanisms and encourages teamwork and cooperation to ensure that everyone is working towards the achieving the goals and objectives of the school.

The findings from the UNESCO KFIT Project in 2018, focusing on ICT in education in Zimbabwe, underscore the crucial role of educational managers in fostering inclusivity through the integration of information and communication technology. The study emphasizes that effective educational leaders should prioritize the needs of all students, including those with learning and physical disabilities, when planning and developing ICT infrastructures. Notably, schools such as Magretha Hugo School and King George School in Zimbabwe serve as exemplars in this regard. These institutions have taken proactive steps to enhance the learning experiences of students with disabilities by providing specialized ICT equipment, including desktop computers, audio amplifiers, and headphones. This tailored infrastructure aims to cater to the diverse learning needs of students, particularly those who are visually impaired, ultimately contributing to improved learning outcomes(Aurora & Tererai, 2018).

E-Schools like Magretha Hugo School and King George School have demonstrated a commitment to inclusivity by leveraging grants and donations to acquire essential ICT tools such as laptops, projectors, television sets, and Smart boards. These resources play a pivotal role in supporting students with

various physical and mental disabilities, facilitating a more interactive and engaging learning environment. By adopting these practices, these schools showcase a model of effective ICT integration that prioritizes accessibility for all students. The success of these initiatives serves as a valuable example for educational managers globally, encouraging them to consider similar strategies in promoting inclusivity within their respective education systems.

The proactive approach taken by these schools in Zimbabwe serves as a compelling case for other nations, including Kenya, to consider adopting similar management strategies. By encouraging school principals to prioritize inclusivity in the provision of ICT infrastructure, governments can contribute to the creation of a more equitable and accessible education system. This not only aligns with the principles of diversity and inclusion but also recognizes the transformative potential of ICT in addressing the diverse needs of students. It underscores the importance of a collaborative effort among educational leaders, policymakers, and stakeholders to ensure that the benefits of ICT in education are accessible to all students, irrespective of their abilities or disabilities. In essence, the Zimbabwean experience offers valuable insights into the potential of ICT to bridge educational gaps and foster a more inclusive learning environment on a broader scale (Aurora & Tererai, 2018).

2.3 Principals' mobilization of resources and provision of ICT infrastructure

The integration of Information and Communication Technology (ICT) infrastructure in educational institutions is pivotal for preparing students for a technology-driven world. School principals play a crucial role in mobilizing resources to facilitate the provision of robust ICT infrastructure. Principals are not merely administrators; they are strategic leaders who shape the vision of educational institutions. Their leadership style and vision significantly influence how resources, including financial, human, and community support, are mobilized for ICT infrastructure (Muli, 2013).

Furthermore, navigating budgetary constraints is a challenge principal's face in their mission to provide ICT infrastructure. The principal's involvement in securing financial resources through methods such as grant applications, fundraising initiatives, and strategic budget allocation. Notably, the extent to which principals engage with the local community, businesses, and non-

governmental organizations for support in ICT infrastructure provision is crucial in resource mobilization. The effectiveness of collaborative efforts in mobilizing resources and establishing sustainable ICT infrastructure is critically analyzed. Principals are key decision-makers in determining the type of ICT hardware and software, the establishment of ICT laboratories, and the implementation of cyber security measures. Finally, beyond infrastructure, principals should prioritize the development of staff through training programs to enable effective ICT integration in teaching. The role of principals in fostering a technologically literate teaching staff capable of utilizing ICT tools for enhanced pedagogy is assessed (Muli, 2013)..

Principals ought to adopt management strategies such as budget allocation for ICT and identification of other sources of financing school budget. The government capitation or school ICT budget allocation from the MOE helps principals in provision of ICT resources. Such resources include financial, physical and human resources. The principal works in conjunction with TSC in selection and recruitment of competent ICT staff and teachers in a school as a means of providing for ICT infrastructure and ensuring the school is provided with internet connectivity by the local government. Effective leadership by principals involves the act of mobilizing adequate ICT resources. These are needed to develop adequate, conducive ICT infrastructure and environment for staff, teachers and students in the school (Oluoch, 2016).

Principals seeks to identify funding sources from local ICT grants from the government and non-governmental organizations. They organize school fund drives to get financial aids towards mobilizing ICT infrastructure in their schools. School information management systems can be made more effective and efficient by ensuring that schools strategic plan prioritizes ICT budget. This is because lack of quality and adequate ICT infrastructure hinders provision of better management services. Government policies on rural electrification and accessible roads has led to improvement in provision of ICT infrastructure (Sungbin Lim, 2014)

Principals, recognizing the financial implications of integrating ICT into their schools, actively seek funding from various sources, including local ICT grants from government initiatives and non-governmental organizations (Sungbin Lim, 2014). By strategically identifying and securing funding opportunities, principals play a vital role in overcoming financial barriers to ICT implementation. Additionally, their efforts extend to organizing school fund drives, engaging the local community and stakeholders to contribute to the financial aid aimed at mobilizing ICT infrastructure. This collaborative approach not only enhances the accessibility of resources but also fosters a sense of shared responsibility for the technological advancement of the educational institution.

The effectiveness of school information management systems is contingent on adequate budget allocation and strategic planning that prioritizes ICT resources (Sungbin Lim, 2014). Principals, as leaders in educational

institutions, can influence the integration of ICT into the school's strategic plan, ensuring that budget considerations align with the institution's long-term goals. Recognizing the pivotal role of information technology in facilitating better management services, principals advocate for robust ICT budgets to address the challenges posed by inadequate infrastructure. By doing so, they contribute to the creation of a conducive environment where information can be efficiently managed, fostering improved administrative processes and overall school management. This strategic approach not only enhances the educational experience for students but also ensures the sustainable and effective use of ICT resources in the long run.

A study of the UNESCO Report of 2019 in Rwanda shows a team of international ICT experts providing secondary school students with ICT infrastructure. This represents the influence of donor agencies in mobilization of ICT resources to African countries, a strategy that Principals in Kenya can adopt as their management strategy. This is an effort to ensure that there is provision of adequate ICT infrastructures according to the UNESCO-ICT Competence based Curriculum Framework for Teachers and their students (Aurora & Tererai, 2018).

The school principal acts as a leader tasked with the responsibility of management of both physical and human resources. ICT leadership and management stems from a shared mission and vision to allow for community participation in mobilization of resources, Laaria Mingaine (2013). Effective leadership by principals involves the act of mobilizing adequate ICT resources needed to develop a conducive ICT environment for staff, teachers and students in the school. Principals should seek for local and international ICT donors, grants, political good-will and organize school fund drives to get financial aids towards acquiring ICT infrastructure in their schools. School management systems can be made more effective and efficient by ensuring that ICT infrastructure is prioritized in the school's strategic plan.

2.4 Principals' capacity building of staff and provision of ICT infrastructure

The Constitution of Kenya Article 53 (1) (b), states that every child in Kenya has the right to access quality and relevant education. The teachers and school principals too have the right for capacity building. The government has made the secondary school education compulsory and subsidized to all the learners and therefore need to make capacity building of staff free and compulsory to teachers. This will assist teachers to equip learners with technical skills to make them fit in the changing society due to technological advancements. ICT has been integrated in the curriculum and the teacher training institutes are offering ICT training to teachers who are posted in secondary schools as computer studies teachers (Ministry of education, 2021).

The Basic Education Act of 2013 Article 95(3) part (k), complements the national ICT policy as it advocates for use of ICT in educational administration and management to enhance capacity building of staff. The ministry of education in conjugation with the ministry of ICT has advocates for provision of ICT infrastructure in schools whose expertise in ICT has been

enhanced. They have developed and promoted the use of and National Education Management Information System (NEMIS) in schools for governance and management of students' data and for library management systems. Teachers are required to attend seminars and workshops facilitated by the MOE for training on the use of NEMIS in their schools.

Similarly, the sessional paper No. 1 of 2019, recommends use of ICT in education for research purpose and also for capacity building of teachers and training of learners across all levels of education. This had led to the need for procurement and installation of ICT infrastructure in the schools leading to improvement in the quality and relevance of the systems of education in Kenya. These policies highlights the need for management strategies that influence provision of ICT infrastructures while ensuring that there is safety of school information systems and security of ICT resources. Educational managers are encouraged to embrace strategies for developing the capacity of staff while putting in place ethical considerations to bring total transformation in the education sector (Ministry of Education, 2021).

The vocational training colleges that are mandated for capacity building of staff by the Technical Vocational Education and Training (TVET) Act of 2013, have designed educational programs that identify the knowledge gaps among teachers. The teacher development contact hours and the frequency of ICT trainings have been increased to ensure that teachers have improved access to more training by use of TVETS. The integration of ICT in education and the introduction of the competency based curriculum has seen teachers enroll for in-service training courses in the universities. This is supported by the Universities Act of 2012 which allows for Open Distance and e-Learning (ODeL) programs as advocated by the MOE to the employed staff.

Principals play a crucial role in supporting teachers to attend Teacher Training programs for TPD. Training should be more frequent and the recommended professional development hours is 24 days in the teacher training institutes that has availed the training resources. A study on the regional perspective of ICT in Rwanda indicates that, between 2015 and 2016, the Rwanda Educational Board (REB) collaborated with UNESCO in training of teachers on the Rwanda ICT essentials in its education system. This is a good management strategy, which Principals in Kenya, need to embrace to ensure proper training of ICT teachers and staff to acquire more ICT competencies. Similarly, a study on ICT in education in Zimbabwe (UNESCO KFIT Project,

2018), indicates that effective educational managers, should prioritize the need for capacity building of staff in education. The study indicates that fifty percent of teachers trained on ICT in Rwanda, regularly use their competencies in their everyday teaching (Aurora & Tererai, 2018).

The ICT training for all the teachers and the capacity building of Principals as educational managers, is highlighted in the Kenyan Policy Framework for educational training (the National ICT Policy Framework of 2021). The Principals are encouraged to identify strategies to improve teachers and learners' digital knowledge, skills and attitudes (GoK, 2021). The MOE through introduction of the National Education Management Information System, (NEMIS) of 2017, for management of students' data in schools highly advocates for capacity building of staff to be able to use NEMIS. Training of staff should improves their basic computer literacy in using search engines and websites to get information and sharing of such information via emails (Mbaka, 2014).

Staff training and development is the Principals' strategy of human resource management in a school. Principals should offer effective training and professional development opportunities through Science, Technology, Engineering and Mathematics (STEM) in-service training to strengthen teachers' competencies and their thinking designs (Wu & Hu, 2019). This helps teachers and support staff to build their skills and confidence in using technology in the classroom and administrative work. This is done through workshops, mentoring programs, and online courses to help teachers stay up-to-date with the latest technological advancements. Capacity building of staff also involves encouraging and supporting ICT training for decision-making among the heads of the department in a school. It enhances institutional leadership and capacity for further research and development in ICT among staff (Sungbin Lim, 2014).

Principals should provide ICT facilities and ensure staff and ICT personnel, are familiar with information security and practices. Capacity building on network security helps staff be able to establish mechanisms of detecting any sort of crime and terrorism in their school information systems. This ensures that all ICT users, school information and resources, are kept safe for use and that data stored in the computers cannot be corrupted and accessed by unauthorized personnel (Odiaga & Abeka, 2020)

The capacity building of staff by principals on cyber security enables them be able to detect on time cyber-attack and take preventive measures by people using ICT infrastructures. This helps them to understand the laws guiding the use of ICT so that in case of insecurity they can investigate and prosecute those offending them in relation to cyber security issues. This is because the

national ICT policy of both 2019 and 2021 on use of ICT in education, training, and research systems promotes ICT environments that are safe and secure to users and recommends them to observe ethical considerations (Ministry of education, 2021).

2.5 Principals' stakeholder involvement and provision of ICT infrastructure

This involves parent-principal communication, parental involvement and community engagement in school ICT projects. The stakeholders from part of school advisory committees consisting of the school alumni, parents, officials in the government from the MOE, as well as non-governmental organizations, the religious sponsors as well as the members of the school board of management who implement management strategies. The principal influences these stakeholders in a school through partnerships and by maintaining good human and community relations (Mwanzia, 2014).

The stakeholders are involved in planning and making decisions concerning ICT projects to be started. They take a major role in financing the projects as well as giving grants inform of ICT hardware and software to the school. The key role of the MOE as stakeholder is monitoring and evaluating the ICT projects established to ensure quality and standards are adhered to. Besides, government capitation to the school increases the financial ability towards purchasing ICT resources needed for completion of the ICT projects pending (Kiteme, 2013).

ICT teachers and their principals engage in continuous in-service training organized by MOE. This is to improve their ICT competencies to properly utilize, manage and maintain the infrastructure provided to them. Auditors from the MOE audit the financial reports of the school to ascertain the level of provision of ICT infrastructure provided by principal after mobilization of resources. The religious sponsors also give spiritual support and cleansing of ICT resources provided before use for school management and administration. The Alumni give generously give grants and technical expertise to the provision of ICT facilities, as they better understand their school than other stakeholders. Further, the principal influences parents through PA meetings and involves them in financing projects through of fees levies (Wanyanga, 2016).

Decentralization of decision making in a school by the principal to teachers BOM members, gives them a higher degree of autonomy over ICT infrastructure. The BOM has autonomy in making main decision pertaining financial resources in the school necessary for provision of ICT infrastructure. They make decisions on the recurrent and operational expenditures on ICT as outlined in the school strategic plan. Decisions on capacity building of ICT personnel is also made (Mwawasi, 2014).

The Board of Management, as a key decision-making body within the school, assumes a central role in determining the financial resources allocated to support ICT infrastructure. The BOM exercises autonomy in making decisions related to both recurrent and operational expenditures on ICT, aligning their

choices with the objectives outlined in the school's strategic plan. This financial independence allows the BOM to strategically allocate resources where they are most needed, ensuring the sustainability and effectiveness of the school's ICT initiatives. Additionally, decisions regarding the capacity building of ICT personnel, a crucial aspect of maintaining a skilled workforce to manage and utilize technology, fall within the purview of the BOM (Mwawasi, 2014).

The decentralization of decision-making to the BOM in schools not only empowers this governing body but also aligns with the principles of effective school governance. By entrusting the BOM with decisions pertaining to financial resources and capacity building in the ICT domain, the school benefits from a more diversified and inclusive decision-making process. This approach ensures that a broad spectrum of perspectives is considered, contributing to the development of well-informed strategies for the sustainable integration of ICT into the educational landscape (Mwawasi, 2014). The collaborative efforts of the principal, teachers, and the BOM create a dynamic framework for effective ICT governance, ultimately enhancing the overall educational experience for students.

