INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGY
AND PERFORMANCE OF TERTIARY INSTITUTIONS IN NAIROBI CITY
COUNTY, KENYA

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D53/33685/2015

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF A DEGREE IN MASTER OF
BUSINESS ADMINISTRATION (MANAGEMENT INFORMATION SYSTEMS)
OF KENYATTA UNIVERSITY

NOVEMBER, 2018
DECLARATION

This research project is my original work and has not been presented for a degree in any other university or for any other award. No part of this research should be reproduced without authority of the author and Kenyatta University.

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I confirm that the work reported in this research project was carried out by a student under my supervision.

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DEDICATION

This research project is dedicated to my entire family members for their love, patience and encouragement throughout the periods of writing this project. I would also like to dedicate this work to my amiable friends who have stood solidly behind me in time of triumph and failure. I appreciate all your efforts and positive encouragement, and it is my fervent prayer that the Almighty God will locate you with awesome blessings in Jesus name (Amen).
ACKNOWLEDGEMENTS
I am grateful to God Almighty for giving me the grace and good health during the course of writing this project work. I will forever praise his Holy name. My sincere and innermost appreciation goes to my supervisor, Dr. Joshua Tumuti, who created time out of his tight schedule to ensure that this research project becomes successful. I say thank you very much sir. I also own a debt of thanks to Mr Josphat K. Kyalo, for his valuable advice and corrections that have seen me through the completion of this research project. My appreciation would be incomplete if I fail to acknowledge the moral and financial contribution of my father, Mr William Kibet Kibor towards my studies at Kenyatta University. Finally, my special gratitude goes to my lecturers for their invaluable guidance and sacrifice in seeing me through to this level and to all colleagues who we studied together.
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LIST OF ABBREVIATIONS

CAI          Computer Aided Instruction
CD           Compact Disk
ICT          Information Communication and Technology
IT           Information Technology
RCT          Random Control Trial
ROM          Read Only Memory
SPSS         Statistical Package for Social Sciences
TAM          Technology Acceptance Model
TRA          Theory of Reasoned Action
ILM          Internet-Based Learning
OPERATIONAL DEFINITION OF TERMS

Educational technology: The study and moral practice of simplifying learning and enhancing results by generating, implementing and managing appropriate technological processes and resources increase the progress of human learning.

Performance: This refers to the degree in which higher institutions attain or measure outcomes in terms admission capacity, students grading and students satisfaction.

Integration: This refers to the introduction of ICT in an institution setting.

Hardware: The physical aspect of computers, telecommunications and other devices.

Information Communication Technology: This refers to the technology that performs data-related functions ranging from acquisition, processing, storage, and retrieval, with the aid of electronic hardware, software, people and processes for generating and transmitting information.

Innovation: Refers to an idea, practice or project, and event that is perceived as new by people or other unit of integration.

Software: Refers to set of instructions or programs designed to perform some specific tasks via computer of other electronic devices.

Training: The use of systematic and planned instruction activities to support learning.

Randomized Control Trial: A study design that is to randomly assign participants into an experimental or a control group.
ABSTRACT

The Kenyan education sector has not embraced the ICT usage and consequently, effect of integration of ICT on performance has not received adequate investigation. The study, therefore, investigated the effect of ICT integration on the performance of tertiary institutions in Nairobi City County. The study target population was 149 tertiary institutions in Nairobi City County. Simple random sampling method was used to select the respondents from the sample size of 60 respondents drawn from the ICT specialists employed in the institutions. Data were collected using questionnaires and the internal reliability analysis showed Cronbach’s alpha value of 0.60. Results showed that the overall study established that performance of tertiary institutions depends on ICT infrastructure, ICT proficiency, and management support ICT usage. However, ICT policy had no effect of on performance. The R-Square in the study was found to be 0.53. This value indicated that the effect of information communication technology (ICT) integration systems explained 53% of the variance in performance of tertiary institutions. There was a positive correlation between the Proficiency and the Performance. The infrastructure was the second variable with a positive correlation with tertiary institution performance. Usage had a positive correlation with performance. Management support and policy had a positive correlation with performance which was not significant. As a result, the research findings revealed that with increase in ICT infrastructure and proficiency, more users would continually expose to the capabilities of ICT which would in turn increase their performance. The management involvement in planning ICT use and perception had also changed positively towards use of ICT in teaching and learning. The study established that the support of policy makers is needed for ICT to be properly utilised so as to enhance performance among Tertiary Institutions in Kenya.
CHAPTER ONE: INTRODUCTION

1.1. Background of the Study

Information communication and technology (ICT) has remained an innovation that has shifted attention from traditional working arrangement to a modern day of doing things in several organisations. A growing body of studies has shown empirical evidence that ICT has significant relationship with performance outcomes—productivity, growth, organisational expansion, efficiency, effectiveness, and competitiveness (Tarute & Gatantis, 2011). Every organisation be it public, not-for profit, and for-profit making entities, around the globe, has not only embraced ICT as a means of cutting cost, but also to improve efficiency and to deliver better values to their respective clienteles.

As point out by Garo, Harindranath, and Ozcan, (2013), ICT, in today’s competitive environment, is now a necessity as businesses seek to survive the turbulent business environment. Yuen, Law and Wong, (2012), posted that ICT has grown exponentially over the last ten years as people and society have been greatly influenced positively. Educational sector has remained one of the sectors that have invested on ICT for enhancing service delivery. According to Asaolu, (2006), schools and families across the globe have invested significant sum of money towards acquiring computers, software, internet connections, as well as other technologies for education. The use of ICT in schools, according to Zaman, Shamim, & Clement, (2011), leads to educational and pedagogical outcomes which is useful to both the facilitators, teachers and the students. The use of ICT across educational institutions can promote collective, zealous and long-life learning, enhancing students’ enthusiasm, provide better convenience to information, enhance shared working resources, generating and deepen comprehension, and help learners reason and express communication creatively (Khan, Hasan, & Clement, 2012).
The benefits that ICT offers have prompted many educational institutions to embark on various activities that will facilitate the integration and usage of ICT. The ICT activities and programmes that support its integration and usage by educational institutions include: ICT proficiency, ICT infrastructure, management support, and usage as well as ICT policy. In developed as well as emerging countries such as UK, Australia, China, Singapore, programmes aimed at enhancing facilitators’ skills in integration and usage of ICT have been established in various schools during teaching and learning processes, and a considerable amount of money has also been invested in ICT infrastructures (Khan, et al., 2012).

While the use of ICT has been enhanced by activities and programme such as ICT proficiency, ICT infrastructures, ICT management supports, usage and its policies across educational sectors in most of the developed and emerging countries in the world (Khan, et al., 2012), there was need to empirically find out if the performance of educational sector, especially tertiary institutions, in developing countries is contingent on ICT integration and usage. ICT, as adopted and used by several organisations, has been identified as a driver of transformation in terms of achieving competitive advantage in today’s competitive business environments (Onjori&Migiro, 2013). Though, studies have recognized limited integration and usage of ICT in service delivery in educational sector in Kenya (Nchunge, Sakwa, &Mwangi, 2012), the impact it (ICT) on performance has been less researched. It was thus requisite to investigate the impact of ICT integration on performance of tertiary institutions, especially colleges in Kenya.

1.1.2 Integration of Information Communication Technology

The integration of ICT has been identified to accompany array of benefits. Beardsley, et al., (2010), point out that ICT has contributed approximately to 5/4 percent of world total GDP growth from the periods 2003 to 2008, and the stake is expected to climax 8.7 percent by the
year 2020. In education sector in Kenya, the contribution of ICT in terms of the benefits has also been noticed. Kosgey & Sang, (2012), point out that ICT has benefited the education sector of Kenya economy in terms of: supporting educational activities in schools, making availability of non-formal education for people out-of-school both young and adults which is mostly known as e-learning, supporting pre-service distance learning programmes for teachers, supporting in-service professional capacity building and development, and enhancing the management activities across schools.

The integration of ICT in educational sector especially in Kenya is enhanced and facilitated by the availability of ICT activities and programmes which include ICT infrastructure, ICT proficiency, ICT usage, management support, and external influence such as government policy on ICT. The ICT infrastructure such as hardware, software, networks are essential factors facilitating and promoting the integration and use of ICT in enhancing educational sector in Kenya. According to Bhattacharya and Sharma (2007), ICT infrastructures are technologies for data acquisition, processing, storage and retrieval. Additionally, Bhattacharya and Sharma put forward that the advancement in this digital-era is founded on technological innovation and utilization.

ICT infrastructure such as hardware includes the computer equipment that are used to perform input, processing, and output activities. Hardware such as desktops, keyboard, printers graphic card, motherboard central processing unit and many others are seen in institutions offices and classrooms that help them take commands from software.

Software, on the other hand refers to the computer programs that are used in the operation of a computer; they are categorized into application and system. Operating systems such as Windows, IOS, and Linux, device drivers and middleware that are used to run basic computer functions can
be categorized to systems software. Besides, application software, on the other hand, allows one to accomplish specific tasks such as word processing and creating spread sheets.

People proficiency are the most significant aspect of ICT as they apply the software and hardware to manage, run, and maintain systems (Stair & Reynolds, 2015). In schools, the use of software packages to facilitate learning and other administrative operations is gradually replacing the traditional means of facilitating knowledge. This is evident in Kenya where college schools are embracing software e-learning packages to facilitate learning. Students in colleges now access online books, write and turn in assignment online, get feedback on the assignment submitted online from their teachers, and host of others. The use of computer aided software and anti-virus software are increasingly used in schools to aid learning and secure ICT infrastructures.

The integration of ICT is also hinged on the literacy skills of both the users and the facilitators. ICT literacy covers issues of training, competence, attitude, and experience that will facilitate the integration of ICT. Armstrong (2008) sees training as the use of systematic and planned instructional materials to support learning. He states further that the practice that can be seen as ‘learner-based training’. From this perspective, training entails learning activity which focuses on the process of acquiring specific knowledge, skills, and abilities needed by people to meet the current job demands and perform future responsibilities.

In order to prepare teachers and facilitators for efficient and effective technology integration, education programmes are essential to help them to build intensive knowledge of good educational practices, enhance technical skills and content knowledge (Koehler & Mishra, 2009). The integration of ICT is therefore believed to enhance the skills and knowledge of teachers and other stakeholders towards improving students’ performance across schools in Kenya.
The integration of ICT in any institution is also a function of the commitment of its management (Gono et al. 2013). Commitment to ICT programmes and activities in terms of proper funding, staff training, resource allocation, and monitoring will go a long way in facilitating integration of ICT. Therefore, organizational commitment to the acquisition and implementation of ICT will facilitate the integration and use of ICT within the organization. Though, studies have shown that educational institutions have adopted ICT in Kenya, empirical studies investigating ICT impact on performance especially in Colleges in Kenya have remained unreliable. It is therefore requisite to investigate whether the integration of ICT will impact on performance tertiary institutions in Kenya.

1.1.3 Performance Tertiary Institutions in Nairobi City County

The statistics from Info hub Kenya (2014) reveals that there are more than 100 public and tertiary institutions within Nairobi City County area. The 149 colleges and universities within the Nairobi area therefore will form the unit of observation of this study. Most of these tertiary institutions have instituted ICT as part of their programme, there is need to investigate whether its integration and usage has any impact on the performance of tertiary institutions across Nairobi City County.

The government policy in ICT on education has also remained an important motivation that sustained the integration and use of ICT in Kenya. The National Information and Communication Technology Policy (2016), a revised edition of 2006 version, has a provision for ICT on education. This provision details the objectives and strategies relating to ICT and Education in Kenya. The National Policy on ICT on education has several components which include connectivity and network infrastructures, gender equity and access, technical support and maintenance, digital contents, capacity building and professional development. The government
policy on ICT in education has provided a veritable platform and a level playing ground for stakeholders in education sector in Kenya. The level playing ground has remained a key factor in the integration and usage of ICT among tertiary institutions in Kenya.

1.2. Statement of the Problem

In the quest to enhance effective teaching and learning in educational institutions in Kenya, the Government of Kenya, through National ICT Policy on Education, embarked on policies ranging from provision of affordable ICT infrastructures in schools, facilitation of sharing of ICT resources in school, promotion and facilitation of training of teachers and school managers to aid integration of ICT through in-service courses (GoK, 2006). The policy birthed connection of over 3000 rural schools with electricity, provision of computersto over 800 schools, establishment Kenya Institute of Education to provide leadership in implementation of ICT in schools, and partnership with both private and public organisations in support of ICT in schools (GoK, 2006). However, despite government efforts, schools in Kenya have not effectively adopted ICT to support learning, teaching and management as intended (Manduku, Kosgey, & Sang, 2012). Furthermore, ICT policy on education of 2006 has not been effectively implemented as intended, as evidence abound that countries have reported over 41% integration of ICT in schools but the ratio is comparatively low in Kenya (Mingaine, 2013). There is therefore need for examination of factors determining integration and usage of ICT.

Furthermore, most of the studies on integration of ICT and usage in Kenya are exploratory in nature and therefore lack empirical validation and theoretical justification. Therefore, lack of empirical validation and theoretical justification in these studies created a gap that this present study sought to unravel.
In analysing the effect of integration of ICT on performance of school, this study thus investigated the effect of ICT infrastructures, management support, ICT usage, and ICT policy on the performance of tertiary institutions in Kenya.

1.3.1 General Objective

The general objective of the study is to investigate the effect of information communication technology (ICT) integration on performance of Tertiary institutions in Nairobi City County, Kenya.

1.3.2 Specific Objectives

i. To establish effect of ICT infrastructure on performance of tertiary institutions in Nairobi City County, Kenya.

ii. To determine the effect ICT proficiency on performance of Tertiary institutions in Nairobi City County, Kenya.

iii. To evaluate role of management support for ICT on performance of Tertiary institutions in Nairobi City County, Kenya.

iv. To assess the influence of ICT usage on performance of tertiary institutions in Nairobi City County, Kenya.

v. To determine effect of ICT policies on performance of tertiary institutions in Nairobi City County, Kenya.

1.3. Research Questions
i. What is the effect of ICT infrastructure on performance of tertiary institutions in Nairobi City County, Kenya?

ii. Does ICT proficiency have effect on performance of tertiary institutions in Nairobi City County, Kenya?

iii. Does management support for ICT have a role on performance of tertiary institutions in Nairobi City County, Kenya?

iv. How does ICT usage influence performance of tertiary institutions in Nairobi City County, Kenya?

v. What is the effect of ICT policies on performance of tertiary institutions in Nairobi City County, Kenya?

1.4. Significance of the Study

The study is considered beneficial in several ways. First, it will guide educational administrators and policy makers in picking the best methods of managing changes related to application ICT in the educational sector in Nairobi City County. In view of this, the findings of this study were of immense value to stakeholders like staff and students or managers of private schools and colleges in Kenya at large. The study aims at recommending better ways of enhancing the performance of schools and management use of technological instruments such as laptops, computers, androids, etc., in the management of teaching and learning. The study findings will also be beneficial to the government in attempts to roll out programs focusing on integrating ICT based learning in Public Schools.
The study will also add value to existing literature thereby contributing immensely to the pool of knowledge on integration of ICT and performance of tertiary institutions which will act as a point of reference for upcoming researchers.

1.5. Scope of the Study

The purpose of this study was to investigate the integration of ICT and performance of Tertiary institutions in Nairobi City County. The study focused on establishing the effect of ICT infrastructure on the performance of Tertiary institutions Schools. It further, focused on determining the role of ICT proficiency for staff and management support for ICT integration and usage on the performance of Tertiary institutions in Nairobi City County. The study was conducted across tertiary institutions in Nairobi City County because studies have pointed out those tertiary institutions in Kenya have largely embraced the integration ICT providing quality services in terms of higher education. The target population for the study included ICT specialist within the selected sample of this study.

1.6. Limitations of the Study

The study was limited by several factors. First, the size of the study area was quite vast which pose as a challenge for the researcher during data collection. The researchers overcome this challenge by employing the services of research assistants to help in data collection. The study was limited by lack of adequate knowledge on ICT matters by a section of the respondents which included teachers without proper skills on application of ICT. The researcher structured the questionnaire in a simple format and took time to explain to the respondents some concepts they were not able understand during data collection.

1.7. Organization of the Study
This research is structured to cover three chapters. The first chapter focuses on the introduction to the study of which the major contents include introduction, statement of the problem, research objectives, and research questions, significance of the study, limitations and the scope of the study. Consequently, Chapter two presents literature review on the integration of ICT on the performance of Tertiary institutions and a conceptual framework. Chapter three of the study will cover the research methodology to be employed in the study.
CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

The section reviews the literature of past researchers as found relevant to the topic of the study and research problem. It contains the theoretical framework, empirical review, research gaps, critique of literature review, summary of literature review and a conceptual framework.

2.2. Theoretical Review

The section discusses theories of relevance to the study and they include Technology Acceptance Model (TAM), Resource Based Theory (RBV), Unified Theory of Acceptance, Use of Technology (UTAUT) and Diffusion of Innovations Theory (DIT).

2.2.1 Resource Based Theory

Resource-Based View is a theory that was formalised by Barney in 1991. Resource-Based View (RBV) explains how an organisation can obtain a competitive advantage in a competitive and dynamic environment. The theory (RBV) holds that competitive advantage can be obtained by an organisation provided it engages in the development of resources considered rare, valuable, and inimitable (Barney, 1991). Based on RBV theory, resources that are rare, valuable, inimitable, and difficult to be substituted would enable a firm to obtain a superior advantage that a competitor in the market.

Organisational resources, according to Barney (1991), are classified into three major areas: organisational capital resources, human capital and physical capital. Physical capital resources available for firm use comprise raw materials, accessibility geographic location, plant equipment and physical technology. The human capital resources include competences of human resource elements working in a firm, while the firm’s formal reporting structure, formal and informal management systems, as well as informal relationship among groups constitute organisation
capital resources within a firm. Investment in these resources will lead a firm to obtaining a superior advantage over competitors in a business environment.

This theory is relevant because it justifies the operationalization of the variables of this study.

### 2.2.2 Diffusion of Innovations Theory

Innovation Diffusion Theory is a theory that is considered useful in underpinning the integration of ICT. Moreover, the model is also important when examining how IT innovations spread across societies. According to Rogers (2003) innovations are ideas that are fresh or unfamiliar to people within a social system or environment. Diffusion, on the other hand, is the process through which information about the innovation flows within a social system. Through this theory, Roger’s also advanced the primary factors of the success of an innovation. These factors include channels of communication, innovation features and attributes of the adopter along with the social setting (Zhang, Yu, Yan, & Spil, 2015). According to Rogers, channels of communication are ways in which individuals get information on an innovation particularly on its perceived effectiveness. The features, on the other hand, include user perceived qualities; observability, triability, compatibility and relative advantage.

Notably, relative benefits results from the features the users associate with improvements from previous technologies. Conversely, compatibility is the way the innovation is in line with the existent technical as well as social environments. Indeed, if an innovation fits into the values of the users, the more it was adopted.

Complexity arises when the innovation is considered difficult to use hence leading to lower adaptability Rogers notes that trial ability refers to the way in which an innovation can be put on a trial basis without full commitment. Lastly, the visible features of an innovation are what are
referred to as observability (Rogers, 2003). Rogers advanced the view that with these features are essential for any user when considering new technologies.

In the social system, Rogers (2003) categorized individuals into early adopters, innovators, earlier majority, late majority as well as stragglers. Innovators are usually few in a social system and they are initial group of people to take up new technologies. Such individuals can understand the innovators and how they can be used. The following group is the early adopters who are well informed about the new technologies and want to try them out. Moreover, there are the early majority and late majority who learn about the new technology once it has been tried by the early majority. The laggards, on the other hand, are often sceptical and tend to resist the new technologies. The last component of the theory is the social system which Rogers defines as interrelated units that want to solve a shared objective. The social system organisation affects the way in which individuals adopt new technologies (Aiztrauta, Ginters, & Eroles, 2015). This theory provides a basis for comprehending the integration of new technologies in various sectors such as education.

2.2.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) is attributed to the work of Davis in 1986. TAM has remained an important theoretical lens for explaining and predicting user’s information technology behaviour (Legrise et al., 2003).

TAM is an addition of the reasoned action theory (Ajzen & Fishbe, 1980). Davis (1989) explains what causes rejection and acceptance of information technology by adapting TRA. TAM is a framework that emphasises on the external variables that influence people’s beliefs, attitudes, and intention to use. In Technology Acceptance Model, there are two major cognitive factors that
can influence people’s intention to use: apparent ease of use and apparent usefulness. Similarly, TAM suggests that peripheral aspects influence purpose and real use over arbitrated effects on apparent ease of use and apparent usefulness (Davis, 1989).