2.6 Principals' involvement of staff in decision-making and provision of ICT infrastructure

Involving staff in decision-making is a strategy that determines the success of the school management. This is a school based management strategy that transfers responsibility of decision making. The principal should involve teachers in setting school ICT goals in the school strategic plan. This makes the students, teachers and support staff, work effectively towards provision ICT infrastructure to achieve their set goals. The principals should also involve teachers in decision making like developing of school ICT policies. At classroom level, teachers make decisions on how to implement ICT strategies at their subject level (Sika et al., 2014).

Principals who provide a clear ICT policy and vision for the school, provides direction and guidance to teachers, students, and parents on how technology should be used to improve the classroom instructions and supervision for effective and efficient teaching-learning process. The school ICT policy set,

should provide security measures to students, teachers and the support staff to protect them from cyber bullying. Therefore, they should be involved in making decisions on the best and reliable, high-speed internet and anti-virus software.

Teachers make decisions on how to use the ICT tools provided by principal in monitoring and evaluation to ensure quality and standards in delivery of services. Teachers as heads of departments have autonomy to make decisions in planning and developing schedules of M& E departmental activities and seminars for their members to enhance ICT knowledge and skills using the provided infrastructures. Teachers can decide and plan fieldwork activities to bench mark with other schools with well-designed and built ICT infrastructures that are sustainable. Principals also involve teachers in school tendering committee to make decisions about ICT purchases and contracts. They carry out verification of tenders and decides the best bidders for the school ICT infrastructure. Involving staff in decision making gives them a sense of school owning ICT projects and this makes them participate in their maintenance during curriculum delivery (Mwawasi, 2014).

Moreover, teachers are granted the authority to decide and plan fieldwork activities, allowing them to benchmark their school's ICT infrastructure with those of other institutions that have well-designed and sustainable setups. This decision-making process enables educators to gain insights into best practices, fostering a culture of continuous improvement and innovation within the school. Additionally, principals involve teachers in the school's tendering committee, allowing them to participate in decisions related to ICT purchases and contracts. Teachers actively contribute to the verification of tenders and play a crucial role in selecting the best bidders for the school's ICT infrastructure projects. This collaborative decision-making approach not only leverages the expertise of teachers but also instills a sense of ownership among

the staff, encouraging their active involvement in the maintenance of ICT projects throughout the curriculum delivery process (Mwawasi, 2014).

Involving staff in decision-making processes is not only about empowerment but also about creating a sense of collective responsibility for the success of ICT initiatives. According to Mwawasi (2014), this participatory approach fosters a collaborative culture within the school, where teachers become stakeholders in the planning, implementation, and maintenance of ICT projects. Such engagement contributes to a more sustainable and effective integration of ICT in education, as the entire school community takes ownership of these initiatives. The partnership between principals and teachers in decision-making processes not only enhances the overall functionality of ICT infrastructure but also strengthens the sense of community and shared commitment to educational excellence.

2.7 Summary of Literature

The review of previous related studies indicated provision of information communication technology infrastructure was either positively or negatively influenced by the four principals' management strategies that were being investigated. That principals' mobilization of financial resources, capacity building of staff, principals' stakeholder involvement and involving staff in making decision related to ICT played a crucial role in provision of ICT infrastructure. ICT is a tool for problem solving, decision making, saves time and improves accuracy of school management systems. Also, the ICT facilities provided by the principals influenced quality of services offered by the school management.

In conclusion, the possible gaps and weaknesses of the study might have been on the review of the literature and theory that guided the study. This leaves a gap for further studies to be done on literature review pertaining the research problem, since the theoretical and conceptual framework discussed in this project might not have been relevant and adequate to ensure that all the objectives of the study was achieved. This might not give adequate and reliable results upon which generalizations on the influence of principals' management strategies on provision of ICT infrastructure in public day secondary schools were made

2.8 Theoretical framework

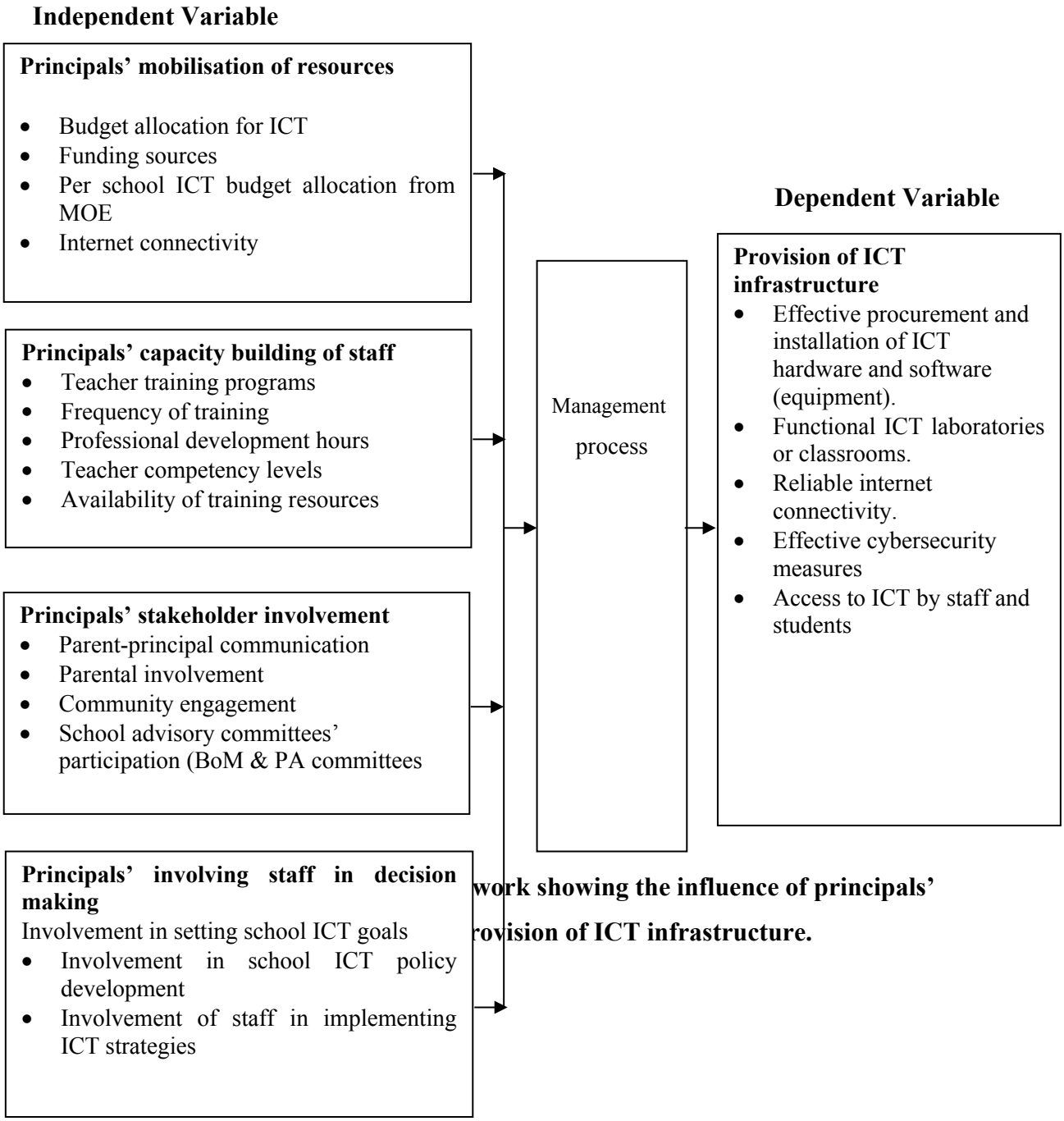
The study was guided by the ICT Theory whose proponents are Davis, Bagozzi & Warshaw of 1989. This is because there is increase in the extent of use of ICT in schools for classroom instruction and for school administration and management. The ICT theory of Technology Acceptance Model as well as the Theory of Planned Behavior influences the management strategies of a leader (Yator, 2015). According to Yator, Technology Acceptance Model (TAM) theory has been widely adopted in organizational management. It is applied in education sector where, it helps in explaining the acceptable ICT usage behaviors. People have high potential of accepting or rejecting the use of information technology in their management strategies. TAM theory talks about the attitudes toward ICT the use. That managers and administrators of organization should have the right attitude and willingness towards use of ICT systems since the world is changing (Granić & Marangunić, 2019).

TAM theory, argues that there are two important elements that determine the behavior and use of information technology: The Perceived ease of use (PEOU) and the Perceived usefulness (PU) of ICT infrastructure available. The designs and features of ICT infrastructures provided by principals determines how the ICT adopters will perceive and use them in performing their tasks. That making effort to regularly use of ICT in offering ICT services in administration, dictates the Perceived usefulness which increases organizational efficiency and effectiveness (Granić & Marangunić, 2019).

In conclusion, the Principals' management strategies like mobilization and provision of financial resources for procurement and installation of functional adequate ICT infrastructure, will increase the use of ICT. The capacity building of staff, stakeholder involvement and involving staff in decision making on provision of ICT infrastructure, will make them change their attitudes and perceptions towards use of ICT. This agrees with the TAM theory in regard to perceived ease of use and perceived usefulness of ICT tools. Therefore, the study adopted TAM model theory to assist the researcher in establishing the influence of Principals' management strategies on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County Nairobi County, Kenya.

2.9 Conceptual framework

This section guides the researcher in discussing relationship between the independent (Principals' management strategies) and dependent variable (Provision of ICT infrastructure) of the study. A school is a system with units or departments that the principal administers and manages. For this reason, the conceptual model of school information systems was adopted to show the relationship between the independent variables.



work showing the influence of principals'

rovision of ICT infrastructure.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

The research methods employed in the study are covered in this section. It highlights the research design, the target population, the sample size and sampling techniques, research instruments, validity and reliability of research instruments, data collection procedures, data analysis techniques that were used in the study and ethical considerations.

3.2 Research design

This study used the descriptive survey research design. The design was appropriate since data from the phenomenon was collected and compared at the same time as the study (Bryman, 2012). According to Wang (2015) the structures for the descriptive sample are usually acceptable if there are significant correlations between the variables at some point in time of study. The design was thus suitable as it aimed at definition of the characteristics of certain classes and estimation of the proportion of certain characteristics in order to making meaningful predictions.

3.3 Target Population

Target population refers to a large group of people, events or things of interest to the researcher and from which the sample is obtained Orodho (2004). The target population was four County public day secondary schools consisting of four principals, ten ICT teachers one QASO and one SCDE in the area of study.

3.4 Sample size and sampling technique

A sample is a collection of items drawn from a population to characterize that population (Creswell, 2013).The study used census sampling technique to cover the entire study population which was a small area of study. Here, all the 4 principals, 5 deputy principals, the 6 ICT teachers, 23 middle managers (HODs) in the four day schools, the QASO and the SCDE were selected for the study.

Thus, the census sampling technique was suitable for this study because the required data was obtained from and within a small area of study conveniently. This sampling technique was reliable since it was cost effective, more accurate and consumed less time as the area of study was small with only four county day schools being investigated. In conclusion, every item of the study was observed using this technique in order to obtain satisfactory

responses from all the targeted respondents. The representation of respondents was as shown in table 3.1 below:

Table 3.1: Sample representation of respondents in the Sub County

Respondent	Target Population (N)	Sample size(f)	Percentage (%) (Census)
ICT Teacher	6	6	100
HODs	23	23	100
D/Principals	5	5	100
Principals	4	4	100
QASO	1	1	100
SCDE	1	1	100
Total	**40**	**40**	**100**

3.5 Research instruments

The study used document analysis, observation check lists and questionnaires as the instruments for collecting data.

3.5.1 Questionnaires

The study made use of both the structured and open-ended questionnaires. The open-ended questions assisted in ensuring that the research respondents gave answers to questions on the influence of Principals' management strategies on provision of ICT infrastructure, in an exact manner as perceived in the regional and international countries (Wambungu & Kyalo, 2015).

3.5.2 Document analysis

The researcher did a literature review on existing records to gather information about the research problem even before the study. This assisted the researcher in understanding the background of the study to establish the significance of the study. More documents were requested to be availed by the research respondents to the researcher during the study for analysis (Wambungu & Kyalo, 2015).

3.5.3 Observation checklist

The researcher made thorough observations in the schools in Kamukunji Sub County on the availability and conditions of ICT infrastructural facilities in school. Detailed checklists were also prepared and given to the respondents to establish availability and adequacy of physical infrastructure provided by principals in the schools for better administration and management (Wambungu & Kyalo, 2015).

3.6 Validity of the research instruments

Validity of a research instrument or test can be described as the extent to which it measures what it is supposed to measure accurately when administered to the research respondents in a quantitative survey (Heale & Twycross, 2015). In order to test the validity of the instruments, research experts was used to carry out a pre-test of the research questionnaires. Piloting was randomly conducted in one County day school and all the possible deviations and ambiguities from the expected research responses realized, was eliminated and corrected by consulting the research supervisors as experts in validating the research instruments according to (Tichapondwa, 2013).

3.7 Reliability of the research instruments

Reliability refers to the repeatability, stability or internal consistency of a research instrument (Bryman, 2012). Cronbach's alpha was used to test the reliability of the measuresurement items in the questionnaire. The researcher used SPPS version 29.0 in testing the reliability of the measurement items (variable indicators) in the questionnaires. Piloting of the research instruments was done by the researcher in one day school. Table **3.**2 below shows the reliability statistics obtained in testing the internal consistency of the items used in the questionnaires.

Table 3. 2: Reliability statistics of the items in the questionnaires

Cronbach's Alpha	N of Items
0.942	**36**

From the table above, Cronbach's Alpha reliability coefficient of 0.942 across a number of 36 items was obtained. This implies that the reliability of the Linkert scale used in the questionnaires, produced reliability results or Cronbach's Alpha reliability coefficient of 0.942 across a number of 36 items, meaning that the scale was fine and satisfactory. This indicates that the results analyzed during the study would therefore be considered to be reliable since the coefficient value was between 0.70 - 0.95. This was an excellent test of the strength of association or reliability of items, since the value was above 0.80, indicating that the scale was fine and satisfactory according to the rule of thumb by Mugenda (2003).