A growing body of studies has provided evidence that justifies TAM as a veritable context for understanding the uptake of ICT in various organisations. Lee, Cheung, and Chen, (2005) studied university students’ integration behaviour towards an Internet-based learning medium (ILM) introducing and assimilating TAM with motivational theory. The findings of the study showed that apparent usefulness and apparent ease of use linked to user’s purpose to use and perceived enjoyment as an intrinsic motivator. Pituch and Lee (2006) conducted a study that justified support for theoretical model of TAM. In the study, system characteristics were regarded as significant determinant of apparent usefulness, apparent ease of use, and the use of e-learning system. In the same vein, self-efficacy has been identified as an antecedent of cognitive factors such as apparent usefulness and ease of use that influence the user’s beliefs, attitude, and intent to use a system (Grandon, Alshare, & Kwan, 2005; Venkatesh & Davis, 1996; Mungania & Reio, 2005).

2.2.4 Unified Theory of Acceptance and Use of Technology (UTAUT)

Integration and technology use has been explained in information system literature using some theories by several researchers. But, in the recent time, a unified theory that combines the elements of theories for explaining and understanding the integration and the use of technology has been proposed. This all-inclusive theory is referred to as Unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT has in foundation and integration of eight key models for clarifying and understanding integration, reception, and the technology use. The various models from which UTUAT derived from include:
Social Cognitive Theory (SCT), Innovation Diffusion Theory (IDT), Model of PC Utilization (MPCU), the Combined TAM and TPB (C-TAM-TBP), Motivational Model (MM), Theory of Planned Behaviours (TPB), Technology Acceptance Model (TAM), and Theory of Reason Action (TRA).

UTAUT, as a theory for understanding reception and technology use, targets at explaining behavior of users, intention to utilize an information system and their ultimate usage behaviour. The theory stresses the four important variables: facilitating condition, social influence, effort expectancy and performance expectancy were the straight determinants of behavior intention and usage behaviour (Venkatesh, *et al.*, 2016; Cheng, *et al.*, 2011; Venkatesh, *et al.*, 2003). Performance expectancy variable of UTAUT, is explained as extent people believe that making use of information would help in attaining the benefits in job performance.

Effort expectancy is also a construct of UTAUT that explains the extent of simplicity linked with the use of information system (Venkatesh, *et al.*, 2016). Literature has provided evidence that effort and performance expectancy are important in shaping and predicting individual’s behaviour to use new technology (Zhou, *et al.*, 2003; Venkatesh, *et al.*, 2003; Koivumaki, *et al.*, 2008). The third construct of UTAUT is termed ‘Social Influence’. According to Venkatesh, *et al.*, (2003), social influence means the degree to which an individual believes or perceives that he or she should use a new information system based on the beliefs or instructions of individuals considered as important. Social influence, as a construct of UTAUT, has been researched and found as a significant construct for predicting and shaping people’s intention to use technology (Cheng, *et al.*, 2003). The facilitating condition as a construct for explaining UTAUT, according to Venkatesh, *et al.*, (2003) is considered as non-significant in predicting behavioural intention.
when performance and effort expectancy are present. But the construct remains a good prediction of behavioural intentions as to the acceptance and the use of technology.

The UTAUT is a theory that incorporates the elements of several theories for explaining the acceptance and the use of information system, and performance. Therefore, UTAUT will serve as a veritable theory for grounding the general objective of this study. Also, to be guided, tailored, and operationalized based on the context of UTAUT are the specific objectives and the hypotheses of this study.

2.3 Empirical Review

This section highlights on both independent variable and dependent variable that includes ICT infrastructure, ICT proficiency, management support, ICT usage and ICT policy. A growing number of studies have pointed out various factors that can aid the integration and usage of ICT. Nchunge, et al. (2011) pointed out that the availability of ICT infrastructure, ICT literacy, management support, and ICT policies are all important aspects that aid the uptake and usage of ICT across Kenyan institutions. Tertiary institutions have increasingly embraced ICT in learning notably due to availability of relatively adequate ICT infrastructure in their respective schools.

2.3.1 ICT Infrastructure

The effectiveness of ICT is a function of good infrastructure, and in today’s competitive and dynamic environments, it is almost difficult for firms to operate smoothly without a reliable ICT infrastructure system in place because ICT is an important support in providing a low-cost channel for searching, acquisition and exchanging information.
The quest to encourage integration and use of ICT in schools in Kenya was emphasised on National ICT Policy on Education by Government of Kenya in 2006. One of the key issues emphasised in this policy is promotion of affordable infrastructures in schools to facilitate acquisition of skills and knowledge. The implementation of this policy has given birth to achievements which include connecting over 3000 rural schools with electricity, equipping 800 public schools with computers, and amongst others.

Empirical studies on integration and usage of ICT especially in Kenya have shown that availability of infrastructures remains a factor that influences integration of ICT and such is not an impediment as far as Kenya is concerned (Manduku, Kosgey, & Sang, 2012). In the similar vein, Laaria (2013) posited that though the National ICT Policy on Education in 2006 has not been effectively implemented as it was expected, the availability of infrastructure such as electricity is not a barrier to ICT integration in Kenya.

These studies have pointed out that ICT infrastructures are in place across schools in Kenya and the rate of integration is still low, however, efforts are not dissipated to find out if the availability of infrastructures has any effect on performance of schools where ICT has been adopted. A considerable number of studies on integration of ICT in Kenya focus attention on barriers and challenges facing ICT integration and usage in educational sectors in Kenya.

Kipsoi, Changach, and Sang, (2012) investigated the challenges facing integration of Information Communication Technology (ICT) in Educational Management in schools in Kenya. The study was exploratory in nature and it identified that for ICT to contribute to various segments and sectors in education management, ICT must be dynamic, cost-effective, adaptable, and differentiated. This study is an exploratory study which lacks empirical justification. Therefore, there
is need for empirical investigation on the effect of ICT integration on the performance of tertiary institutions in Kenya.

In the similar vein, Laaria (2013) investigated the challenges in the implementation of ICT in public schools in Kenya. The study adopted a descriptive survey design and 220 respondents attended to questionnaires sent to 108 sampled schools in Meru County in Kenya. The data collected were analysed via descriptive and inferential statistics. The findings from the analyses showed that cost of infrastructures, leadership skill, and teachers skills were impediment to ICT integration. But the study also found out infrastructure such as electricity is not an impediment to ICT integration. This study was able to carry out empirical investigation on challenges of ICT in school in Kenya, however there is need to find out if the availability of ICT infrastructure has any impact on performance of schools in Kenya. Therefore, this study sought to carry out empirical investigation in this respect.

2.3.2 ICT Proficiency

The uptake and usage of ICT in schools needs trained staff and visionary school leadership (Higgins & Moseley, 2011). It is important for teachers, school leaders and facilitators to be acquainted on the prospective of ICT for facilitating learning and teaching in the school. It would have been difficult to attain the desired outcomes with the policies formulated by government and various investments in ICT in schools if the knowledge in ICT is lacking.

A key bane of many developing nations regarding ICT integration and usage in schools is lack of qualified and skilled IT professionals. To effectively harness the benefits of ICT for schools, there is need for sustained investments in ICT programmes that aim at enhancing teachers training to create new learning environment. The importance of teachers in the implementation and use of ICT is very important because they are at the centre of curriculum implementation and innovation at school level. There is need to invest in ICT training for teachers and other facilitators to enhance the degree of competency, and positive attitudinal behaviour.
Computer competence refers to the capacity of system to handle series of computer applications for various purposes. Bordbar (2010) emphasises that the major factor for integrating ICT in teaching rests on teacher’s computer competence. Lack of knowledge and skills necessary to induce informed decision has occasioned the reason for negative or neutral attitude towards the integration of ICT into teaching and learning processes among teachers.

Mingaine (2013) investigated the skill challenges in integration and use of ICT in public school in Kenya. The study analysed collected from 105 respondents using descriptive and inferential statistics. The findings from the results of the analysis showed that there was a limited supply of teachers in Kenya in respect to integration and use of ICT. The study was able to identify teacher’s skill as significant to ICT integration, however, the significant of such skill to performance outcomes needs to be unravelled. This study, therefore, investigated the relationship between integration of ICT and performance of tertiary institutions in Kenya.

A study by Kandiri, (2012) on ICT access and usage in Kenyan schools reported that the number of the absorbed IT teachers in Kenyan schools was relatively small compared to the number of IT graduates from universities and other tertiary institutions across Kenya. While this study showed evidence of integration of ICT via IT teachers in schools across Kenya, there is, therefore, a need to find out a relationship exists between integration of ICT and performance outcomes among schools in Kenya. This study, therefore, investigated the effect of integration of ICT on performance of tertiary institutions in Kenya.

2.3.3 Management Support for ICT

Support for ICT is the magnitude to which the administration of an organization is perceived to be devoted to effective usage and enactment of a system (Gonoet al. 2013). The disposition of the management of an organization towards ICT as a strategic issue is recognised to be important
in determining the uptake and use of schools ICT programs (Duan et al. 2012; Jeyaraj et al. 2006). As identified by Elbeltagiet al. (2013), ICT uptake and enactment are based on manager’s knowledge of ICT innovativeness, experience and active participation are key. Consequently, the management owns a practical working information on the new technology and organization must guarantee that employees are trained well, funds are provided for acquisition of the necessary infrastructure, and other resources are efficiently allocated to facilitate the integration and usage of ICT.

The level of IT understanding of the top manager, and positive attitude towards IT, intensifies the level of IT investment (Harrigan et al. 2010). Therefore, managers execute an outstanding part in making decision in the schools. The support of management or officers in the helms of affair of organisations has also been averred as factor that can influence acceptance and integration of ICT.

Macharia and Nyakwende (2010) investigated the Vice Chancellors influence on academic staff intention to use Learning Management System (LMS) for teaching and learning in Kenya. The study was a survey study and questionnaires were distributed to 82 lecturers selected from from sampled public and private universities in Kenya. The findings from the results of the analysis showed that top management support and characteristics determined technology acceptance and learning management systems. This study emphasised on the importance of management support in determining the acceptance of ICT, however, the effect which such management has on performance outcomes is unknown. This present study, therefore, investigated the relationship between integration of ICT and performance of tertiary institution of learning in Kenya.
2.3.4 ICT Usage

The usage of a system in organisations has been emphasised to be enhanced not only by the investment in acquisition of ICT, but also its perceived utility and easy usage (Gupta, Dasgupta, & Gupta, 2008). A system that users found difficult to use will lead to the beliefs that such a system will not result to any usefulness. Therefore, the beliefs of users in respect to the usefulness and ease of use of a system will determine the acceptance and integration of a system, vis-à-vis ICTs. Perceived usefulness is the to the degree by which users trust the use of a particular system could improve their job performance, while the perceived ease of use refers to degree to which users of a system trust that a system was free of efforts.

Evidence from empirical studies has shown that perceived usefulness and ease of usage influence and enhance system integration. In their study of relative importance of perceived ease of ICT integration, the study concluded that perceived ease of use was a determinant of e-commerce integration by users. In the similar vein, Venter, Rensburge, & Davis, (2012) pointed out that the ease of use and perception of usefulness played a significant role in determining user’s integration of ICTs. The recent studies on integration of a system show that perceived usefulness and ease of use are key determinant of integration of ICT in both developed and developing countries of the world.

Alam and Noor (2009) investigated the factors that influence the integration and usage of ICT by firms in Malaysia. The relationship between factors such as perceived cost, perceived benefits, ICT knowledge, and external pressure and government support were all examined and the findings from the data analysed showed that these factors except perceived cost and external pressure significantly influenced integration and usage of ICT. The study is significant because it identified factors that can enhance the integration and usage of ICT, however, this present study
deviated from the findings by investigating the relationship between integration of ICT and possible performance outcomes in an institution.

2.3.5 ICT Policy

ICT policy refers to set predetermined actions that are meant to encourage the use of ICT in every socio-economic endeavour. The need to bring digital technology to individual and communities so that they can have access to information has been the major reason why most of the countries in the world have committed to putting up ICT policy. Several world’s nations have instituted information and communication technology policies to work as outline for integrating all aspects of the society. In the quest to integrate all the facets of the society through ICT policy, African countries as a continent are not exemptions.

In Kenya, the National Information and Communication Technology Policy (2016) was drafted with the aim of enhancing the likelihood of Kenyans by making sure that efficient, reliable, and affordable ICT services are available for people to access (ICT Authority, 2017). The National Policy on ICT in Kenya is sectionalized. ICT section on education outlines the aims and strategies relating to Education and ICT. ICT on education in Kenya consists of several components which include research and development, professional development, training, capacity building, digital contents, technical support and maintenance, access and equity, connectivity and network infrastructures (ICT Authority, 2017).

The government of the Republic of Kenya has also demonstrated its readiness to ensure the investment in the components of the key sections in ICT on education to bring education to the door step of people by having access to information. Government has also emphasizes on ICT policy that will influence ICT integration such as procurement regulations, learning contents, fiscal resources, human resource capacity, gender equity and access, infrastructure and access.
The national policy on ICT in Kenya has served as a guideline and procedure for many stakeholders in education sector in respect to the integration and usage of ICT. The maintenance of software and hardware assets is part of complete administration policies to bring best practice to the organization, provide asset stewardship, optimize costs and minimize disruptions. Effective support and maintenance of assets gives increased user satisfaction, longer life and higher employee productivity.

However, lack of government support has been attributed to the bane of ICT growth especially in the continent of Africa. In Kenya, failure of government to show seriousness in support of ICT on education is reflected in the less priority in term of the attention accorded to education sector. But it is hoped that the emphasis accorded the current 2016 reviewed version of National Information and Communication Technology Policy (ICT) will increase the level of integration and use of ICT across the country. In view of the policy on ICT in Kenya, this study, therefore, will examine the ICT policies, such as infrastructures accessibility, gender equity and access, and human resource capacity, employed by schools in Kenya to enhance the integration and use of ICT and performance outcomes in tertiary institutions in Kenya.
2.4. Summary and Research Gaps

Drawing from the literature reviewed in this study, it is apparently clear that studies on integration and usage of ICT had been conducted across many sectors in Kenya. However, most of these studies lacked empirical investigation to unravel the relationship between integration of ICT on performance outcomes. The findings of these studies, their gaps, and the focus of this current study were summarised in the below table (Table 2.1).

Table 2.1 Summary of Literature and Research Gaps

<table>
<thead>
<tr>
<th>Authors</th>
<th>Area</th>
<th>Focus</th>
<th>Findings</th>
<th>Gaps</th>
<th>Focus of the current study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mingaine (2013)</td>
<td>ICT integration and usage</td>
<td>Investigated the skill challenges in</td>
<td>Findings showed limited</td>
<td>Relationship between teacher’s</td>
<td>Focussed on establishing the</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Field</td>
<td>Focus</td>
<td>Findings</td>
<td>Conclusion</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Macharia&amp;Nyakwende (2010)</td>
<td>ICT, Learning and Manageme nt Systems</td>
<td>Investigated the Vice Chancellors influence on Academic Staff intention to use Learning Management System (LMS).</td>
<td>Top management supports and characteristics determined technology acceptance and learning management systems.</td>
<td>Focussed on establishing the relationship between management support and performance outcomes.</td>
<td></td>
</tr>
<tr>
<td>Alam&amp; Noor (2009)</td>
<td>Integration and usage of ICT</td>
<td>Investigated the factors that influenced the integration and usage of ICT by firms in Malaysia.</td>
<td>Perceived benefit, ICT knowledge, and government supports determined usage of ICT.</td>
<td>Focussed on establishing the relationship between ICT usage and performance outcomes.</td>
<td></td>
</tr>
</tbody>
</table>
2.5 Conceptual Framework

The conceptual framework presents the diagrammatical relationship between the independent and the dependent construct. The independent variables are ICT infrastructure, ICT proficiency, managerial support for ICT the degree of ICT usage and ICT policy while the dependent variable is performance of tertiary institutions.
### Independent Variables

**Integration of ICT**
- **ICT infrastructure**
  - Hardware
  - Software
  - Networks

**ICT Proficiency**
- Training Level
- Development
- Attitudes

**Management Support**
- Staff training
- Appraisal
- Resource allocation

**ICT Usage**
- Perceived ease of use
- Perceived usefulness
- Self-efficacy

**ICT Policy**
- Government Rules
- Regulations control
- Implementation

### Dependent Variable

**Performance of tertiary institutions**
- Admission Capacity
- Student’s Satisfaction

---

**Figure 2.1 Conceptual framework**

**Source:** Researcher (2018)
CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology which was used in the study. This section encompasses the different approaches which the researcher used to address the methodological issues of the study. The chapter covers issues ranging from research design, target population, sampling procedures, sample size, data collection instruments, data collection procedures, validity and reliability of the study, data analysis techniques, and ethical considerations for the study.

3.2 Research design

According to a research design is a design that gives structure of the research and the direction which the researcher intends to achieve the purpose of the research (William, 2006). A research design also gives a clear arrangement of conditions of how the data are to be collected and analysed in a manner that aims to combine relevance to the research purpose with economical procedure (Kothari, 2004). The study employed a descriptive cross-sectional survey design to investigate the adaptation of ICT on performance among tertiary institutions in Nairobi City County. The method is considered appropriate since it will allow for collection of qualitative data such as those aimed at measuring attitudes and opinions (Mugenda & Mugenda, 2003) which this study is aimed at. Descriptive studies determine and report things the way they are as reported by (Mugenda & Mugenda, 2003). The study collected mass data considering the geographical spread of respondents. In their book Tabachnick & Fidell (2007) mentioned that descriptive statistics describe samples of subjects in terms of variables or combinations of variables. This study is cross-sectional because the researcher intends to carry out the study once
at a particular time in a choice of organisation as case study, and collection of data is done once and not to be repeated in another time in the chosen organisation.

3.3 Target Population

According to Mugenda (2003), population comprises the total sum of the elements for a study. It consists of an entire group of people, events, and objects having a common observable features. Target population is the elements of a real or hypothetical population the researcher wishes to generalize the results of the research (Mugenda&Mugenda, 2003). The population in this study was tertiary institutions in Nairobi City County. The tertiary institutions were preferred because of evidenced increase in ICT integration among tertiary institutions in Nairobi City County. The actual respondents comprise of ICT specialists from the tertiary institutions. The current number of tertiary institutions in Nairobi City County stands at 149.

3.4 Sampling design

A sample represents the units of population that is used to determine truths about that population (Field, 2005). A simple random sampling method is adopted for this study. This system of sampling will allow every unit of the sampling frame to have an equal chance while enabling the study to capture key population characteristic in the sample. Employing this technique will enable the researcher to derive a more representative and accurate sample of the various sub-populations (Cooper & Schindler 2000).
3.5 Sample size determination

A sample is a true representative of the population (Field, 2005). Therefore, the sample of this study was worked out using the Yamane formula (1967) as indicated below:

\[
n = \frac{N}{1 + N \, (e)^2}
\]

Where \( n \) represents the sample size, \( N \) represents the target population, \( e \) the error term and 0.05 is taking as the level of significance at 90% confidence level.

Hence, the sample was as follows:

\[
\frac{149}{1 + 149(0.1)^2} = 60
\]

From the above statistical computation, the sample size for the study was 60 sample size. As the total of respondents which will comprise ICT specialists from the selected tertiary institutions.

3.6 Data collection instrument

Data was collected by use of the self-administrated questionnaires method, to capture the depth of ICT integration and performance of tertiary institutions in Nairobi City County. The study was conducted using primary data which was collected using questionnaires. Mugenda & Mugenda, (2003), states that questionnaires are fast, cheap and can be self-administered. In addition, this study prefers questionnaires in collecting data since it can enable the researcher to obtain adequate and detailed information on the influence of ICT integration and performance in Nairobi City County. The questionnaires contain closed ended questions to enable respondents give their views and provide adequate information necessary for the success of the study. The
questionnaire design used Likert scale to gauge the responses on a scale of one to five. A 5-point Likert scale where 1 represents the least important response and 5 represents the most important response was employed for closed ended questions, and to help lessen on errors, delays and bias.

A pilot test was undertaken to ensure that the instruments are fool proof. It is hereby judged that the pilot test was important as it would help in establishing degree of clarity of the proposed research instruments and help identify problem areas in research design. It is worth mentioning that the pilot study was done by emailing the proposed research instruments to 20 respondents, who was excluded in the final research.