3.8 Data collection procedures

The researcher obtained an introductory letter from University of Nairobi. The researcher also obtained a permit from National Commission of Science, Technology and Innovation (NACOSTI). Authority to collect data at Kamukunji Sub County was sought from the Sub County Director of Education and County Deputy Commissioner. The researcher used the letter of trasmittal to seek for permission from the principals to collect data from their schools. From the research instruments selected for the study, the data collection procedures were as follows: Asking questions as listed in the questionnaires the targeted respondents and document analysis. There was observation and counting of physical ICT infrastructures available to establish the influence of the Principals on provision of ICT infrastructure in the area of study (Wambungu & Kyalo, 2015).

3.9 Data analysis techniques

The study used both the quantitative and qualitative methods of data analysis. Data coding and cleaning was done to remove all the outliers and missing values. There was use of weighted mean and data coding using the Likert scale as follows: 5-Stongly Agree, 4-Agree, 3-Undecided, 2-Disagree, 1-Strongly Disagree. This was used to make the necessary conclusions. The data was computed using the Statistical Package for Social Sciences (SPSS), version 29.0. The quantitative data obtained from the study, was analyzed using the measures of central tendency like the mean. Similarly, calculation of standard deviation was done to determine the measure of variability of the obtained data. The value of the weighted mean or average value was used in making decisions using the perceptions of the respondents on particular measurement items (Wang, 2015).

Data was also analyzed by employing inferential statistics such as chi-square and multiple regression analysis was employed to ascertain the level of association linking the independent and dependent variables. ANOVA was also used to determine the level of significance among variables. The study adopted the following regression model

$Y=\beta o+\beta_1\chi_{1+}\beta_2\chi_{2+}\beta_3\chi_3 + \beta_4\chi_4\ \varepsilon$

Where;
Y= Independent Variables (Principals' management strategies)
X_1 = Principals' capacity building of staff
$\chi_{2=}$ Principals' capacity building of staff
$\chi_{3=}$ Principals' stakeholder involvement
$\chi_{4=}$ Principals' involving staff in decision making
βo = Coefficient of the model
β_1, $\beta 2$, $\beta 3$ = Slope of coefficient showing dependent per unit change in the independent variables
ε= Error term

3.10 Ethical considerations

The responders were notified of the aim of the study before collecting the data. In addition, informed consent was ascertained by ensuring respondents were fully informed about the purpose of the research and their consent to participate was requested through an introductory letter. Confidentiality was assured as the information provided through the study would not be made available to anyone who did not participate in it. Anonymity allowed the respondents not to identify themselves throughout the study and to avoid the fear of being victimized for providing the required data.

CHAPTER FOUR
DATA ANALYSIS, INTERPRETATIONS AND DISCUSSIONS

4.1 Introduction

This chapter deals with the analysis and discussion of results of data collected during the study. The study examined the influence of principals' management strategies on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County in Nairobi County, Kenya. The researcher collected data from the all the principals, deputy principals, heads of departments, ICT teachers, the QASO and SCDE in the Sub County. The SPSS as well as descriptive statistics was used to analyze data obtained and frequency tables, percentages and figures have been used in presenting and explaining information from the data collected and analyzed. Inferential statistics such as chi-square and multiple regression analysis was employed to ascertain the level of association linking the independent and dependent variables.

Results were presented as follows: response rate to questionnaires and observation list, gender, age and academic levels of the respondents. Data on influence of principals' management strategies on provision of ICT infrastructure was also presented as follows: Principals mobilization of resources, principals' capacity building of staff, principals' stakeholder involvement, principals' involvement of staff in decision making on provision of ICT infrastructure. Finally, data analysis on principals' provision of ICT resources were presented.

4.2 Response Rate

The questionnaires were administered to a total of 40 (100%) respondents and 36 (90%) responded to the questionnaires. The other 4 (10%) respondents did not responded. Four checklists were issued to the four public day secondary

schools and 3 (75%) checklists were responded to and there was no response to 1 (25%) checklist. Triangulation of the statistical results of the study was done through literature review on other related studies carried out on use of ICT in secondary school administration and management in order to draw meaningful conclusion.

4.3 Socio-Demographic information of the Respondents

Variables such as the gender and age of the respondents (SCDE, QASO, Principals, Deputy Principals, Middle managers and ICT teachers) as well as their highest level of academic qualification was analyzed and presented in this section.

4.3.1 Gender Distribution of the Respondents

In education administration and management and in other fields of study, gender disparity is evident. There are gender gaps in appointment of managers and other members of school staff. This study tried to examine through measurement whether gender parity or equity in the appointment of men and female in the management of the schools. Such data makes it easy in implementation of the Basic education act and National ICT policy by all the stakeholders' education as they can be able to ascertain whether gender influences management strategies that will in turn, influence provision of ICT infrastructure. Table 4.1 below presents the distribution of respondents of the study in Kamukunji Sub County by gender.

Table 4.1: Distribution of the respondents by gender

Gender	N	%
Male	20	55.6%
Female	16	44.4%
Total	**36**	**100.0%**

The government of Kenya has made an effort to realize a third gender rule in the employment sector and in the management of institutions. The data

obtained the table above indicates almost equal distribution of male to female in the Kamukunji Sub County in the management positions. However, the findings of this study shows that there are more 20 (55.6%) males holding administrative positions than the 16 (44.4%) females. This can be attributed to the fact that the public secondary schools in Kamukunji are day schools where learners come from the slum areas and therefore, more men are needed in maintaining and managing learners' discipline. The study found that there is no gender inequality in the public day secondary school administration in Kamukunji Sub County. Thus, the influence of gender on management strategies is insignificant and therefore, gender does not influence provision of ICT infrastructure.

4.3.2 Age distribution of the respondents

During the study, the researcher established the distribution of age of the respondents in Kamukunji Sub County as shown in the table below: Table 4.2 shows the age distribution of the respondents of the study:

Table 4. 2: The age distribution of the respondents

Age bracket	N	%
25 – 34 Years	3	8.3%
35 – 44 Years	13	36.1%
45 – 54 Years	10	27.8%
Above 55 Years	10	27.8%
Total	**36**	**100.0%**

Table 4.2 above shows that majority 33 (91.7%) of the respondents holding managerial positions in the secondary school administration in the Sub County are above 35 years. This represents the middle managers (heads of departments), the deputy principals and principals. A small number 3 (8.3%) of respondents aged between 25 – 34 years are slightly involved in school management. This represents the young teachers who have been internally appointed by the principals to assist as subject heads and heads of departments.

People within this age brackets are ICT experts and have high potential and right attitude of accepting the use of information technology in their management practices. The TAM theory talks about the right attitudes toward

the use of ICT. That managers and administrators of organization should have the right attitude and willingness towards use of ICT systems since the world is changing (Granić & Marangunić, 2019). Therefore, the study found that there is higher frequency of principals and other middle managers within these age brackets (35 to above 55 Years). Thus, they should identify management strategies that supports provision of ICT infrastructure as they are the most experienced that their immediate young managers aged (25 -34 Years).

4.3.3 Academic level of the respondents of the study

This section presents the skills and competencies of the respondents necessary for effective and efficient secondary school administration. The SCDE, the QASO, principals, deputy principals, and heads of departments as well as ICT teachers have a wide variety of technical and human resource management skills. Their skills are applied in the operations of the school and determines the success of the educational administration.

Principals play a crucial role in supporting teachers to attend Teacher Training programs for TPD to ensure that they attain the highest level of academics. Effective educational managers, should prioritize the need for capacity building of staff in education to improve the academic level of staff. This enhances institutional leadership and capacity for further research and development in ICT among staff and will positively influence provision of ICT infrastructure (Sungbin Lim, 2014). Table 5 below shows the distribution of Academic level of the respondents of the study:

Table 4. 3: Distribution of Academic level of the respondents

Highest level of education	N	%
Diploma	2	5.6%
Degree	23	63.9%
Masters	11	30.5%
Total	**36**	**100.0%**

Table 4.3 shows that, 2 (5.6%) respondents acting as administrators in the schools have attained the lower level of education. On the other hand, the majority, 34 (94.4%) respondents acting as administrators have higher academic qualifications which is highly recommendable. This represents the principals, deputies and the middle managers who have made effort to pursue education and acquire undergraduate and master's degrees as a way of bettering their various skills to cater for the raising demands of educational administration and management. Even though career progression and teacher promotions by the TSC is not pegged on academic level but on performance appraisal, principals who have acquired Master's degree have been made the overall schools' managers. Such principals can regularly use their competencies in their everyday management practices to improve mobilization and provision of ICT infrastructure.

4.4 Influence of principals' mobilization of resources on provision of ICT infrastructure.

Principals should adopt management strategies that promotes mobilization of ICT infrastructure in their schools. The strategies includes, school budget allocations for ICT infrastructure, having school strategic plans that support provision of ICT infrastructure, identifying funding sources for ICT budget, being aware of school ICT budget allocation by the MOE, mobilizing

resources for internet connectivity, establishing ICT classrooms which are fully equipped with internet connectivity, ensuring student-textbook ratio for ICT is adequate as well as ensuring that schools have sufficient ICT resources for administrative purpose and classroom instruction. Table 4.4 below shows statistics/responses on the influence of principal on mobilization of financial resources for provision of ICT infrastructure.

Table 4. 4: Responses on the influence of principal on mobilization of financial resources

Variable indicators	SA (%)	A (%)	UN (%)	D (%)	SD (%)	Mean	Std. Dev.	Decision
The schools have budget allocation for ICT infrastructure	4 11.2%	7 19.4%	16 44.4%	8 22.2%	1 2.8%	3.14	0.99	High perception
The schools strategic plans supports provision of ICT infrastructure	0 0%	1 1%	21 21%	12 33.3%	2 5.6%	2.58	0.65	Low perception
The principals has identified funding sources for ICT budget	3 8.3%	9 25.0%	8 22.2%	12 33.4%	4 11.1%	2.86	1.18	Low perception
The principals is aware of school ICT budget from the MOE	11 30.6%	9 25.0%	11 30.6%	3 8.2%	2 5.6%	3.67	1.17	High perception
The principals has mobilized resources for internet connectivity in school	12 33.3%	13 36.1%	2 5.6%	4 11.1%	5 13.9%	3.64	1.42	High perception
The principals has established ICT classrooms/laboratories	8 22.2%	11 30.6%	3 8.3%	8 22.2%	6 16.7%	3.19	1.45	High perception
The ICT classrooms are fully equipped and have internet connectivity	6 16.7%	8 22.2%	8 22.2%	5 13.9%	9 25.0%	2.92	1.44	Low perception
The student-textbook ratio for computer studies/ICT is adequate	4 11.1%	9 25.0%	6 16.7%	11 30.6%	6 16.7%	2.83	1.30	Low perception
The schools have sufficient administrative, teaching & learning ICT resources	3 8.3%	11 30.6%	7 19.4%	10 27.8%	5 13.9%	2.92	1.23	Low perception

Note: N = 9, SA: Strongly Agree, A: Agree, UN: Undecided (Neutral), D: Disagree, SD: Strongly Disagree. The weighted mean $is\ given\ by, \frac{27.75}{9}$ **= 3.08**

The data analysis shows that only 16 (44%) respondents, highly perceived that the schools had budget allocation for ICT infrastructure, the principals were aware of school ICT budget from the MOE and that the principals had

mobilized resources for internet connectivity in school. They also appeared to feel that the principals had established ICT classrooms/laboratories. Thus, there is a higher perception that principals' mobilization of resources is a good management strategy that positively influences provision of ICT infrastructure. On the other hand, 20 (56%) respondents had a lower perception that the school's strategic plans support provision of ICT infrastructure, the principals had identified funding sources for ICT budget, the ICT classrooms were fully equipped and have internet connectivity and that the student-textbook ratio for computer studies/ICT is adequate. They had a low feeling that the schools have sufficient administrative, teaching & learning ICT resources. Based on these findings, it is clear that principals' poor management strategy of mobilization of resources negatively influences provision of ICT infrastructure in the schools.

4.5 Influence of **principals' capacity building of staff on provision of ICT infrastructure**

Principals play a crucial role in supporting teachers to attend Teacher Training programs for TPD organized by the employer or the by MOE. Training should be more frequent and the recommended professional development hours is 24 days in the teacher training institutes that has availed the training resources. The capacity building of staff and principals as educational managers, is highlighted in the Kenyan Policy Framework for educational training (the National ICT Policy Framework of 2021). Staff training and development is the Principals' strategy of human resource management in a school. It enhances institutional leadership and capacity for further research and development in ICT among staff (Sungbin Lim, 2014). Table 4.5 below shows statistics on the influence of Principals' capacity building of staff on provision of ICT infrastructure.

Table 4. 5: Responses on the influence of principals' capacity building of staff

Variable indicators	SA (%)	A (%)	UN (%)	D (%)	SD (%)	Mean	Std .dev	Decision
The principals supports capacity building of teachers	4 11.1%	16 44.4%	11 30.6%	4 11.1%	1 2.8%	3.50	0.94	High perception
There is availability of teacher training programs	4 11.1%	8 22.2%	10 27.8%	13 36.1%	1 2.8%	3.03	1.08	High perception
Professional development contact hours are enough	1 2.8%	10 27.8%	9 25.0%	12 33.3%	4 11.1 %	2.78	1.07	Low perception
There is availability of training resources	2 5.6%	9 25.0%	7 19.4%	16 44.4%	2 5.6%	2.81	1.06	Low perception
The frequency of training is more often	1 2.8%	0 0%	11 30.6%	20 55.5%	4 11.1 %	2.28	0.78	Low perception
There is staff promotion for career progression	2 5.5%	4 11.1%	11 30.6%	9 25.0%	10 27.8 %	2.42	1.18	Low perception

The schools have experienced adequate skilled ICT teachers	4 11.1%	8 22.2%	9 25.0%	10 27.8%	5 13.9 %	2.89	1.24	High perception

Note: N = 7, SA: Strongly Agree, A: Agree, UN: Undecided (Neutral), D: Disagree, SD: Strongly Disagree. The weighted mean $is\ given\ by, \frac{19.71}{7}$ **= 2.82**

This data analysis shows that 15 (42.9%) respondents, highly perceived that the principals supports capacity building of teachers, there is availability of teacher training programs and that the schools had experienced adequate skilled ICT teachers. On the other hand, the majority, 21 (57.1%) respondents, had a lower perception that professional development contact hours were enough, there were availability of training resources and that the frequency of training was more often. They had also had a lower feeling that there was staff promotion for career progression of teachers by the TSC. Based on these findings, it is very clear that principals' management strategy of capacity building of staff has an impact on provision of ICT infrastructure.