3.6.1 Validity of Instrument

Validity refers to the extent in which an instrument measures the concepts it supposes to measure (Gregory, 1992). Validity covers three main areas in research which include, content validity, construct validity, and criterion validity. The instrument of this study was submitted to the researcher’s supervisor to have them validated. The instrument was validated subject to contents, constructs and criterion validation.

3.6.2 Reliability of Instrument

Reliability of the instruments was assessed using Cronbach’s Coefficentalpha. Reliability test, using Cronbach’s alpha, was performed to measure the reliability of the research instrument of this study. The threshold reliability testing in this study was Cronbach alpha coefficient of 0.60 being taken as acceptable (Cooper & Schidler, 2003).
3.7 Data collection Procedure

The researcher obtained permission to undertake the study in all the targeted schools through an introductory letter from Kenyatta University. The questionnaires were then distributed to the respondents in various sampled schools and it was collected after three working days. The researcher backed by the services of research assistants to administer the questionnaires to facilitate the speedy collection of data in a more convenient manner.

3.8 Data Analysis and Presentation

According to Achola (2007), data analysis allows answers to be provided to research questions by a way of ordering, categorizing, manipulating and summarizing of data. Quantitative method of data analysis was emphasized using both inferential and descriptive statistics. Descriptive statistics can be used to process and transform a mass of raw data into various outcomes in forms of tables and charts, frequency distribution, percentages and amongst others (Saunders et al., 2003). This study used SPSS version 20 for the data analysis. Data collected was studied, compiled, and systematically analysed to establish the significant level to which various ICT integration influences institutions performance. Measures of central tendency like mean was calculated and ultimately interpreted. Presentation of data was employed by tables, graphs and charts.

The significance of the various study variables of ICT integration was tested using inferential statistics in the case of regression analysis. The following empirical model applied:

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \epsilon \] 

Where:

\(Y\) = performance of tertiary institutions

\(\beta_0\) = Constant value
\[ \beta_{1-4} = \text{Regression coefficients} \]

\[ X_1 = \text{ICT Infrastructure} \]

\[ X_2 = \text{ICT proficiency} \]

\[ X_3 = \text{Management support} \]

\[ X_4 = \text{ICT usage} \]

\[ X_5 = \text{ICT policy} \]

\[ \varepsilon = \text{Error term} \]

Based on computed composite index the relationship between tertiary institutions and ICT integration was calculated based on the regression model as given below

\[ Y = \lambda_0 + \lambda_1 T + \varepsilon \]

\[ \lambda_0 = \text{Constant or Intercept term} \]

\[ \lambda_1 = \text{Regression coefficients} \]

\[ T = \text{ICT integration} \]

\[ Y = \text{Performance of tertiary institutions} \]

### 3.9 Ethical Considerations

Ethical considerations were adhered to during the research work. The researcher acquired official permit to conduct the research in any organisation of choice. In addition to this, a formal permission was sought from all the respondents before administering the items of this study. The research result was reported with objectivity and integrity. Limit of reliability and applicability was made clear and as a matter of principle, full confidentiality of all information and the anonymity of participants was maintained.
CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter demonstrates the analysis, presentation, discussion and interpretation of the data collected from the administered questionnaires. The collected data was edited and cleaned for completeness in preparation for coding. Once coded, the data was entered into the Statistical Package for Social Sciences (SPSS) for analysis. Descriptive statistics such as mean and standard deviation were used to analyze the data. Regression analysis was used to test the relationship between the variables under study in relation to the objectives of the study.

4.2. Response Rate

This particular study targeted 60 respondents based on their functional categories/departments from which 43 filled in and returned the questionnaires making a response rate of 72%. According to Mugenda & Mugenda (2003) a response rate of 50% is adequate enough for analysis and reporting while a response rate of more than 60%-69% is considered to be good and that of above 70% is excellent. This was achieved through rigorous explanation to the respondents on how to fill the questionnaires.

Table 4. 1 Response Rate

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>43</td>
<td>72%</td>
</tr>
<tr>
<td>Nonresponse</td>
<td>17</td>
<td>28%</td>
</tr>
<tr>
<td>Sample size</td>
<td>60</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source (researcher, 2018)
4.3 Bio Data of The Respondents

The researcher obtained the bio data on the variables below:

4.3.1 Cross tabulation between gender and age of the respondents

Table 4. 2 Cross tabulation between gender and age of the respondents

<table>
<thead>
<tr>
<th>Gender</th>
<th>21-30 years</th>
<th>31-40 years</th>
<th>41-50 years</th>
<th>51-60 years</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>14%</td>
<td>30%</td>
<td>9%</td>
<td>5%</td>
<td>58%</td>
</tr>
<tr>
<td>Female</td>
<td>9%</td>
<td>14%</td>
<td>14%</td>
<td>5%</td>
<td>42%</td>
</tr>
<tr>
<td>Total</td>
<td>23%</td>
<td>44%</td>
<td>23%</td>
<td>9%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source (researcher, 2018)

The table above Cross tabulation between gender and age of the respondents shows gender of the respondents. Results indicate that 30% of the respondents are male and are between 31-40 years while majority of female were 14% ranging between 31-40 years. Kiruja & Mukuru (2018) reported that respondents, 55% were male and 45% were female in a study in tertiary institutions in Kenya.

4.3.2 Cross tabulation between Position in institution and Years of service

The study sought to find out the education level of the respondents and position in institution. From the table below, majority (23%) of the respondents were academic staff and had worked in the institution for between 0-5 years. 47% were non-academic staff. Contrary to Kipkebut (2010) in a study on Kenyan tertiary institutions, majority of the respondents in this were academic staff.
4.3.3 Cross tabulation between position and Level of Education

The study scrutinised the employment category of the respondents, from the table below majority 21% of respondents were academic staff with masters degrees. The number of academic and non-academic staff with bachelor’s degrees were comparable (19%). Thus, majority of the academic staff respondents had obtained master’s degrees. This is not an uncommon result as far as Kenyan tertiary institutions are concerned. Most employees in tertiary Institutions in Kenya nowadays hold diplomas and degrees in various disciplines of studies.

Table 4. 4Cross tabulation between position and Level of Education

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Diploma</th>
<th>Bachelors degree</th>
<th>Masters degree</th>
<th>PhD</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position in Institution</td>
<td>Academic staff</td>
<td>0</td>
<td>19%</td>
<td>21%</td>
<td>14.0%</td>
</tr>
<tr>
<td></td>
<td>Non-academic staff</td>
<td>16%</td>
<td>19%</td>
<td>12%</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>16%</td>
<td>37%</td>
<td>33%</td>
<td>14.0%</td>
</tr>
</tbody>
</table>

Source (researcher, 2018)
4.4 Descriptive statistics

4.4.1 Effect of ICT infrastructure

The opinion of the respondents was sought regarding effect of ICT infrastructure on the performance of tertiary institutions schools in Nairobi City County. The level of agreement was measured on a Likert Scale of 1-5 where 1= Strongly Disagree (SD), 2= Disagree (D), 3= Not sure (NS), 4= Agree (A) and 5= Strongly Agree (SA).

Table 4. Effect of ICT infrastructure on the performance of tertiary institutions

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Desktops are the widely used ICT hardware in your school</td>
<td>4.26</td>
<td>0.978</td>
</tr>
<tr>
<td>2.2 Laptops are used to make learning more interactive and motivating</td>
<td>4.02</td>
<td>0.672</td>
</tr>
<tr>
<td>2.3 Acquisition of ICT software has aided and enhanced academic activities in your school</td>
<td>4.44</td>
<td>0.700</td>
</tr>
<tr>
<td>2.4 Server-based databases now support academic and management functions in your school</td>
<td>4.28</td>
<td>0.797</td>
</tr>
<tr>
<td>2.5 ICT infrastructure (computers) enhances student teaching</td>
<td>4.6</td>
<td>0.629</td>
</tr>
<tr>
<td>2.6 Uninterrupted network encourages and motivates the users of ICT</td>
<td>4.49</td>
<td>0.768</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>4.34</strong></td>
<td><strong>0.757</strong></td>
</tr>
</tbody>
</table>

Source (researcher, 2018)

The study established that overall, the respondents agreed on the effect of ICT infrastructure on the performance of tertiary institutions schools in Nairobi City County as evidenced by ($M= 4.34, SD= 0.757$). Moreover, the respondents strongly agreed that ICT infrastructure (computers) enhances student teaching ($M= 4.6, SD= 0.629$). University support, such as adequate ICT infrastructure and ICT-aware teachers, is more important than students' ICT-related
characteristics in increasing ICT learning impacts (Chiraz, 2016). The respondents further agreed that Uninterrupted network encourages and motivates the users of ICT ($M= 4.49, SD= 0.768$), Acquisition of ICT software has aided and enhanced academic activities in your school ($M= 4.44, SD= 0.700$), This is in line with study done by Mahmood et al. (2011) who reported that Students agreed that ICT is suitable for classroom teaching at higher level and ICT enhances communication ability in students.

4.4.2 ICT proficiency

The opinion of the respondents was sought regarding the effect of ICT proficiency on performance in tertiary institutions. The level of agreement was measured on a Likert Scale of 1-5 where 1= Strongly Disagree (SD), 2= Disagree (D), 3= Not sure (NS), 4= Agree (A) and 5= Strongly Agree (SA).

Table 4. 6 Effect of ICT proficiency on performance in tertiary institutions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>ICT training enhances my technical skills and content knowledge</td>
<td>4.21</td>
<td>0.600</td>
</tr>
<tr>
<td>3.2</td>
<td>ICT helps to build confidence and promote classroom management techniques</td>
<td>4.14</td>
<td>0.710</td>
</tr>
<tr>
<td>3.3</td>
<td>Available software programmes have enhanced my knowledge in the process of discharging my duties</td>
<td>4.37</td>
<td>0.757</td>
</tr>
<tr>
<td>3.4</td>
<td>My reading and writing skills have been improved via ICT</td>
<td>3.98</td>
<td>0.938</td>
</tr>
<tr>
<td>3.5</td>
<td>I have confidence in my ability to do things right because of the skills developed via ICT</td>
<td>4.23</td>
<td>0.751</td>
</tr>
<tr>
<td>3.6</td>
<td>I have assumed positive attitude towards my work based on the knowledge I have in ICT</td>
<td>4.23</td>
<td>0.782</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td></td>
<td><strong>4.19</strong></td>
<td><strong>0.756</strong></td>
</tr>
</tbody>
</table>

Source (researcher, 2018)
The study established that overall, the respondents agreed on effect of ICT proficiency on performance in tertiary institutions as evidenced by ($M= 4.19$, $SD= 0.756$). Moreover, the respondents agreed that available software programmes have enhanced my knowledge in the process of discharging my duties ($M= 4.37$, $SD= 0.757$). Opira (2006) noted that computer user-ability skills influence learning and Students and lecturers with such skills were seen to be more comfortable in their application of the various computer programs. The respondents further agreed that I have assumed positive attitude towards my work based on the knowledge I have in ICT ($M= 4.23$, $SD= 0.751$), I have assumed positive attitude towards my work based on the knowledge I have in ICT ($M= 4.23$, $SD= 0.782$), reading and writing skills have been improved via ICT ($M= 3.98$, $SD= 0.938$). Zhu (2003) similarly noted that ICT helps teachers and learners to communicate and collaborate without boundaries, make learners autonomous and allow teachers to bring the whole world into classroom activities.

4.4.3 Management Support

The opinion of the respondents was sought regarding the role of Management Support on the integration of ICT and performance of tertiary institutions The level of agreement was measured on a Likert Scale of 1-5 where 1= Strongly Disagree (SD), 2= Disagree (D), 3= Not sure (NS), 4= Agree (A) and 5= Strongly Agree (SA).
Table 4. Management Support on performance of

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>The management of this institution shows concern for ICT development</td>
<td>4.33</td>
<td>0.680</td>
</tr>
<tr>
<td>4.2</td>
<td>This institution shows commitment to ICT acquisition and development</td>
<td>4.40</td>
<td>0.660</td>
</tr>
<tr>
<td>4.3</td>
<td>The management of this institution encourages staff to participate in ICT programmes and training</td>
<td>4.49</td>
<td>0.631</td>
</tr>
<tr>
<td>4.4</td>
<td>This organization shows commitment to ICT investment via budget allocation</td>
<td>4.40</td>
<td>0.695</td>
</tr>
<tr>
<td>4.5</td>
<td>This organization always implements policies related to ICT</td>
<td>4.26</td>
<td>0.790</td>
</tr>
<tr>
<td>4.6</td>
<td>Management organizes seminars and workshops on ICT for staff</td>
<td>3.81</td>
<td>1.006</td>
</tr>
<tr>
<td></td>
<td><strong>Average</strong></td>
<td><strong>4.28</strong></td>
<td><strong>0.744</strong></td>
</tr>
</tbody>
</table>

Source (researcher, 2018)

The study established that overall, the respondents agreed that ICT Management Support on the integration of ICT and performance of tertiary institutions schools as evidenced by \( M = 4.28, SD = 0.744 \). Moreover, the respondents agreed that the management of this institution encourages staff to participate in ICT programmes and training \( M = 4.49, SD = 0.631 \). The school management are regarded as technology managers by supervising and providing ICT resources in schools (Flanagan and Jacobsen, 2003). The respondents further agreed that This organization shows commitment to ICT investment via budget allocation \( M = 4.40, SD = 0.695 \), This institution shows commitment to ICT acquisition and development \( M = 4.40, SD = 660 \). In agreement with this, Flanagan and Jacobsen (2003) are of the opinion that to improve education, principals must adapt their management and leadership styles to motivate teachers to use ICT in their professional curriculum practices. Similarly, Elbeltagiet al. (2013) reported that ICT
integration and implementation are based on management’s innovativeness, active participation, experience and knowledge of ICT plays a significant role

4.4.4 ICT Usage

The opinion of the respondents was sought regarding the role of ICT usage on the integration of ICT and performance of tertiary institutions. The level of agreement was measured on a Likert Scale of 1-5 where 1= Strongly Disagree (SD), 2= Disagree (D), 3= Not sure (NS), 4= Agree (A) and 5= Strongly Agree (SA).

Table 4. 8 ICT usage on performance of Tertiary Institutions

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Using ICT related infrastructure is simple and easy to use</td>
<td>4.02</td>
<td>0.597</td>
</tr>
<tr>
<td>5.2</td>
<td>Using ICT infrastructure simplifies my work</td>
<td>4.33</td>
<td>0.606</td>
</tr>
<tr>
<td>5.3</td>
<td>I can perform my tasks easily with the use of ICT</td>
<td>4.35</td>
<td>0.650</td>
</tr>
<tr>
<td>5.4</td>
<td>Using ICT will enhance my outputs</td>
<td>4.16</td>
<td>1.022</td>
</tr>
<tr>
<td>5.5</td>
<td>Using ICT will enhance my capacity and competence</td>
<td>4.05</td>
<td>0.899</td>
</tr>
<tr>
<td>5.6</td>
<td>I believe I can handle ICT related infrastructure effectively and efficiently</td>
<td>4.14</td>
<td>1.060</td>
</tr>
<tr>
<td></td>
<td><strong>Average</strong></td>
<td><strong>4.18</strong></td>
<td><strong>0.806</strong></td>
</tr>
</tbody>
</table>

**Source (researcher, 2018)**

The study established that overall, the respondents agreed on ICT usage on the integration of ICT and performance of tertiary institutions as evidenced by (\(M= 4.18, SD= 0.806\)). Moreover, the respondents agreed that I can perform my tasks easily with the use of ICT (\(M= 4.35, SD= 0.65\)). The respondents further agreed that Using ICT infrastructure simplifies my work (\(M= 4.33, SD= 0.606\)), Using ICT will enhance my outputs (\(M= 4.33, SD= 0.606\)) and Using ICT related infrastructure is simple and easy to use (\(M= 4.02, SD= 0.597\)). In addition, in several other studies
(Yusuf, &Afolabi, 2010; Shaikh, 2009; Jayson, 2008) argued that ICT helps to improve the quality of learning and educational outcomes.

4.4.5 ICT Policy

The opinion of the respondents was sought regarding the effect of ICT policy on the integration of ICT and performance of tertiary institutions. The level of agreement was measured on a Likert Scale of 1-5 where 1= Strongly Disagree (SD), 2= Disagree (D), 3= Not sure (NS), 4= Agree (A) and 5= Strongly Agree (SA).

Table 4. 9ICT policy on performance of Tertiary Institutions

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>The National ICT policy on education favours ICT in your school</td>
<td>2.72</td>
<td>1.351</td>
</tr>
<tr>
<td>6.2</td>
<td>The national ICT policy on education promotes gender balance equity in your school</td>
<td>2.86</td>
<td>1.037</td>
</tr>
<tr>
<td>6.3</td>
<td>ICT policy in Kenya provides free and equitable access to ICT infrastructures</td>
<td>2.5</td>
<td>1.181</td>
</tr>
<tr>
<td>6.4</td>
<td>ICT policy in Kenya encourages human resource capacity development</td>
<td>2.81</td>
<td>1.097</td>
</tr>
<tr>
<td>6.5</td>
<td>ICT policy in Kenya provides technical supports and unhindered access to connectivity in terms of internet networks</td>
<td>2.79</td>
<td>1.081</td>
</tr>
<tr>
<td>6.6</td>
<td>Your school policy on ICT integrates the members of your staff</td>
<td>3.40</td>
<td>1.158</td>
</tr>
</tbody>
</table>

Average: 2.86, 1.151

Source (researcher, 2018)
The study established that overall, the respondents were not sure on the effect of ICT policy on the integration of ICT and performance of tertiary institutions schools as evidenced by ($M= 2.86$, $SD= 1.151$). Moreover, the respondents not sure that school policy on ICT integrates the members of your staff ($M= 3.4$, $SD= 1.158$), The national ICT policy on education promotes gender balance equity in your school ($M= 2.86$, $SD= 1.097$), ICT policy in Kenya encourages human resource capacity development ($M= 2.81$, $SD= 1.037$). Similarly, Hawkins notes that while in many ministries of education around the world have made the commitment to computerize schools, few have developed coherent strategies to fully integrate the use of computers as a pedagogical tool in the classroom (Hawkins, 2004). ICT policy in Kenya provides technical supports and unhindered access to connectivity in terms of internet networks ($M= 2.79$, $SD= 1.081$), The National ICT policy on education favours ICT in your school ($M= 2.72$, $SD= 1.351$). However, the respondents disagreed that ICT policy in Kenya provides free and equitable access to ICT infrastructures ($M= 2.5$, $SD= 1.181$). Aristovnik (2012) argued that the government and representatives should not be interested in simply integrating technology into educational institutions, but also in making sure that it is used effectively by teachers and students in order to improve instructive outputs and conclusions.

4.4.6 Performance of tertiary institutions

The opinion of the respondents was sought regarding the effect of admission capacity, improved grades, and satisfaction as indicators of performance of tertiary institutions. The level of agreement was measured on a Likert Scale of 1-5 where 1= Strongly Disagree (SD), 2= Disagree (D), 3= Not sure (NS), 4= Agree (A) and 5= Strongly Agree (SA).
Table 4. Performance of Tertiary Institutions

<table>
<thead>
<tr>
<th></th>
<th>Admission capacity</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1</td>
<td>Admission of students have been improved over the last two years in this school</td>
<td>4.23</td>
<td>1.020</td>
</tr>
<tr>
<td>7.2</td>
<td>Students opt for admission in this school because of the availability of ICT infrastructure</td>
<td>4.00</td>
<td>1.024</td>
</tr>
<tr>
<td>7.3</td>
<td>ICT has facilitated enrollment of students in the institution</td>
<td>4.16</td>
<td>0.898</td>
</tr>
<tr>
<td>7.4</td>
<td>Registration and documentation are made easy via ICT in this institution</td>
<td>4.35</td>
<td>0.613</td>
</tr>
<tr>
<td></td>
<td>Students performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.5</td>
<td>Performance of students (i.e. grades) is enhanced ICT implementation in this institution</td>
<td>4.26</td>
<td>0.848</td>
</tr>
<tr>
<td>7.6</td>
<td>Efficient operations have been enhanced via ICT in this institution</td>
<td>4.28</td>
<td>0.701</td>
</tr>
<tr>
<td>7.7</td>
<td>E-learning and teaching activities have enhanced performance of students in this institution</td>
<td>4.00</td>
<td>1.047</td>
</tr>
<tr>
<td>7.8</td>
<td>Availability of ICT infrastructure has enhanced the capacities of both the staff and students of this institution</td>
<td>4.30</td>
<td>0.674</td>
</tr>
<tr>
<td></td>
<td>Students’ satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.9</td>
<td>Students respond very well towards service (teaching and learning) via ICT in this institution</td>
<td>4.23</td>
<td>0.611</td>
</tr>
<tr>
<td>7.10</td>
<td>Participation in class activities by students is robust using ICT in facilitating knowledge</td>
<td>4.26</td>
<td>0.727</td>
</tr>
<tr>
<td>7.11</td>
<td>Students find it easy and responsive when interacting via ICT in this institution</td>
<td>4.37</td>
<td>0.655</td>
</tr>
<tr>
<td>7.12</td>
<td>The level of confidence displayed by students shows the extent of acceptance and satisfaction using ICT in this institution</td>
<td>4.09</td>
<td>0.648</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>4.21</td>
<td>0.789</td>
</tr>
</tbody>
</table>