4.6 Influence of **principals' stakeholder involvement on provision of ICT infrastructure**

The stakeholders are involved in planning and making decisions concerning ICT projects to be started by the principal. This involves parent-principal communication, parental involvement and community engagement in school ICT projects. The principal influences these stakeholders in a school through partnerships and by maintaining good human and community relations (Mwanzia, 2014). They form part of advisory committees and play a role in monitoring and evaluating the ICT projects. The BOM as the main advisory team to the principal, has autonomy in making main decision pertaining financial resources in the school necessary for provision of ICT infrastructure. The principal influences parents through PA meetings and involves them in financing ICT projects through payment of fees levies (Wanyanga, 2016). Table 8 below shows statistics on the influence of principals' stakeholder involvement on provision of ICT infrastructure.

Table 4. 6: Responses on the influence of principals' stakeholder involvement

Variable indicators	SA (%)	A (%)	UN (%)	D (%)	SD (%)	Mean	Std. dev	Decision
There is effective Parent-Principal communication in the schools	4 11.1%	17 47.2%	7 19.4%	6 16.7%	2 5.6%	3.42	1.08	High perception
There is parental involvement in provision finance of ICT infrastructure	0 0%	6 16.7%	10 27.7%	14 38.9%	6 16.7 %	2.44	0.97	Low perception
There is community engagement in provision of ICT infrastructure in schools	0 0%	4 11.1%	8 22.2%	17 47.3%	7 19.4 %	2.25	0.91	Low perception
Schools have advisory committees(BOM & PA) to plan and advice on ICT	4 11.1%	5 13.8%	14 38.9%	11 30.6%	2 5.6%	2.94	1.07	High perception

Note: N = 4, SA: Strongly Agree, A: Agree, UN: Undecided (Neutral), D: Disagree, SD: Strongly Disagree. The weighted mean $is\ given\ by, \frac{11.05}{4}$ **= 2.76**

From this data analysis, 18 (50%) respondents, agreed that Principals' stakeholder involvement positively influences provision of ICT infrastructure. There was a higher perception that there is effective Parent-Principal communication in the schools and that schools had advisory committees (BOM & PA) as management strategies to plan and advice on provision of ICT infrastructure. Similarly, 18 (50%) respondents, had a low perception that there was parental involvement in provision finance of ICT infrastructure. They also appeared to have low feeling that there was community engagement in provision of ICT infrastructure in schools. Based on these findings, it is also clear that Principals' stakeholder involvement is a management strategy that influences provision of ICT infrastructure in schools.

4.7 Influence of **principals' involvement of staff in decision-making on provision of ICT Infrastructure**

The principal involves teachers in setting school ICT goals for the school strategic plan so that they can work effectively towards provision ICT infrastructure to achieve their set goals. The principals also involve teachers in making other decisions like developing school ICT policies. At classroom level, teachers make decisions on how to implement ICT strategies at their subject level (Sika et al., 2014). Teachers can decide and plan fieldwork activities to bench mark with other schools with well-designed and built ICT infrastructures that are sustainable. Involving staff in decision making gives them a sense of school owning ICT projects and this makes them participate in

their maintenance during curriculum delivery (Mwawasi, 2014). Table 4.7 below shows statistics on the influence of Principals' involvement of staff in decision making on provision of ICT infrastructure:

Table 4.7: Responses on the influence of Principals' involvement of staff in decision making

Variable indicators	SA (%)	A (%)	UN (%)	D (%)	SD (%)	Mean	Std. dev.	Decision
Teachers are involved in setting of school ICT goals	4 11.1 %	6 16.7%	10 27.8 %	9 25.0%	7 19.4 %	2.75	1.27	Low perception
Teachers are involved development of school ICT policies	3 8.3%	8 22.2%	10 27.8 %	12 33.4%	3 8.3%	2.89	1.12	High perception
Teachers are involved in implementing ICT strategies	3 8.3%	11 30.6%	12 33.3 %	5 13.9%	5 13.9 %	3.06	1.17	High perception
Teachers are involved in school ICT tendering projects	1 2.8%	10 27.8%	12 33.3 %	7 19.4%	6 16.7 %	2.81	1.18	Low perception
Teachers are involved in M & E ICT projects provided by principal	2 5.6%	6 16.5%	14 38.9 %	10 27.9%	4 11.1 %	2.78	1.05	Low perception

Note: N = 5, SA: Strongly Agree, A: Agree, UN: Undecided (Neutral), D: Disagree, SD: Strongly Disagree. The weighted mean $is\ given\ by, \frac{14.29}{5}$ **= 2.86**

This data analysis shows that 14 (40%) respondents appeared to agree that principals' management strategy of involvement of staff in decision-making positively influences provision of ICT Infrastructure. This is because there was a higher perception that teachers were involved by principals in the development of school ICT policies and that teachers were also involved in implementing school ICT strategies. On the other hand, 22 (60%) respondents, had a lower perception that teachers were involved in setting of school ICT goals and that teachers were involved in school ICT tendering projects. There was also a low perception that teachers were involved in monitoring and evaluating ICT projects provided by principal. Based on these findings, the principals' management strategy of involvement of staff in decision-making has an impact on provision of ICT Infrastructure schools.

4.8 Provision of ICT infrastructure

Better principals' management strategies to help in influencing provision of ICT infrastructure in their schools as discussed in this section.

4.8.1 The principals on provision of ICT infrastructure

The provision educational resources and relevant digital contents by principals to teachers, students and the public at large has improved quality of education

(Tulowitzki & Gerick, 2022). The main beneficiaries of provision of ICT infrastructure are educational administrators who in turn foster human and social development by positively influencing the way their staff and students work in the institution. Principals who provide effective ICT support and management practices have been found to have a significant positive impact on ICT integration in schools, (Aurora & Tererai, 2018). The schools budget and strategic plans mandates construction and installation of physical ICT facilities. It should allow principals to provide intranet, internet and extranet connectivity to ICT machines used by teachers, students and staff for academic or administrative work (Tanui, 2013). They provide the high cost of e-security structures like antivirus software and firewall for computers and laptops in a school. Principals should ensure that all the stakeholders have access and are satisfied with ICT infrastructure provided. Table 10 below shows statistics on the influence of principals on provision of ICT infrastructure.

Table 4.8: Responses on the influence of principals on provision of ICT infrastructure.

Variable indicators	SA (%)	A (%)	UN (%)	D (%)	SD (%)	Mean	Std.dev.	Decision
The principals effectively has procured and installed ICT hardware and software	5 13.9%	18 50.0%	8 22.2%	3 8.3%	2 5.6%	3.58	1.03	High perception
The principals have set up functional ICT laboratories or classrooms	6 16.7%	11 30.6%	8 22.2%	8 22.2%	3 8.3%	3.25	1.23	High perception
The principals have provided reliable internet connectivity	10 27.8%	10 27.8%	5 13.9%	6 16.6%	5 13.9%	3.39	1.42	High perception
The principals have provided effective cyber security measures	3 8.3%	9 25.0%	10 27.8%	8 22.2%	6 16.7%	2.86	1.22	Low perception
The Principals have provided access to ICT by staff and students	7 19.4%	10 27.8%	10 27.8%	5 13.9%	4 11.1%	3.31	1.26	High perception
The Principals have built sustainable ICT infrastructure	3 (8.3%)	10 27.8%	14 38.9%	4 11.1%	5 13.9%	3.06	1.15	High perception
The principals have installed tracking system for ICT infrastructure provided	2 5.5%	6 16.7%	10 27.8%	12 33.3%	6 16.7%	2.61	1.13	Low perception
The stakeholders are satisfied with ICT infrastructure provided	1 2.8%	7 19.4%	13 36.2%	8 22.2%	7 19.4%	2.64	1.10	Low perception

by principals

Note: N = 8, SA: Strongly Agree, A: Agree, UN: Undecided (Neutral), D: Disagree, SD: Strongly Disagree. The weighted mean $is\ given\ by, \frac{24.7}{8}$ **= 3.09**

From this data analysis, 23 (63%) respondents, appeared to have a higher feeling on the necessity of provision of ICT infrastructure in the schools by principals. Also they had a higher perception that the principals effectively had procured and installed ICT hardware and software, the principals had set up functional ICT laboratories or classrooms, the principals had provided reliable internet connectivity, the Principals had provided access to ICT by staff and students and that the Principals had built sustainable ICT infrastructure in the schools.

On the other hand, 13 (37%) respondents, appeared to have a lower perception that the principals had provided effective cyber security measures and that the principals had installed tracking system for ICT infrastructure provided. They also had a low perception that the school stakeholders were satisfied with ICT infrastructure provided by principals. Based on this finding, there is need for principals to establish management strategies for provision ICT resources in the schools.

4.8.2 Results from observation Checklists on provision of ICT Infrastructure

The researcher issued checklists to the respondents to observe and give record of physical ICT infrastructure in all their schools. Observations made were recorded accordingly on the checklist on the availability and adequacy of resources provided by the principals. The record of the items observed was as follows: Computer classrooms, ICT textbooks, CCTV cameras, Printers and scanners, Projectors, computer desktops, Laptops, Digital content both Audio and Visual, Internet connectivity, E-security structures, social media platforms, NEMIS, school ICT databases and smart boards/TVs/Radios. Table 4.9 below shows statistics on the availability and adequacy of ICT infrastructure in Kamukunji Sub County after physical verification.

Table 4.9: Responses on the availability and adequacy of ICT infrastructure.

TYPE OF ICT INFRASTRUCTURE	A (%)	UA (%)	AD (%)	IAD (%)	f	Mean	Std. dev.	Decision
Computer labs/classrooms	12 35.3%	7 20.6%	8 23.5%	7 20.6%	34	2.29	1.169	High perception
ICT textbooks	10 29.4%	14 41.2%	3 8.8%	7 20.6%	34	2.21	1.095	High perception
CCTV cameras	16 47.1%	2 5.9%	5 14.7%	11 32.4%	34	2.32	1.364	High perception
Printers and scanners	17 50.0%	2 5.9%	1 2.9%	14 41.2%	34	2.35	1.454	High perception
Projectors	12 35.3%	5 14.7%	4 11.8%	13 38.2%	34	2.53	1.331	High perception
Computer desktops	14 41.2%	5 14.7%	5 14.7%	10 29.4%	34	2.32	1.296	High perception
Laptops	10 29.4%	5 14.7%	5 14.7%	14 41.2%	34	2.68	1.296	High perception
Digital content(A & V)	4 11.8%	13 38.2%	4 11.8%	13 38.2%	34	2.76	1.103	High perception
Internet connectivity	7 20.6%	10 29.4%	5 14.7%	12 35.3%	34	2.65	1.178	High perception
E-security structures	6 17.6%	12 35.3%	1 2.9%	15 44.2%	34	2.74	1.214	High perception
Social Media platforms	26 76.5%	7 20.6%	0 0%	1 2.9%	34	1.29	0.629	Low perception
NEMIS	34 100.0%	0 0%	0 0%	0 0%	34	1.00	0.000	Low perception
School ICT data base	34 100.0%	0 0%	0 0%	0 0%	34	1.00	0.000	Low perception
Smart boards/TVs/Radios	34 100.0%	0 0%	0 0%	0 0%	34	2.00	0.000	Low perception

Note: N = 15, A: Available, UA: Unavailable, AD: Adequate, IAD: Inadequate. **The weighted mean is given by** $\frac{30.14}{14}$ **= 2.15**

The results of the analysis in table 4.9 shows that 24 (72%) respondents, had a higher perception that computer labs/classrooms, ICT textbooks, CCTV cameras, Printers and scanners, Projectors, Computer desktops, Laptops, Digital content both audio & visual, Internet connectivity and E-security structures were available but inadequate in their schools. On the other hand, 10 (28%) respondents, had a lower perception on the availability and adequacy of the following ICT structures: Social Media platforms, NEMIS, School ICT data base and Smart boards/TVs/Radios.

Based on these findings, the researcher concludes that principals' management strategies influences provision of ICT infrastructure as evident in schools in Kamukunji Sub County. The results of this study also agrees with results of other related studies on ICT infrastructure in Public secondary schools in Nairobi County. For instance, majority of the schools have inadequate basic

ICT infrastructure like Computers, slow or no internet connectivity, inadequate projectors and other relevant ICT infrastructures (Chepkonga, 2015).

4.9 Bivariate analysis of Influence of Principals' Management Strategies on Provision of Information Communication Technology Infrastructure in Public Day Secondary Schools

To understand the association between the dependent and independent variable the researcher further conducted bivariate statistical analysis. This was motivated by the need to provide insight into associations, consequently allows for predictive modeling. The results are presented in the following sections:

4.9.1 The influence of principals' management strategies of mobilization of financial resources on provision of ICT infrastructure in public day secondary schools

The relationship between Principals' management strategies of resource mobilization and provision of ICT infrastructure are presented in the Table 4.10 shown below:

Table 4.10: Relationship between Principals' management strategies of resource mobilization and provision of ICT infrastructure

	ICT Installation			**ICT Labs**			**Internet Connectivity**			**Cyber security**			**ICT staff**		
	Chi-squ are	**DF**	**P values**	**Chi-squ are**	**DF**	**P values**	**Chi-squ are**	**DF**	**P values**	**Chi-squ are**	**DF**	**P values**	**Chi-squ are**	**DF**	**P values**
Budget allocation for ICT infrastructure	12.484	4	0.014	6.714	4	0.152	6.714	4	0.152	5.569	4	0.234	12.095	4	0.017
School strategic plans supports provision of ICT infrastructure	0.564	3	0.905	3.235	3	0.357	4.301	3	0.231	3.740	3	0.291	1.460	3	0.691
Identified funding sources for ICT budget	6.271	4	0.180	3.142	4	0.534	4.516	4	0.341	5.746	4	0.216	11.704	4	0.020
Awareness of school ICT budget from the MOE	15.392	4	0.004	14.579	4	0.0060	13.2460	4	0.010	5.483	4	0.241	10.572	4	0.032
Mobilized resources for internet connectivity in school	21.593	4	0.000	7.790	4	0.100	12.110	4	0.017	6.362	4	0.174	12.485	4	0.014
Established ICT classrooms/laboratories	29.032	4	0.000	15.382	4	0.004	19.738	4	0.001	14.722	4	0.005	26.0000	4	0.000

The ICT classrooms are fully equipped and have internet connectivity	17.419	4	0.002	14.767	4	0.005	18.890	4	0.001	20.957	4	0.000	18.993	4	0.001
The student-textbook ratio for computer studies/ICT is adequate	17.250	4	0.002	6.855	4	0.144	19.220	4	0.001	17.979	4	0.001	22.828	4	0.000
The schools have sufficient administrative, teaching & learning ICT resources	5.422	4	0.247	3.243	4	0.518	12.124	4	0.016	8.015	4	0.091	11.113	4	0.025

Study findings in table 4.10 above indicate that, the schools with budget allocation for ICT infrastructure show a significant association (Chi-square = 12.484, p = 0.014). This suggests that there is evidence that schools with budget allocations are different from those without when it comes to the installation of ICT, establishment of ICT labs, and cyber security measures. Furthermore, there is no significant association between schools' strategic plans supporting ICT infrastructure and the implementation of ICT-related measures ($p > 0.05$ for all) therefore, the strategic plans of schools do not differ significantly concerning ICT installation, labs, internet connectivity, cyber security, and ICT staff.

In addition the principals' ability to identify funding sources for ICT budgets do not show a significant association with the implementation of ICT measures ($p > 0.05$ for all). More importantly, principals awareness of the school ICT budget from the Ministry of Education is significantly associated with the implementation of ICT measures (Chi-square = 15.392, p = 0.004). Consequently their mobilization of resources for internet connectivity in schools show a significant association with the implementation of ICT measures (Chi-square = 21.593, p = 0.000). Implying that schools where principals actively mobilize resources for internet connectivity differ significantly in the implementation of ICT infrastructure measures.

Results in Table 4.10 also show that there is a significant association between principals establishing ICT classrooms/laboratories and the implementation of ICT measures (Chi-square = 29.032, p = 0.000). More so, there is a significant association between fully equipped ICT classrooms with internet connectivity and the implementation of ICT measures (Chi-square = 17.419, p = 0.002). Suggesting that the presence of fully equipped ICT classrooms with internet connectivity correlates with differences in ICT infrastructure provision. Finally the results in table above reveals that there was a significant association between an adequate student-textbook ratio for computer studies/ICT and the implementation of ICT measures (Chi-square = 17.250, p = 0.002); but there is no significant association between schools having sufficient administrative, teaching & learning ICT resources and the implementation of ICT measures ($p > 0.05$ for all).

In summary, the associations and differences between the variables indicate areas where specific measures or actions by principals are correlated with variations in the provision of ICT infrastructure in schools.

4.9.2 The influence of principals' management strategies on capacity building of staff on provision of ICT infrastructure in public day secondary schools

Table 4. 11: The relationship between principals' management strategies and capacity building of staff on provision of ICT infrastructure

ITEM	ICT Installation			ICT Labs			Internet Connectivity			Cyber security			ICT staff		
	Chi-square	DF	P values	Chi-square	DF	P values	Chi-square	DF	P values	Chi-square	DF	P values	Chi-square	DF	P values
The principals supports capacity building of teachers	1.937	4	0.747	5.903	4	0.207	3.332	4	0.504	2.146	4	0.709	1.424	4	0.846
There is availability of teacher training programs	3.118	4	0.538	4.751	4	0.314	8.403	4	0.078	3.576	4	0.966	6.431	4	0.169
Professional development contact hours are enough	0.836	4	0.934	3.456	4	0.485	1.492	4	0.848	1.025	4	0.909	1.837	4	0.775
There is availability of training resources	2.588	4	0.629	1.908	4	0.753	2.819	4	0.509	0.384	4	0.984	1.799	4	0.121
The frequency of training is more often	6.317	3	0.097	2.133	3	0.545	8.666	3	0.034	5.761	3	0.124	5.818	3	0.165
There is staff promotion for career progression	5.080	4	0.279	2.578	4	0.6311	4.277	4	0.370	1.573	4	0.814	6.500	4	0.965
The schools have experienced adequate skilled ICT teachers	11.009	4	0.026	5.852	4	0.211	9.072	4	0.059	10.964	4	0.027	4.992	4	0.288

The study results in Table 4.11 shows theta there was no significant association ($p = 0.747$) between principals' support for capacity building of teachers and ICT installation factors. Similar non-significant associations are observed for ICT Labs, Internet Connectivity, Cyber security, and ICT Staff. Furthermore, the availability of teacher training programs does not exhibit a significant association with the specified ICT factors. The p-values range from 0.078 to 0.966, suggesting a lack of statistical significance. More so, sufficiency of professional development contact hours also shows no significant associations with any of the ICT factors, with p-values ranging from 0.484 to 0.934 while there was no significant association ($p = 0.121$) between the availability of training resources and ICT Labs.

Study result also shows that there was a potential significant association ($p = 0.034$) between the frequency of training and ICT Staff factors, suggesting that the frequency of training may impact ICT staff dynamics. There is no significant associations are found between staff promotion for career progression and the specified ICT factors, with p-values ranging from 0.279 to 0.965. Finally, there was a significant association ($p = 0.026$) between schools having experienced adequate skilled ICT teachers and ICT Labs, indicating a potential link between teacher expertise and ICT Labs.

4.9.3 The influence of principals' management strategy of stakeholder involvement on provision of ICT infrastructure in public day secondary schools

Table 4.12: The relationship between principals' management strategy of stakeholder and involvement on provision of ICT infrastructure

ITEM	ICT Installation			ICT Labs			Internet Connectivity			Cyber security			ICT staff		
	Chi-square	DF	P values	Chi-square	DF	P values	Chi-square	DF	P values	Chi-square	DF	P values	Chi-square	DF	P values
There is effective Parent-Principal communication in the schools	3.457	4	0.485	5.717	4	0.221	10.634	4	0.081	5.505	4	0.239	1.337	4	0.855
There is parental involvement in provision finance of ICT infrastructure	1.798	3	0.615	2.091	3	0.554	8.195	3	0.042	3.620	3	0.306	2.502	3	0.475
There is community engagement in provision of ICT infrastructure in schools	6.481	3	0.09	2.553	3	0.465	8.511	3	0.037	6.722	3	0.081	5.877	3	0.118
Schools have advisory committees (BOM & PA) to plan and advice on ICT	12.094	4	0.017	3.706	4	0.447	7.225	4	0.124	2.084	4	0.720	5.063	4	0.281

Study results in Table 4.12 shows that there is no significant association between effective parent-principal communication and the implementation of ICT measures ($p > 0.05$ for all). Furthermore, there was no significant association between parental involvement in the provision of finance for ICT infrastructure and the implementation of ICT measures ($p > 0.05$ for all). Table 4.12 reveals that community engagement in the provision of ICT infrastructure shows a marginally significant association with the implementation of ICT measures (Chi-square = 6.481, $p = 0.090$). Thus there might be differences in the implementation of ICT measures based on the level of community engagement, although the significance level is borderline. More precisely, there was a significant association between schools having advisory committees (BOM & PA) for ICT planning and advice and the implementation of ICT measures (Chi-square = 12.094, $p = 0.017$).

4.9.4 The influence of principals' management strategy of involvement of staff in decision-making on provision of ICT infrastructure in public day secondary schools

Table 4.13: The relationship between principals' management strategy of involvement of staff in decision-making and provision of ICT infrastructure

ITEM	ICT Installation			ICT Labs			Internet Connectivity			Cyber security			ICT staff		
	Chi-square	DF	P values	Chi-square	DF	P values	Chi-square	DF	P values	Chi-square	DF	P values	Chi-square	DF	P values
Teachers are involved in setting of school ICT goals	14.141	4	0.007	5.981	4	0.201	10.626	4	0.081	7.384	4	0.117	11.285	4	0.024
Teachers are involved development of school ICT policies	11.613	4	0.020	3.914	4	0.418	9.884	4	0.042	9.877	4	0.043	12.889	4	0.012
Teachers are involved in implementing ICT strategies	15.933	4	0.003	6.553	4	0.162	18.177	4	0.001	6.290	4	0.178	16.889	4	0.002
Teachers are involved in school ICT tendering projects	17.187	4	0.002	5.177	4	0.270	12.403	4	0.015	12.827	4	0.012	14.984	4	0.005
Teachers are involved in M & E ICT projects provided by principal	6.497	4	0.165	2.585	4	0.630	9.710	4	0.046	4.412	4	0.353	10.057	4	0.039

Finding in table 4.13 indicated that there was a significant association between teachers being involved in setting school ICT goals and the implementation of ICT measures (Chi-square = 14.141, p = 0.007). There was a significant association between teachers being involved in the development of school ICT policies and the implementation of ICT measures (Chi-square = 11.613, p = 0.020). Additionally, there was a significant association between teachers being involved in implementing ICT strategies and the implementation of ICT measures (Chi-square = 15.933, p = 0.003). Study showed that there was a significant association between teachers being involved in school ICT tendering projects and the implementation of ICT measures (Chi-square = 17.187, p = 0.002). Finally, there is no significant association between teachers being involved in monitoring and evaluating (M&E) ICT projects provided by the principal and the implementation of ICT measures (p > 0.05 for all).

4.10 Regression analysis

The purpose of conducting regression analysis was to assess the linearity of the relationship between the dependent and independent variables in the study. The findings are organized and discussed in the subsequent sub-sections.

4.10. Model summary

A Regression analysis was also conducted to determine the effects of different aspects of ICT infrastructure for schools that participated in the study. The measures of Provision of ICT infrastructure were combined and their means computed, after which the outcome was regressed against selected indices of mobile money usage. The model summary in table 4.14 below provides an overview of the goodness-of-fit of the regression model.

Table 4. 14: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.812a	0.660	0.603	0.29431	1.995

Table 4.14 presents the coefficient of determination, denoted as R^2, which is calculated to be 0.660. This value signifies that approximately 66% of the total variance in provision of ICT infrastructure is accounted for by the model. Conversely, around 34% of the total variance remains unexplained by the model. These results indicate that the independent variables do exert an influence on the provision of ICT infrastructure. The table further details the outcomes concerning the discrepancies between the dependent and independent variables.

Table 4.15: Analysis of Variance (ANOVA)

	Sum of	Df	Mean	F	Sig.

	Squares		Square		
Regression	5.040	5	1.008	11.637	0.000b
Residual	2.599	30	0.087		
Total	7.639b	35			

The residuals are positive, implying that there was a significant relationship between the dependent and independent variables used in the study. From the ANOVA Table 4.15 it was established that principals' mobilization of resources, capacity building of staff, stakeholder involvement and Principals' involving staff in decision making affected provision of ICT infrastructure since F is 11.637 at p-value 0.000.

4.10.2 Regression Coefficients

The Coefficients table provided further information about the effects of individual predictor variables on the dependent variable (Provision of ICT infrastructure), arrived at by a combination of multiple variables alluding to Provision of ICT infrastructure as presented in table 4.16

Table 4. 16: Coefficient of regression

	Unstandardized Coefficients Beta (β)	**Std. Error**	**Standardized Coefficients Beta ((β)**	**t**	**Sig.**
(Constant)	-.107	.307		-.349	.730
Principals' mobilisation of resources	.141	.166	.133	.852	.094
Principals' capacity building of staff	.414	.166	.311	2.491	.018
Principals' stakeholder involvement	.421	.136	.446	3.089	.004
Principals' involving staff in decision making	.322	.131	.345	2.466	.020

The regression equation is as shown below;

$$\mathbf{Y= -0.107+0.141X_1 +0.414X_2 +0.421X_3+0.322X_4}$$

When the independent variables are all zeros, this means that Provision of ICT infrastructure will be at -0.107 units. When the mobilization of resources increases by one unit, Provision of ICT infrastructure increases by 0.141 units. When capacity building of staff increases by one unit, Provision of ICT infrastructure increases by 0.414 units, when stakeholder involvement increases by one unit the provision of ICT infrastructure increases by 0.421

and when involvement of staff in decision making increases by one unit, Provision of ICT infrastructure increases by 0.322 units. It's important to note that mobilization of resources did not seem to be a significant predictor (p value 0.094), while capacity building of staff, stakeholder involvement and involving staff in decision making were statistically significant influencer of Provision of ICT infrastructure (p value, 0.018, 0.004 and 0.020 respectively).

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives a discussion on the summary of the study. It also gives the conclusion, the recommendations and possible suggestions for further researches.

5.2 Summary of the Study

The findings obtained during the research as narratives to the open-ended questionnaires agreed with the results of descriptive statistics obtained about each variable indicator. The findings also agreed with observations made on the checklists concerning the physical ICT infrastructure provided by the school principals. The study was done in all the public day secondary schools in Kamukunji Sub County in Nairobi County, Kenya. The research respondents were all the ICT teachers, middle managers (HODs), Deputy Principals, the Principals and the QASO as well as the SCDE. A total of 36 respondents mentioned above took part in the study.

5.3 Summary of findings of the study

This section gives the summaries of the findings obtained by the researcher according to the specific objectives of the study.

The study found that 16 (44%) of the respondents, highly perceived that the schools had budget allocation for ICT infrastructure, the principals were aware of school ICT budget from the MOE and that the principals had mobilized resources for internet connectivity in school. They also appeared to feel that the principals had established ICT classrooms/laboratories. Thus, there is a higher perception that principals' mobilization of resources is a good management strategy that positively influences provision of ICT infrastructure. On the other hand, 20 (56%) respondents, the majority had a low perception that the school's strategic plans supports provision of ICT infrastructure, the principals had identified funding sources for ICT budget, the ICT classrooms were fully equipped and have internet connectivity and that the student-textbook ratio for computer studies/ICT is adequate. They had a low feeling that the schools have sufficient administrative, teaching & learning ICT resources. Study findings also indicated that, the schools with budget allocation for ICT infrastructure showed a significant association (Chi-square = 12.484, p = 0.014), suggesting that there was evidence that, schools with budget allocations were different from those without when it in terms of the installation of ICT, establishment of ICT labs, and cyber security measures. Based on these findings, it is clear that principals' management strategy of mobilization of resources influences provision of ICT infrastructure in the schools.