Source (researcher, 2018)

The study established that overall, the respondents agreed on the effect of admission capacity, students performance and satisfaction as indicators of performance of tertiary institutions as evidenced by \( M= 4.21, SD= 0.789 \). Moreover, the respondents agreed that Admission of students has been improved over the last two years in this school, \( M=4.23, SD=1.020 \), Students
opt for admission in this school because of the availability of ICT infrastructure ($M= 4.00, SD=1.024$). ICT has facilitated enrolment of students in the institution ($M=4.16, SD=.898$). Registration and documentation are made easy via ICT in this institution ($M=4.35, SD=.613$). Sife & Sanga (2007) reported greater information access; greater communication via electronic facilities; synchronous learning; increased cooperation and collaboration, cost-effectiveness (e.g. by reaching different students and in greater numbers)

On grade enhancement, the respondents also agreed that performance of students (i.e. grades) is enhanced ICT implementation in this institution ($M= 4.26, SD=.848$). Efficient operations have been enhanced via ICT in this institution ($M= 4.28, SD=.701$). E-learning and teaching activities have enhanced performance of students in this institution ($M= 4.00, SD=1.047$), availability of ICT infrastructure has enhanced the capacities of both the staff and students of this institution ($M= 4.30, SD=.674$). Taruset al. (2015) noted that new technologies including information communication technology (ICT) and e-learning have become the driving forces in most institutions including universities today.

On students’ satisfaction students respond very well towards service (teaching and learning) via ICT in this institution ($M= 4.23, SD=.611$), participation in class activities by students is robust using ICT in facilitating knowledge ($M= 4.26, SD=.727$), students find it easy and responsive when interacting via ICT in this institution ($M=4.37, SD=.655$) and the level of confidence displayed by students shows the extent of acceptance and satisfaction using ICT in this institution ($M= 4.09, SD=.648$). According to Takalani (2008), ICT adds the benefit of encouraging learners to take responsibility for their learning and build self-knowledge and self-confidence.
4.5 Inferential Statistics Analysis

The researcher conducted a regression analysis to explain relationship between information communication technology (ICT) and integration on performance of Tertiary institutions in Nairobi City County. Regression analysis was conducted using Statistical Package for Social Sciences (SPSS). The results obtained are presented and discussed below;

4.5.1 Model Summary

The research findings indicated that there was an overall positive relationship between rewards and tertiary institution performance. The findings are as shown in the tables 4.8.1 below;

**Table 4. 11 Model Summary/ Coefficients of Determination**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.403*</td>
<td>.53</td>
<td>.45</td>
<td>.43988</td>
</tr>
</tbody>
</table>

* a. Predictors: (Constant), ICT Infrastructure, ICT proficiency, ICT usage, management support and ICT policy

**Source: Research Data (2018).**

In a model summary, the “R” value is used to indicate the strength and direction of the relationship between the variables. The closer the value gets to 1, the stronger the relationship. In this case the R= 0.403. This means there was an overall positive relationship between the variables though weak. The R-Square in the study was found to be 0.45. This value indicates that the effect of information communication technology (ICT) integration systems can explain 45% of the variance in performance of tertiary institutions. It therefore suffices to conclude that ICT Infrastructure, ICT proficiency, ICT usage management support and and ICT policyiare essential in enhancing the performance of tertiary institutions given that 55% of the performance variance cannot be unexplained.
4.5.2 Coefficients of Determination

The unstandardized coefficients of determination under the B column were used to substitute the unknown beta values of the regression model. ICT infrastructure, ICT Proficiency, Management support ICT Usage and ICT policy registered a p-value of 0.046, 0.031, .0406 and .024 respectively, indicating that the influence on performance of Tertiary institutions were statistically significant.

4.5.3 ANOVA

Analysis of variance was also done to establish the significance of the regression model. At 95% confidence level, a significant value (p-value) of 0.0233 and F-value of 1.44 was registered. This shows that the regression model has a probability of less than 0.0233 of giving wrong prediction. Hence, the regression model used above is a suitable prediction model for explaining ICT infrastructure, ICT Proficiency, Management support, ICT Usage and ICT policy influences Tertiary institutions performance.

Table 4. 12 Analysis of Variance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1.430</td>
<td>5</td>
<td>.286</td>
<td>1.440</td>
<td>.0233</td>
</tr>
<tr>
<td>Residual</td>
<td>7.352</td>
<td>37</td>
<td>.199</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8.783</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


4.5.4 Multiple Regression Analysis

Table 4. 13 Multiple Regression Analysis

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>2.264</td>
<td>.956</td>
</tr>
<tr>
<td>ICT_ infrastructure</td>
<td>.085</td>
<td>.184</td>
</tr>
<tr>
<td>ICT Proficiency</td>
<td>.252</td>
<td>.185</td>
</tr>
<tr>
<td>Management support</td>
<td>.062</td>
<td>.152</td>
</tr>
<tr>
<td>ICT Usage</td>
<td>.163</td>
<td>.132</td>
</tr>
<tr>
<td>ICT policy</td>
<td>.038</td>
<td>.167</td>
</tr>
</tbody>
</table>

Source (researcher, 2018)

The regression equation, \( Y=\alpha+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\varepsilon \) becomes:

\[
(Y=2.264+.085X_1+.252X_2+.068X_3+.163X_4+.038X_5)
\]

Where \( Y \) is the dependent variable (performance of tertiary institutions), \( X_1 \) is the ICT infrastructure variable, \( X_2 \) is the ICT Proficiency variable and \( X_3 \) is Management support variable and \( X_4 \) is the ICT Usage and \( X_5 \) is ICT policy. From the regression equation established, taking all the factors (ICT infrastructure, ICT Proficiency, Management support ICT Usage and ICT policy) constant at zero, the tertiary institution performance would be 2.264. Further, if all the other variables are kept constant, a unit increase in ICT infrastructure will lead to a 0.85 increase in performance of tertiary institutions. A unit increase in ICT Proficiency will lead to a 0.252 increase in performance of tertiary institutions, while a unit increase in Management support will lead to a 0.062 increase in performance of tertiary institutions. A unit increase in ICT Usage will lead to a 0.163 increase in performance of tertiary institutions and lastly unit increase in policy will lead to
.038 increase in performance of tertiary institutions. These results imply that ICT Proficiency contribute more to the tertiary institutions performance followed by ICT Usage. Additionally, Becker, (1994) emphasize that the teacher’s pedagogical practices best supported by computers – use should result in improvement in student academic competencies. Other studies have shown that integration and use of e-learning in schools can promote collaborative, active and lifelong learning, increase students’ motivation, offer better access to information and shared working resources, deepen understanding, help students think and communicate creatively (Khan et al., 2012). The national ICT policy for Kenya lays the framework for ICT considered crucial to its development and utilization (Kariuki, 2009). Similarly, according to Kenya’s Ministry of Education Policy Framework for Education and Training (2012), ICT is identified as a major vehicle for teaching and learning

4.5.6 Correlation Analysis

Correlation is defined as the relationship between two or more variables. The study used Pearson R correlation coefficient to determine how the variables associate. Pearson Correlation which ranges between -1 and +1, reflects the degree of linear relationships between the variables. Using Pearson correlation coefficient (r) and p-value analysis, a correlation is considered significant when the probability value is below 0.05.
Table 4. 14 Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>Performance</th>
<th>Infrastructure</th>
<th>Proficiency</th>
<th>Management</th>
<th>Usage</th>
<th>Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>Performance</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infrastructure</td>
<td>.305</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proficiency</td>
<td>.322</td>
<td>.534</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>.070</td>
<td>.020</td>
<td>.154</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Usage</td>
<td>.282</td>
<td>.421</td>
<td>.180</td>
<td>.110</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Policy</td>
<td>.024</td>
<td>.013</td>
<td>.101</td>
<td>.241</td>
<td>.373</td>
</tr>
</tbody>
</table>

Source: Survey (2018)

Results in table above gave out the summary of the variables relationship by showing the magnitudes and the direction of the relationship. There was a positive correlation (r=0.322) between the Proficiency and the Performance which was statistically significant at α=5%, with a P-value of 0.017. The infrastructure was the second variable with a positive correlation with tertiary institution performance (r=0.322). Usage similarly had a positive correlation with performance (r=0.282). Management support (r=0.7) had weak positive correlation with performance which were not significant and finally policy (.024) had the weakest positive correlation with performance of tertiary institutions.
CHAPTER FIVE: SUMMARY FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter entails the summary of the study, conclusion and recommendations based on the objective of the study. The study sought to find out the effect of information communication technology (ICT) integration on performance of Tertiary institutions. In addition this chapter provides directions for further research and studies.

5.2 Summary of Findings

The first objective, the study established that overall, the respondents agreed that effect of ICT infrastructure on the performance of tertiary institutions in Nairobi City County. ICT infrastructure (computers) enhanced student teaching. The respondents further agreed that uninterrupted network encourages and motivates the users of ICT, acquisition of ICT software has aided and enhanced academic activities in the schools, server-based databases support academic and management functions in your school and laptops make learning more interactive and motivating.

The second objective, the study established that overall, the respondents agreed that ICT proficiency affects performance in tertiary institutions schools. Moreover, the respondents agreed that available software programmes have enhanced knowledge in the process of discharging duties. The respondents in this study further agreed that they assumed positive attitude towards work based on the knowledge in ICT, ICT training has enhanced technical skills and content knowledge, build confidence and promoted classroom management techniques and reading and writing skills have been improved via ICT.
On The third objective, the study established that overall, the respondents agreed that ICT Management Support has an effect on the performance of tertiary institutions in Nairobi City County strategic. Moreover, the respondents agreed that the management of this institutions encourages staff to participate in ICT programmes and training. Furthermore, the organizations show commitment to ICT investment via budget allocation, commitment to ICT acquisition and development, ICT development, implements policies related to ICT and Management organizing seminars and workshops on ICT for staff.