The study discovered that, 15 (42.9%) respondents, highly perceived that the principals supports capacity building of teachers, there is availability of teacher training programs and that the schools had experienced adequate skilled ICT teachers. On the other hand, majority, 21 (57.1%) respondents had

a lower perception that professional development contact hours were enough, there were availability of training resources and that the frequency of training was more often. They had also had a lower feeling that there was staff promotion for career progression of teachers by the TSC. It was also found that, there was a significant association ($p = 0.026$) between schools having experienced adequate skilled ICT teachers the ICT facilities. Based on these findings, it is very clear that principals' management strategy of capacity building of staff has an impact on provision of ICT infrastructure

The study realized that, 18 (50%) respondents, agreed that Principals' stakeholder involvement positively influences provision of ICT infrastructure. There was a highly perception that there is effective Parent-Principal communication in the schools and that schools had advisory committees (BOM & PA) as management strategies to plan and advice on provision of ICT infrastructure. Similarly, an equal number of 18 (50%) respondents, had a low perception that there was parental involvement in provision finance of ICT infrastructure. They also appeared to have low feeling that there was community engagement in provision of ICT infrastructure in schools. It was revealed that community engagement in the provision of ICT infrastructure showed a marginally significant association with the implementation of ICT measures (Chi-square = 6.481, $p = 0.090$). More precisely, there was a significant association between schools having advisory committees (BOM & PA) for ICT planning and advice and the implementation of ICT measures (Chi-square = 12.094, $p = 0.017$). Based on this findings, it is also clear that Principals' stakeholder involvement is a management strategy that influences provision of ICT infrastructure in schools.

The study also discovered that 14 (40%) respondents, appeared to agree that principals' management strategy of involvement of staff in decision-making positively influences provision of ICT Infrastructure. This is because there was a high perception that teachers were involved by principals in the development of school ICT policies and that teachers were also involved in implementing school ICT strategies. On the other hand, the majority, 22 (60%) respondents, had a low perception that teachers were involved in setting of school ICT goals and that teachers were involved in school ICT tendering projects. There was also a low perception that teachers were involved in monitoring and evaluating ICT projects provided by principal. The finding of the study indicated that there was a significant association between teachers being involved in setting school ICT goals and the implementation of ICT measures (Chi-square = 14.141, $p = 0.007$). There was also significant

association between teachers being involved in the development of school ICT policies and the implementation of ICT measures (Chi-square = 11.613, p = 0.020). Additionally, there was a significant association between teachers being involved in implementing ICT strategies and the implementation of ICT measures (Chi-square = 15.933, p = 0.003). Study showed that there was a significant association between teachers being involved in school ICT tendering projects and the implementation of ICT measures (Chi-square = 17.187, p = 0.002). Based on these findings, the principals' management strategy of involvement of staff in decision-making has an impact on provision of ICT Infrastructure schools.

5.4 Conclusions

The study concluded that the principals' management strategy of mobilization of financial resources influences provision of information communication technology infrastructures. This is because the results of the revealed that principals had provided ICT infrastructure in their schools but they were not adequate. This showed a gap on the Principals' management strategy of mobilization of resources since some ICT infrastructure like projectors and smart boards were not available in some schools. It was found that all schools had CCTV cameras for surveillance but they were not adequate too thus more needs to be provided.

The study also concluded that the principals' management strategy of capacity building of staff influences provision of ICT infrastructure. It was discovered that the capacity building of staff was not adequate as some teachers lacked essential ICT skills making it difficult to use the available ICT infrastructure provided by the principals and therefore there is need for more capacity building of staff. This can be attributed to shortage of training resources and inadequate as well as low frequency of staff by the principals.

The study also concludes that, the principals' management strategy of stakeholder involvement has influence on provision of ICT infrastructure. It revealed that there was stakeholder involvement in provision of ICT resources but this strategy had not been fully actualized. The respondents had lower perception that there was parental involvement in provision finance of ICT infrastructure by principals. They also appeared to have a lower feeling that there was community engagement in provision of ICT infrastructure in schools. Based on this findings, the study concludes that Principals' stakeholder involvement is a management strategy that influences provision of ICT infrastructure in schools. This calls the need for the principals to improve their public relations with the community to harness their potential in providing the school with ICT facilities.

Further, based on the findings of this study, it is concluded that principals' involvement of staff and especially teachers in decision making process highly influences provision of ICT infrastructure. It was discovered that some principals involved teachers in decision making processes regarding setting school ICT goals and policies but never involved them in the procurement, installation as well as in monitoring and evaluation of ICT projects. This too

had an impact on implementation of the ICT strategies and usage of ICT infrastructure provided in schools.

From the findings of this study, it is concluded that the gender of the respondents does not influence management strategies and therefore has no influence on provision of ICT infrastructure. However, the age and highest level of academics of the respondents determines their work experience. The study found that these influenced the management strategies and had an impact on the level of provision of ICT infrastructure. Finally, the study concludes that many principals have not practiced better management practices for provision of ICT infrastructure to fully implement the national ICT policy of 2019 and the Basic education act of 2013 towards realization of digital literacy as a core competency skill of the 21st century.

5.5 Recommendations

Based on the findings of the research conducted, the following are the recommendations of the study.

5.5.1 Recommendations for Policy

Since technology in 21st Century is a key driving force towards government systems, the government through the ministry of ICT should develop policies that continues to push for 100% digitalization in all the schools and in all government systems. School principals in their strategic plans should set policies that places the schools strategically in fully adopting ICT in management of education. They should develop school ICT policies that ensure staff and students meet the standards of the current technological trends for realization of digital literacy as a core 21st century competency skill.

The study recommends that the MOE should design policies that provide and support school ICT budget and create its awareness to the school mangers so that principals can reach out to the MOE for funds to procure and install functional and sustainable ICT infrastructure in schools. This is because the study found out that principals are not aware of school ICT budget from the MOE needed awareness on the same. A policy to increase government capitation to schools to enable them meet the costs of ICT infrastructure alongside other recurrent expenditures.

Policy makers to assess the teachers need for ICT and provide more and efficient software for school management information systems (SMIS). The ministry of ICT to provide experts from their field to go and train teachers on the same. A policy that each school should have ICT champion who oversees ICT operations to be set. Clear policies on professional development contact hours and the frequency of training to be developed by MOE in conjugation with TTI. There is need for more involvement of teachers in setting, planning and developing ICT policies and in purchasing of ICT materials as they are the ones directly involved in the implementation process.

It is recommended that the government through the MOE should introduce a policy on the use of laptops and tablets instead of exercise books and pens by students during classrooms instructions. Teacher and students textbooks

should be inform of software other than hard copies so that ICT can be fully embraced for maximum utilization of ICT infrastructures provided. Policies to replace physical meetings with online and interactive meetings to be developed as well. Finally, education stakeholders should develop a supportive policy environment for ICT infrastructure and ICT use in the schools.

5.5.2 Recommendations for Management Practices

The study recommends that educational managers should start programs for continuous upgrading of school ICT infrastructure. The old computers should be mopped up and replaced with new effective hardware to ensure use of updated ICT infrastructure. The study recommends upgrading of school ICT software and hardware. Managers should have budgets ICT infrastructure and prioritize training of teachers to be specialists in ICT maintenance as well as employing well trained ICT technicians to work for the school in supporting the ICT teachers. It is recommended that principals in their management practices allow staff to be part of decision making processes in the procurement of ICT infrastructure. ICT tenders to be given to people of high integrity to avoid loss of funds.

The study recommends more funding by stakeholders to be able to improve on ICT infrastructure and ICT security structures and measures. Concerning mobilization of financial resources and physical ICT infrastructure, the study recommends that the principals can reach out to stakeholders for further ICT support. This includes community engagement where they can ask the business community within their areas for financial and ICT support. The principals to collaborate with donor partners, well-wishers, sensitize and engage parents and the school alumni to facilitate provision of ICT materials. The principals are recommended to reach out to the National Government Constituencies Development Fund (NGCDF) for funds to put up ICT infrastructure and facilitate training of staff.

In terms of capacity building of staff, the study recommends that the MOE and the principals should organize for international training of teachers and encourage staff to use ICT resources provided since through practice, knowledge is gained and the perceived ease of use ICT will increase. It also recommends need for more staff training and encourage peer training among staff and exchange programs with those endowed with sustainable ICT facilities. The QASO and SCDE are recommended to set sub-county school teams for frequent capacity building of teachers and principals on ICT. Teachers should make personal initiatives for capacity building. There is also need for provision of a more diversified internet and installation of more CCTVs cameras in for better management of schools. The study recommends need for enhancing security measures to ICT infrastructure by engaging the personnel with such expertise.

The study recommends that teachers and principals can use internally generated resources by reaching out to the Intergovernmental Authority on

Development (IGAD) for support in ICT infrastructural development within their school. Principals should involve local leaders like area MCA, MP and other political groups as strategy for mobilizing resources, tap on other infrastructure put by the communities and do cost-sharing with stakeholders to reduce the costs of installation of ICT, regular repairs and maintenance. The BOM and the Principals are recommended to establish ICT committees to monitor and evaluate the ICT projects initiated. The principals should also provide each department in the school with the required ICT infrastructure to increase access and use of ICT. Classrooms should be installed with projectors to facilitate learning through visual and audios to improve content mastery and retention.

Further, the study recommends mandatory construction of more ICT classrooms which are fully equipped and well connected with internet to cater for the raising demand for ICT use, the way schools have science labs. The principal to improve the strength of internet connectivity in schools and extent connectivity from the administration block and computer labs to all students for research and learning purposes. This calls the need for the TSC to employ enough ICT teachers in each school as some schools had ICT facilities but did not have a computer teacher. TPD teams to appraise teacher ICT skills to identify and fill the possible gaps. Principals who are at the top of school management are recommended to be in the fore front towards championing ICT strategies.

5.5.3 Recommendations for Research

The research findings can be used by relevant stakeholders and the government as the basis for adequately equipping the schools with ICT infrastructure, to enhance efficiency in management at school level. From the research findings, academicians and researchers are recommended to establish exchange programs and carry out more research on other principals' management practices that influence provision of ICT infrastructure.

5.6 Suggestions for Future Research

Based on the findings obtained in this study, the researcher recommends that:

1. More research on ICT should be done especially on Robotics, machine learning as well as research on internet of things and how they can impact on the livelihood of people as we move towards industry 4.0 revolution as a result of emerging issues in education such as impact of Covid-19 pandemic.
2. Suggestions for further studies to be done by the ministry on the influence of principals' management strategies on provision of ICT infrastructure in a larger sample size to make it more effective.
3. In future, a study can be conducted on cyber security and ICT applications, since with increased integration of ICT the issue of cyber security has become increasingly important.

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APPENDICES

Appendix I: Letter of Transmittal

Mbithi Kennedy Mulwa,
Moi Forces Academy-nrb,
P.O Box 77155-00611,
NAIROBI.

To The QASO/SCDE/Principal_____

Dear Sir/ Madam,

RE: COLLECTION OF DATA ON PROVISION OF ICT INFRASTRUCTURE

I am a Masters student in the Department of Educational Management Policy and Curriculum Studies of the University of Nairobi. I am doing a research study on the **'Influence of principals' management strategies on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya.'**

I kindly request you to participate in the study by filling the questionnaire and in answering the interview questions where possible. I assure you privacy and confidentiality throughout the study. Therefore, do not write your name anywhere in the research questionnaire, interview schedule or observation checklist. Your responses and any assistance offered to me will be highly valued and appreciated.

Thank you in advance.

Yours faithfully,

Mbithi Kennedy Mulwa.

Appendix II: The ICT teachers' Questionnaire

You have been identified as a key respondent in this study. You are requested to provide the information in the spaces provided. Do not write your name anywhere. The study will seek to establish the **Influence Principals' management strategies on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya**

Section A: Demographic Information

1. What is your gender? Male [ ] Female [ ]
2. Kindly indicate your age bracket: 25-34 ( ) 35-44 years [ ] 45-54 years [ ] Above 55 years [ ]
3. Kindly indicate your highest level of education: Diploma [ ] Degree [ ] Masters [ ] PhD [ ]

Section B: INFLUENCE OF PRINCIPALS' MANAGEMENT STRATEGIES ON PROVISION OF ICT INFRASTRUCTURE IN

PUBLIC DAY SECONDARY SCHOOLS IN KAMUKUNJI SUB COUNTY, KENYA.

Principals' mobilization of resources

4. Please indicate by using a tick (√), the extent to which Principals' mobilization of resources influences provision of ICT infrastructure Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	2	3	4	5
The school has budget allocation for ICT infrastructure					
The school strategic plans supports provision of ICT infrastructure					
The principal has identified funding sources for ICT budget					
The principal is aware of school ICT budget from the MOE					
The principal has mobilized resources for internet connectivity					
The principal has established ICT classrooms/laboratories					
The ICT classrooms are fully equipped and have internet connectivity					
The student-textbook ratio for computer studies/ICT is adequate					
The school has sufficient administrative, teaching & learning ICT					

In your opinion, what other management strategies can principals adopt for mobilization of resources to improve provision ICT infrastructure?

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Principals' Capacity building of staff on Provision of ICT infrastructure

5. Please indicate by using a tick (√), the extent to which Principals' capacity building of staff influence provision of ICT infrastructure in the Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	2	3	4	5

The principal supports capacity building of teachers					
There is availability of teacher training programs					
Professional development contact hours are enough					
There is availability of training resources					
The frequency of training is more often					
There is staff promotion for career progression					
The school has experienced adequate skilled ICT teachers					

6. In your opinion, what other aspects of capacity building of staff should principals schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principals' Stakeholder involvement on Provision of ICT infrastructure

7. Please indicate by using a tick (√), the extent to which principals' stakeholder involvement influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
There is effective Parent-Principal communication in the schools					
There is parental involvement in provision finance of ICT facilities					
There is community engagement in provision of ICT infrastructure					
School has advisory committees(BOM & PA) to plan and advice on ICT					

9. In your opinion, what other aspects of stakeholder involvement should principals in schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principals' involving staff in decision making on Provision of ICT infrastructure

10. Please indicate by using a tick (√), the extent to which principals' involving teachers in decision making influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
Teachers are involved in setting of school ICT goals					
Teachers are involved development of school ICT policies					
Teachers are involved in implementing ICT strategies					
Teachers are involved in school ICT tendering projects					
Teachers are involved in M & E ICT projects provided					

11. In your opinion, what other aspects of involving teachers in decision making should principals in schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principal's Provision of ICT resources

12. Please indicate by using a tick (√), the extent to which as a principal you, principals' management strategies influences provision of ICT infrastructure teachers? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**

The principal has effectively procured and installed ICT hardware & software					
The principal has set up functional ICT laboratories or classrooms					
The principal has provided reliable internet connectivity					
The principal has provided effective cyber security measures					
The Principal has provided access to ICT by staff and students					
The Principal has built sustainable ICT infrastructure					
The principal has installed tracking system for ICT infrastructure					
The stakeholders are satisfied with ICT infrastructure provided					

13. In your opinion, what other aspects of provision of ICT infrastructure should school principals' in Kamukunji Sub County adopt to improve the school management?

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On the checklist below, please indicate the availability and adequacy of the following ICT facilities, stating whether they are adequate or inadequate in the schools.

ICT infrastructure	**Available**	**Unavailable**	**Adequate**	**Inadequate**
Computer laboratories				
ICT textbooks				
CCTVs				
Printers and scanners				
Projectors/Smart boards				
Computer desktops				
Laptops				
Digital content(A&V)				

Internet connectivity				
E-security structures				

14. Give any reasons for the perceptions above?

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Recommendations for the study and suggestions for future research

As a key stakeholder in secondary school administration and management, you agree with me that Principals' management strategies influences provision of ICT infrastructure in a school. Therefore, collaborative efforts by all stakeholders in provision and use of ICT infrastructure in secondary schools is very important. Problems of ICT infrastructure and management strategies hinders ICT use in secondary schools and need to be addressed. As a respondent, kindly give your recommendations to this study and give suggestions for future research.

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Thank you very much for the information and time you have given me during the study. God bless you.

Appendix III: middle managers' (HODs) questionnaire

You have been identified as a key respondent in this study. You are requested to provide the information in the spaces provided. Do not write your name anywhere. The study will seek to establish the **Influence Principals' management strategies on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya**

Section A: Demographic Information

1. What is your gender? Male [ ] Female [ ]

2. Kindly indicate your age bracket:

25-34 ( ) 35-44 years [ ] 45-54 years [ ] Above 55 years [ ]

3. Kindly indicate your highest level of education:

Diploma [ ] Degree [ ] Masters [ ] PhD [ ]

Section B: INFLUENCE OF PRINCIPALS' MANAGEMENT STRATEGIES ON PROVISION OF ICT INFRASTRUCTURE IN PUBLIC DAY SECONDARY SCHOOLS IN KAMUKUNJI SUB COUNTY, KENYA.

Principals' mobilization of resources

4. Please indicate by using a tick (√), the extent to which Principals' mobilization of resources influences provision of ICT infrastructure Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The school has budget allocation for ICT infrastructure					
The school strategic plans supports provision of ICT infrastructure					
The principal has identified funding sources for ICT budget					
The principal is aware of school ICT budget from the MOE					
The principal has mobilized resources for internet connectivity					
The principal has established ICT classrooms/laboratories					
The ICT classrooms are fully equipped and have internet connectivity					
The student-textbook ratio for computer studies/ICT is adequate					

The school has sufficient administrative, teaching & learning ICT					

5. In your opinion, what other management strategies can principals adopt for mobilization of resources to improve provision ICT infrastructure?

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Principals' Capacity building of staff on Provision of ICT infrastructure

6. Please indicate by using a tick (√), the extent to which Principals' capacity building of staff influence provision of ICT infrastructure in the Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The principal supports capacity building of teachers					
There is availability of teacher training programs					
Professional development contact hours are enough					
There is availability of training resources					
The frequency of training is more often					
There is staff promotion for career progression					
The school has experienced adequate skilled ICT teachers					

7. In your opinion, what other aspects of capacity building of staff should principals schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principals' Stakeholder involvement on Provision of ICT infrastructure

8. Please indicate by using a tick (√), the extent to which principals' stakeholder involvement influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
There is effective Parent-Principal communication in the					

schools					
There is parental involvement in provision finance of ICT facilities					
There is community engagement in provision of ICT infrastructure					
School has advisory committees(BOM & PA) to plan and advice on ICT					

9. In your opinion, what other aspects of stakeholder involvement should principals in schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principals' involving staff in decision making on Provision of ICT infrastructure

10. Please indicate by using a tick (√), the extent to which principals' involving teachers in decision making influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
Teachers are involved in setting of school ICT goals					
Teachers are involved development of school ICT policies					
Teachers are involved in implementing ICT strategies					
Teachers are involved in school ICT tendering projects					
Teachers are involved in M & E ICT projects provided					

11. In your opinion, what other aspects of involving teachers in decision making should principals in schools in Kamukunji Sub County adopt to

improve on provision of ICT infrastructure?

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Principal's Provision of ICT resources

12. Please indicate by using a tick (√), the extent to which as a principal you, principals' management strategies influences provision of ICT infrastructure teachers? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The principal has effectively procured and installed ICT hardware & software					
The principal has set up functional ICT laboratories or classrooms					
The principal has provided reliable internet connectivity					
The principal has provided effective cyber security measures					
The Principal has provided access to ICT by staff and students					
The Principal has built sustainable ICT infrastructure					
The principal has installed tracking system for ICT infrastructure					
The stakeholders are satisfied with ICT infrastructure provided					

13. In your opinion, what other aspects of provision of ICT infrastructure should school principals' in Kamukunji Sub County adopt to improve the school management?

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14. On the checklist below, please indicate the availability and adequacy of the following ICT facilities, stating whether they are adequate or inadequate in the schools.

ICT infrastructure	**Available**	**Unavailable**	**Adequate**	**Inadequate**

Computer laboratories				
ICT textbooks				
CCTVs				
Printers and scanners				
Projectors/Smart boards				
Computer desktops				
Laptops				
Digital content(A&V)				
Internet connectivity				
E-security structures				

15. Give any reasons for the perceptions above? .....

……

Recommendations for the study and suggestions for future research

As a key stakeholder in secondary school administration and management, you agree with me that Principals' management strategies influences provision of ICT infrastructure in a school. Therefore, collaborative efforts by all stakeholders in provision and use of ICT infrastructure in secondary schools is very important. Problems of ICT infrastructure and management strategies hinders ICT use in secondary schools and need to be addressed. As a respondent, kindly give your recommendations to this study and give suggestions for future research.

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Thank you very much for the information and time you have given me during the study. God bless you.

Appendix IV: Deputy principals' questionnaire

You have been identified as a key respondent in this study. You are requested to provide the information in the spaces provided. Do not write your name anywhere. The study will seek to establish the **Influence Principals' management strategies on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya**

Section A: Demographic Information

1. What is your gender? Male [ ] Female [ ]
2. Kindly indicate your age bracket: 25-34 ( ) 35-44 years [ ] 45-54 years [ ] Above 55 years [ ]
3. Kindly indicate your highest level of education: Diploma [ ] Degree [ ] Masters [ ] PhD [ ]

Section B: INFLUENCE OF PRINCIPALS' MANAGEMENT STRATEGIES ON PROVISION OF ICT INFRASTRUCTURE IN PUBLIC DAY SECONDARY SCHOOLS IN KAMUKUNJI SUB COUNTY, KENYA.

Principals' mobilization of resources

4. Please indicate by using a tick (√), the extent to which Principals' mobilization of resources influences provision of ICT infrastructure Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The school has budget allocation for ICT infrastructure					
The school strategic plans supports provision of ICT infrastructure					
The principal has identified funding sources for ICT budget					
The principal is aware of school ICT budget from the MOE					
The principal has mobilized resources for internet connectivity					
The principal has established ICT classrooms/laboratories					
The ICT classrooms are fully equipped and have internet connectivity					

The student-textbook ratio for computer studies/ICT is adequate					
The school has sufficient administrative, teaching & learning ICT					

5. In your opinion, what other management strategies can principals adopt for mobilization of resources to improve provision ICT infrastructure?

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Principals' Capacity building of staff on Provision of ICT infrastructure

6. Please indicate by using a tick (√), the extent to which Principals' capacity building of staff influence provision of ICT infrastructure in the Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The principal supports capacity building of teachers					
There is availability of teacher training programs					
Professional development contact hours are enough					
There is availability of training resources					
The frequency of training is more often					
There is staff promotion for career progression					
The school has experienced adequate skilled ICT teachers					

7. In your opinion, what other aspects of capacity building of staff should principals schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?. .....

Principals' Stakeholder involvement on Provision of ICT infrastructure

8. Please indicate by using a tick (√), the extent to which principals' stakeholder involvement influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**

There is effective Parent-Principal communication in the schools					
There is parental involvement in provision finance of ICT facilities					
There is community engagement in provision of ICT infrastructure					
School has advisory committees(BOM & PA) to plan and advice on ICT					

9. In your opinion, what other aspects of stakeholder involvement should principals in schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principals' involving staff in decision making on Provision of ICT infrastructure

10. Please indicate by using a tick (√), the extent to which principals' involving teachers in decision making influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
Teachers are involved in setting of school ICT goals					
Teachers are involved development of school ICT policies					
Teachers are involved in implementing ICT strategies					
Teachers are involved in school ICT tendering projects					
Teachers are involved in M & E ICT projects					

provided					

11. In your opinion, what other aspects of involving teachers in decision making should principals in schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principal's Provision of ICT resources

12. Please indicate by using a tick (√), the extent to which as a principal you, principals' management strategies influences provision of ICT infrastructure teachers? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The principals have effectively procured and installed ICT hardware & software					
The principal has set up functional ICT laboratories or classrooms					
The principal has provided reliable internet connectivity					
The principal has provided effective cyber security measures					
The Principal has provided access to ICT by staff and students					
The Principal has built sustainable ICT infrastructure					
The principal has installed tracking system for ICT infrastructure					
The stakeholders are satisfied with ICT infrastructure provided					

13. In your opinion, what other aspects of provision of ICT infrastructure should school principals' in Kamukunji Sub County adopt to improve the school management?

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14. On the checklist below, please indicate the availability and adequacy of the following ICT facilities, stating whether they are adequate or inadequate in the schools.

ICT infrastructure	**Available**	**Unavailable**	**Adequate**	**Inadequate**
Computer laboratories				
ICT textbooks				
CCTVs				
Printers and scanners				
Projectors/Smart boards				
Computer desktops				
Laptops				
Digital content(A&V)				
Internet connectivity				
E-security structures				

15. Give any reasons for the perceptions above? .....

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Recommendations for the study and suggestions for future research

As a key stakeholder in secondary school administration and management, you agree with me that Principals' management strategies influences provision of ICT infrastructure in a school. Therefore, collaborative efforts by all stakeholders in provision and use of ICT infrastructure in secondary schools is very important. Problems of ICT infrastructure and management strategies hinders ICT use in secondary schools and need to be addressed. As a respondent, kindly give your recommendations to this study and give suggestions for future research.

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Thank you very much for the information and time you have given me during the study. God bless you.

Appendix V: Principals' questionnaire

You have been identified as a key respondent in this study. You are requested to provide the information in the spaces provided. Do not write your name anywhere. The study will seek to establish the **Influence Principals' management strategies on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya**

Section A: Demographic Information

1. What is your gender? Male [ ] Female [ ]
2. Kindly indicate your age bracket: 25-34 ( ) 35-44 years [ ] 45-54 years [ ] Above 55 years [ ]
3. Kindly indicate your highest level of education: Diploma [ ] Degree [ ] Masters [ ] PhD [ ]

Section B: INFLUENCE OF PRINCIPALS' MANAGEMENT STRATEGIES ON PROVISION OF ICT INFRASTRUCTURE IN PUBLIC DAY SECONDARY SCHOOLS IN KAMUKUNJI SUB COUNTY, KENYA.

Principals' mobilization of resources

4. Please indicate by using a tick (√), the extent to which Principals' mobilization of resources influences provision of ICT infrastructure Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The school has budget allocation for ICT infrastructure					
The school strategic plans supports provision of ICT infrastructure					
The principal has identified funding sources for ICT budget					
The principal is aware of school ICT budget from the MOE					
The principal has mobilized resources for internet connectivity					
The principal has established ICT classrooms/laboratories					
The ICT classrooms are fully equipped and have internet connectivity					

The student-textbook ratio for computer studies/ICT is adequate					
The school has sufficient administrative, teaching & learning ICT					

5. In your opinion, what other management strategies can principals adopt for mobilization of resources to improve provision ICT infrastructure?

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Principals' Capacity building of staff on Provision of ICT infrastructure

5. Please indicate by using a tick (√), the extent to which Principals' capacity building of staff influence provision of ICT infrastructure in the Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The principal supports capacity building of teachers					
There is availability of teacher training programs					
Professional development contact hours are enough					
There is availability of training resources					
The frequency of training is more often					
There is staff promotion for career progression					
The school has experienced adequate skilled ICT teachers					

6. In your opinion, what other aspects of capacity building of staff should principals schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure? .....

Principals' Stakeholder involvement on Provision of ICT infrastructure

7. Please indicate by using a tick (√), the extent to which principals' stakeholder involvement influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
There is effective Parent-Principal communication in the schools					
There is parental involvement in provision finance of ICT facilities					
There is community engagement in provision of ICT infrastructure					
School has advisory committees(BOM & PA) to plan and advice on ICT					

8. In your opinion, what other aspects of stakeholder involvement should principals in schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principals' involving staff in decision making on Provision of ICT infrastructure

10. Please indicate by using a tick (√), the extent to which principals' involving teachers in decision making influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
Teachers are involved in setting of school ICT goals					

Teachers are involved development of school ICT policies					
Teachers are involved in implementing ICT strategies					
Teachers are involved in school ICT tendering projects					
Teachers are involved in M & E ICT projects provided					

11. In your opinion, what other aspects of involving teachers in decision making should principals in schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principal's Provision of ICT resources

12. Please indicate by using a tick (√), the extent to which as a principal you, principals' management strategies influences provision of ICT infrastructure teachers? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The principal has effectively procured and installed ICT hardware & software					
The principal has set up functional ICT laboratories or classrooms					
The principal has provided reliable internet connectivity					
The principal has provided effective cyber security measures					
The Principal has provided access to ICT by staff and students					
The Principal has built sustainable ICT infrastructure					
The principal has installed tracking system for ICT infrastructure					
The stakeholders are satisfied with ICT infrastructure provided					

13. In your opinion, what other aspects of provision of ICT infrastructure should school principals' in Kamukunji Sub County adopt to improve the school management?

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14. On the checklist below, please indicate the availability and adequacy of the following ICT facilities, stating whether they are adequate or inadequate in the schools.

ICT infrastructure	**Available**	**Unavailable**	**Adequate**	**Inadequate**
Computer laboratories				
ICT textbooks				
CCTVs				
Printers and scanners				
Projectors/Smart boards				
Computer desktops				
Laptops				
Digital content(A&V)				
Internet connectivity				
E-security structures				

15. Give any reasons for the perceptions above? .....

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Recommendations for the study and suggestions for future research

As a key stakeholder in secondary school administration and management, you agree with me that Principals' management strategies influences provision of ICT infrastructure in a school. Therefore, collaborative efforts by all stakeholders in provision and use of ICT infrastructure in secondary schools is very important. Problems of ICT infrastructure and management strategies hinders ICT use in secondary schools and need to be addressed. As a respondent, kindly give your recommendations to this study and give suggestions for future research.

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Thank you very much for the information and time you have given me during the study. God bless you.

Appendix VI: The QASO'S questionnaire

You have been identified as a key respondent in this study. You are requested to provide the information in the spaces provided. Do not write your name anywhere. The study will seek to establish the **Influence Principals' management strategies on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya**

Section A: Demographic Information

1. What is your gender? Male [ ] Female [ ]

2. Kindly indicate your age bracket:

25-34 ( ) 35-44 years [ ] 45-54 years [ ] Above 55 years [ ]

3. Kindly indicate your highest level of education:

Diploma [ ] Degree [ ] Masters [ ] PhD [ ]

Section B: INFLUENCE OF PRINCIPALS' MANAGEMENT STRATEGIES ON PROVISION OF ICT INFRASTRUCTURE IN PUBLIC DAY SECONDARY SCHOOLS IN KAMUKUNJI SUB COUNTY, KENYA.

Principals' mobilization of resources

4. Please indicate by using a tick (√), the extent to which Principals' mobilization of resources influences provision of ICT infrastructure Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The schools have budget allocation for ICT infrastructure					
The schools strategic plans supports provision of ICT infrastructure					
The principals has identified funding sources for ICT budget					
The principals are aware of school ICT budget from the MOE					
The principals have mobilized resources for internet connectivity					

The principals have established ICT classrooms/laboratories					
The ICT classrooms are fully equipped and have internet connectivity					
The student-textbook ratio for computer studies/ICT is adequate					
The schools have sufficient administrative, teaching & learning ICT					

In your opinion, what other management strategies can principals adopt for mobilization of resources to improve provision ICT infrastructure?

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Principals' Capacity building of staff on Provision of ICT infrastructure

5. Please indicate by using a tick (√), the extent to which Principals' capacity building of staff influence provision of ICT infrastructure in the Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The principals supports capacity building of teachers					
There is availability of teacher training programs					
Professional development contact hours are enough					
There is availability of training resources					
The frequency of training is more often					
There is staff promotion for career progression					
The schools have experienced adequate skilled ICT teachers					

6. In your opinion, what other aspects of capacity building of staff should principals schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principals' Stakeholder involvement on Provision of ICT infrastructure

7. Please indicate by using a tick (√), the extent to which principals' stakeholder involvement influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	2	3	4	5
There is effective Parent-Principal communication in the schools					
There is parental involvement in provision finance of ICT facilities					
There is community engagement in provision of ICT infrastructure					
Schools have advisory committees(BOM & PA) to plan and advice on ICT					

9. In your opinion, what other aspects of stakeholder involvement should principals in schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principals' involving staff in decision making on Provision of ICT infrastructure

10. Please indicate by using a tick (√), the extent to which principals' involving teachers in decision making influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	2	3	4	5
Teachers are involved in setting of school ICT goals					
Teachers are involved development of school ICT policies					
Teachers are involved in implementing ICT strategies					
Teachers are involved in school ICT tendering projects					
Teachers are involved in M & E ICT projects provided					

11. In your opinion, what other aspects of involving teachers in decision making should principals in schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principal's Provision of ICT resources

12. Please indicate by using a tick (√), the extent to which as a principal you, principals' management strategies influences provision of ICT infrastructure teachers? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The principals have effectively procured and installed ICT hardware & software					
The principals have set up functional ICT laboratories or classrooms					
The principals have provided reliable internet connectivity					
The principals have provided effective cyber security measures					
The Principals have provided access to ICT by staff and students					
The Principals have built sustainable ICT infrastructure					
The principals have installed tracking system for ICT infrastructure					
The stakeholders are satisfied with ICT infrastructure provided					

13. In your opinion, what other aspects of provision of ICT infrastructure should school principals' in Kamukunji Sub County adopt to improve the school management?

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14. On the checklist below, please indicate the availability and adequacy of the following ICT facilities, stating whether they are adequate or inadequate in the schools.

ICT infrastructure	**Available**	**Unavailable**	**Adequate**	**Inadequate**
Computer laboratories				
ICT textbooks				
CCTVs				
Printers and scanners				
Projectors/Smart boards				
Computer desktops				
Laptops				
Digital content(A&V)				
Internet connectivity				
E-security structures				

15. Give any reasons for the perceptions above? .....

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Recommendations for the study and suggestions for future research

As a key stakeholder in secondary school administration and management, you agree with me that Principals' management strategies influences provision of ICT infrastructure in a school. Therefore, collaborative efforts by all stakeholders in provision and use of ICT infrastructure in secondary schools is very important. Problems of ICT infrastructure and management strategies hinders ICT use in secondary schools and need to be addressed. As a respondent, kindly give your recommendations to this study and give suggestions for future research.

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Thank you very much for the information and time you have given me during the study. God bless you.

Appendix VII: The SCDE'S questionnaire

You have been identified as a key respondent in this study. You are requested to provide the information in the spaces provided. Do not write your name anywhere. The study will seek to establish the **Influence Principals' management strategies on provision of ICT infrastructure in public day secondary schools in Kamukunji Sub County, Kenya**

Section A: Demographic Information

1. What is your gender? Male [ ] Female [ ]

2. Kindly indicate your age bracket: 25-34 ( ) 35-44 years [ ] 45-54 years [ ] Above 55 years [ ]

3. Kindly indicate your highest level of education: Diploma [ ] Degree [ ] Masters [ ] PhD [ ]

Section B: INFLUENCE OF PRINCIPALS' MANAGEMENT STRATEGIES ON PROVISION OF ICT INFRASTRUCTURE IN PUBLIC DAY SECONDARY SCHOOLS IN KAMUKUNJI SUB COUNTY, KENYA.

Principals' mobilization of resources

4. Please indicate by using a tick (√), the extent to which Principals' mobilization of resources influences provision of ICT infrastructure Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The schools have budget allocation for ICT infrastructure					
The schools strategic plans supports provision of ICT infrastructure					
The principals has identified funding sources for ICT budget					
The principals are aware of school ICT budget from the MOE					
The principals have mobilized resources for internet connectivity					
The principals have established ICT classrooms/laboratories					
The ICT classrooms are fully equipped and have internet connectivity					

The student-textbook ratio for computer studies/ICT is adequate					
The schools have sufficient administrative, teaching & learning ICT					

In your opinion, what other management strategies can principals adopt for mobilization of resources to improve provision ICT infrastructure?

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Principals' Capacity building of staff on Provision of ICT infrastructure

5. Please indicate by using a tick (√), the extent to which Principals' capacity building of staff influence provision of ICT infrastructure in the Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The principals supports capacity building of teachers					
There is availability of teacher training programs					
Professional development contact hours are enough					
There is availability of training resources					
The frequency of training is more often					
There is staff promotion for career progression					
The schools have experienced adequate skilled ICT teachers					

6. In your opinion, what other aspects of capacity building of staff should principals schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principals' Stakeholder involvement on Provision of ICT infrastructure

7. Please indicate by using a tick (√), the extent to which principals' stakeholder involvement influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
There is effective Parent-Principal communication in the schools					
There is parental involvement in provision finance of ICT facilities					
There is community engagement in provision of ICT infrastructure					
Schools have advisory committees(BOM & PA) to plan and advice on ICT					

9. In your opinion, what other aspects of stakeholder involvement should principals in schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principals' involving staff in decision making on Provision of ICT infrastructure

10. Please indicate by using a tick (√), the extent to which principals' involving teachers in decision making influence provision of ICT infrastructure in Kamukunji Sub County? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**

Teachers are involved in setting of school ICT goals					
Teachers are involved development of school ICT policies					
Teachers are involved in implementing ICT strategies					
Teachers are involved in school ICT tendering projects					
Teachers are involved in M & E ICT projects provided					

11. In your opinion, what other aspects of involving teachers in decision making should principals in schools in Kamukunji Sub County adopt to improve on provision of ICT infrastructure?

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Principal's Provision of ICT resources

12. Please indicate by using a tick (√), the extent to which as a principal you, principals' management strategies influences provision of ICT infrastructure teachers? Use the 5-point scale where: 5 is strongly agree, 4 is agree, 3 is neutral, 2 is disagree and 1 is strongly disagree.

	1	**2**	**3**	**4**	**5**
The principals have effectively procured and installed ICT hardware & software					
The principals have set up functional ICT laboratories or classrooms					
The principals have provided reliable internet connectivity					
The principals have provided effective cyber security measures					
The Principals have provided access to ICT by staff and students					
The Principals have built sustainable ICT infrastructure					
The principals have installed tracking system for ICT infrastructure					
The stakeholders are satisfied with ICT infrastructure provided					

13. In your opinion, what other aspects of provision of ICT infrastructure should school principals' in Kamukunji Sub County adopt to improve the school

management?.....

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14. On the checklist below, please indicate the availability and adequacy of the following ICT facilities, stating whether they are adequate or inadequate in the schools.

ICT infrastructure	**Available**	**Unavailable**	**Adequate**	**Inadequate**
Computer laboratories				
ICT textbooks				
CCTVs				
Printers and scanners				
Projectors/Smart boards				
Computer desktops				
Laptops				
Digital content(A&V)				
Internet connectivity				
E-security structures				

15. Give any reasons for the perceptions above? .....

……

Recommendations for the study and suggestions for future research

As a key stakeholder in secondary school administration and management, you agree with me that Principals' management strategies influences provision of ICT infrastructure in a school. Therefore, collaborative efforts by all stakeholders in provision and use of ICT infrastructure in secondary schools is very important. Problems of ICT infrastructure and management strategies hinders ICT use in secondary schools and need to be addressed. As a respondent, kindly give your recommendations to this study and give suggestions for future research.

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Thank you very much for the information and time you have given me during the study. God bless you.

Appendix VIII: Observation checklist

The researcher used this instrument to collect data on the condition of ICT infrastructure /facilities after the implementation of ICT policy. This was a list to check the influence of the principals' management strategies on provision and mobilization of ICT resources. Confidentiality of the data collected using the observation checklist was highly maintained, since the research was purely academic oriented.

S/NO	Facility	Available (A)	Unavailable (UA)	Adequate (AD)	Inadequate (IAD)	USES A / C	
1	Computer Lab/classes						
2	ICT Textbooks						
3	CCTVs						
4	Printers and Scanners						
5	Projectors						
6	Computer desktops						
7	Laptops						
8	Digital content(V&A)						
9	Internet connectivity						
10	E-security Structures						
11	Social media platforms						
12	NEMIS						
13	School ICT data base						
14	Smart boards/TVs/radios						

Give some reasons for the infrastructure identified above?

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Appendix IX: Letter of introduction from the university

UNIVERSITY OF NAIROBI
FACULTY OF EDUCATION
DEPARTMENT OF EDUCATIONAL MANAGEMENT POLICY &CURRICULUM STUDIES

P.O. BOX 30197
OR P.O. BOX 92 -00902
dept-edpcs@uonbi.ac.ke
KIKUYU
October 9, 2023
OUR REF: UON/FED/EMPCS/1/20
TO WHOM IT MAY CONCERN
Dear Sir/Madam,

RE: KENNEDY MULWA– REG NO. E55/39615/2021
This is to confirm that Kennedy Mulwa is a Master of Education student in the Department of Educational Management Policy and Curriculum Studies of the University of Nairobi. He is currently working on his research proposal entitled **"Influence of Principals' Management Strategies on Provision of ICT Infrastructure in Public Day Secondary Schools in Kamukunji Sub-county, Kenya".**

His area of specialization is Educational Administration.

Any assistance accorded to him will be highly appreciated

SUSAN CHEPKONGA, PHD
CHAIRMAN
DEPARTMENT OF EDUCATIONAL MANAGEMENT POLICY AND CURRICULUM STUDIES
SCY/vm

Appendix X: Research permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 953242

Date of Issue: 17/October/2023

RESEARCH LICENSE

This is to Certify that Mr.. Kennedy Mulwa Mbithi of University of Nairobi, has been licensed to conduct research as per the provision of the Science,. Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: INFLUENCE OF PRINCIPALS' MANAGEMENT STRATEGIES ON PROVISION OF ICT INFRASTRUCTURE IN PUBLIC DAY SECONDARY SCHOOLS IN KAMUKUNJI SUB COUNTY, KENYA for the period ending : 17/October/2024.

License No: NACOSTI/P/23/30510

953242

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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

See overleaf for conditions

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)
Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was the established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
    i. Endanger national security
    ii. Adversely affect the lives of Kenyans
    iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
    iv. Result in exploitation of intellectual property rights of communities in Kenya
    v. Adversely affect the environment
    vi. Adversely affect the rights of communities
    vii. Endanger public safety and national cohesion
    viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. The license any rights thereunder are non-transferable
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
8. The License does not give authority to transfer research materials.
9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.
10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

National Commission for Science, Technology and
Innovation(NACOSTI),
Off Waiyaki Way, Upper Kabete,
P. O. Box 30623 - 00100 Nairobi, KENYA
Telephone: 020 4007000, 0713788787, 0735404245
E-mail: dg@nacosti.go.ke
Website: www.nacosti.go.ke

Appendix XI: Research authorization letter

OFFICE OF THE PRESIDENT

MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION
STATE DEPARTMENT FOR INTERNAL SECURITY AND NATIONAL ADMINISTRATION

Telegrams.....
Telephone: Nairobi 316845, 341666
When replying please quote

COUNTY COMMISSIONER
NAIROBI.
P.O. Box 30124-00100
NAIROBI

REF: ED 10/6 VOL. XXVII (179)

19th October, 2023

Mr. Kennedy Mulwa Mbithi
University of Nairobi
Nairobi

RESEARCH AUTHORIZATION

Your letter dated 17th October, 2023 refers.

This office has no objection and authority is hereby granted to conduct research on the topic "**Influence of Principals' Management Strategies on Provision of ICT Infrastructure in Public Day Secondary Schools"** in Nairobi County for the period 17th October 2024.

P.K. ONGERE
For: COUNTY COMMISSIONER

Copy to: Deputy County Commissioner
Kamukunji Sub-County