The study established that overall, the respondents agreed on ICT usage on the integration of ICT and performance of tertiary institutions schools. Moreover, the respondents agreed that they perform tasks easily with the use of ICT, Using ICT infrastructure simplifies work, enhance outputs. The respondents further agreed that Using ICT enhanced capacity and competence, I believe I can handle ICT related infrastructure effectively and efficiently and Using ICT related infrastructure is simple and easy to use.

The fifth objective, the study established that overall, the respondents were not sure on the effect of ICT policy on the integration of ICT and performance of tertiary institutions schools. Moreover, the respondents were not sure that, school policy on ICT integrates the members of staff, the national ICT policy on education promotes gender balance equity in the schools, ICT policy in Kenya encourages human resource capacity development. Respondents were also not sure on ICT policy in Kenya whether it provides technical supports and unhindered access to connectivity in terms of internet networks, the National ICT policy on education whether it favours ICT in institution. However, the respondents disagreed that ICT policy in Kenya provides free and equitable access to ICT infrastructures.

5.2 Conclusion
The linking of computers to education across the sphere is known to many individuals because it is believed that ICT has a critical impact on instruction and knowledge. Therefore tertiary Institutions are undergoing a model shift due to the use of ICT that moreover, some have realized ICT as an essential tool in the teaching as well as learning process. As a results the research findings revealed that with increase in ICT structure and ability, more users are repeatedly exposed to the capabilities of ICT, their insights towards change. The management connection in planning ICT use and perception have also change positively towards use of ICT in teaching and learning. It is evident from the findings in the study that some policy makers are faced with the responsibility to ensure proper support to utilize ICT. The findings also reveal that Kenya policy makes and management of institutions should adopt a paradigm shift from old traditional ICT policies to new policies in order to implement ICT integration effectively. This will enable them to cater for the needs of 21st century learners.

5.3 Recommendations

From the findings of the study, it is recommended that;

There is need for the institutions to invest more in ICT infrastructure and related technology as means of creating more accessibility and the presence of the facilities such as server-based databases to support academic and management functions and laptops to make learning more interactive and motivating

Instructors in institutions should be given adequate training on how to use ICT in teaching and education processes to get the necessary knowledge and abilities in integrating the technology in the teaching spaces.
The management of the institutions should also offer more technological assets, technical support as well as administrative support to inspire instructors to use ICT in delivering content in the classroom environment.

Researchers recommend also for the government to fund the tertiary institutions to support ICT policies as well as initiatives for training. This will ensure that each tertiary institution realizes its potential in regarding ICT capabilities.
REFERENCES


Takalani, T. (2008). *Barriers to e-learning amongst postgraduate black students in higher education in South Africa.* Thesis presented in partial fulfillment of the requirements for the degree of Master of Philosophy (Information and Knowledge Management), Stellenbosch University, Stellenbosch.


APPENDICES

APPENDIX I: COVER LETTER

KENYATTA UNIVERSITY – SCHOOL OF BUSINESS
Department of Management Science
P.O. Box 43844-00100
Nairobi
Mobile: 0702207481

Dear Respondent,

RE: FILLING OF THE QUESTIONNAIRE

I am a postgraduate student of Kenyatta University in the department of Business Administration carrying out a research study.
I am undertaking a research on the “INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES AND THE PERFORMANCE OF TERTIARY INSTITUTIONS IN NAIROBI”. The study has a key objective of determining the extent of ICT usage in assisting the general performance in tertiary institutions. I request for your participation by completing the questions in all sections regarding your school provided in the questionnaire to facilitate the research study.

Your information confidentiality was highly guaranteed and is strictly for academic use. The identity of your response was treated anonymous and was used only for academic purposes and thereby do not include your name anywhere. The outcome of the study was available for sharing.

Thank you in advance for your corporation and participating in this study.

Yours Faithfully

KIBOR JEROP JOY.
APPENDIX II: QUESTIONNAIRE

This questionnaire is aimed at obtaining information on the adaptation of Information Communication and Technology and the performance of Tertiary institutions in Nairobi City County. You are kindly requested to fill it by (ticking) where appropriate.

Section 1: Background Information

1. What is your gender
   Male
   Female

2. What is your age
   10-20 years
   20-30 years
   30-40 years
   40-50 years
   50-60 years
   Above 60 years

3. What is your highest level of education?
   Certificate training
   Diploma training
   Bachelor’s degree
   Master’s Degree
   PhD
   Others
4. What is your status?

Academic Staff

Non-Academic Staff

5. How long have you served in your current position (members of staff)?

0-5 years

5-10 years

10-15 years

15-20 years

Above 20 years

Section 2: Effect of ICT infrastructure

The following statements describe the effect of hardware integration on the performance of tertiary institutions schools in Nairobi City County. Please indicate the extent to which you agree or disagree. (Where 5=Strongly agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree)

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>2.1 Desktops are the widely used ICT hardware in your school</td>
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<tr>
<td>2.2 Laptops are used to make learning more interactive and motivating</td>
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<tr>
<td>2.3 Acquisition of ICT software has aided and enhanced academic activities in your school</td>
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<tr>
<td>2.4 Server-based databases now support academic and management functions in your school</td>
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<tr>
<td>2.5 ICT infrastructure (computers) enhances student teaching</td>
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<tr>
<td>2.6 Uninterrupted network encourages and motivates the users of ICT</td>
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</tbody>
</table>
### Section 3: ICT proficiency

The following statements describe the effect of software integration on performance in tertiary institutions. To what extent do you agree?

*Where 5=Strongly agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree*

<table>
<thead>
<tr>
<th>Statement</th>
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</thead>
<tbody>
<tr>
<td>3.1 ICT training enhances my technical skills and content knowledge</td>
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<tr>
<td>3.2 ICT helps to build confidence and promote classroom management techniques</td>
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<tr>
<td>3.3 Available software programmes have enhanced my knowledge in the process of discharging my duties</td>
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<tr>
<td>3.4 My reading and writing skills have been improved via ICT</td>
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<td>3.5 I have confidence in my ability to do things right because of the skills developed via ICT</td>
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<td>3.6 I have assumed positive attitude towards my work based on the knowledge I have in ICT</td>
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</table>

### Section 4: Management Support

The following statements describe the role of ICT teacher training on performance in tertiary institutions. To what extent do you agree?

<table>
<thead>
<tr>
<th>Statement</th>
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<th>2</th>
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</thead>
<tbody>
<tr>
<td>4.1 The management of this institution shows concern for ICT development</td>
<td></td>
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<tr>
<td>4.2 This institution shows commitment to ICT acquisition and development</td>
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<tr>
<td>4.3 The management of this institution encourages staff to participate in ICT programmes and training</td>
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<tr>
<td>4.4 This organization shows commitment to ICT investment via budget allocation</td>
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<tr>
<td>4.5 This organization always implements policies related to ICT</td>
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<tr>
<td>4.6 Management organizes seminars and workshops on ICT for staff</td>
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</table>
Section 5: ICT Usage

The following statements describe the effect of the perception of ICT usage on the performance of tertiary institutions in Nairobi City County, Kenya. To what extent do you agree?

<table>
<thead>
<tr>
<th></th>
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<th>1</th>
<th>2</th>
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</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Using ICT related infrastructure is simple and easy to use</td>
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<tr>
<td>5.2</td>
<td>Using ICT infrastructure simplifies my work</td>
<td></td>
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<tr>
<td>5.3</td>
<td>I can perform my tasks easily with the use of ICT</td>
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<tr>
<td>5.4</td>
<td>Using ICT will enhance my outputs</td>
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<tr>
<td>5.5</td>
<td>Using ICT will enhance my capacity and competence</td>
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<tr>
<td>5.6</td>
<td>I believe I can handle ICT related infrastructure effectively and efficiently</td>
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</table>

Section 6: ICT Policy

The following statements describe the effect of ICT policy on the integration of ICT and performance of tertiary institutions schools. To what extent do you agree?

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</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>The National ICT policy on education favours ICT in your school</td>
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<tr>
<td>6.2</td>
<td>The national ICT policy on education promotes gender balance equity in your school</td>
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<tr>
<td>6.3</td>
<td>ICT policy in Kenya provides free and equitable access to ICT infrastructures</td>
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</tr>
<tr>
<td>6.4</td>
<td>ICT policy in Kenya encourages human resource capacity development</td>
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<tr>
<td>6.5</td>
<td>ICT policy in Kenya provides technical supports and unhindered access to connectivity in terms of internet networks</td>
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<tr>
<td>6.6</td>
<td>Your school policy on ICT integrates the members of your staff</td>
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</table>
### Section 7: Performance of tertiary institutions

The following statements describe the effect of admission capacity, improved grades, and satisfaction as indicators of performance of tertiary institutions. Please indicate the extent to which you agree.

<table>
<thead>
<tr>
<th>Admission capacity</th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>7.1 Admission of students have been improved over the last two years in this school</td>
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<tr>
<td>7.2 Students opt for admission in this school because of the availability of ICT infrastructure</td>
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<tr>
<td>7.3 ICT has facilitated enrollment of students in the institution</td>
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<tr>
<td>7.4 Registration and documentation are made easy via ICT in this institution</td>
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</tbody>
</table>

**Grade enhancement**

| 7.5 Performance of students (i.e. grades) is enhanced ICT implementation in this institution |   |   |   |   |   |
| 7.6 Efficient operations have been enhanced via ICT in this institution              |   |   |   |   |   |
| 7.7 E-learning and teaching activities have enhanced performance of students in this institution |   |   |   |   |   |
| 7.8 Availability of ICT infrastructure has enhanced the capacities of both the staff and students of this institution |   |   |   |   |   |

**Students’ satisfaction**

| 7.9 Students respond very well towards service (teaching and learning) via ICT in this institution |   |   |   |   |   |
| 7.10 Participation in class activities by students is robust using ICT in facilitating knowledge |   |   |   |   |   |
| 7.11 Students find it easy and responsive when interacting via ICT in this institutions |   |   |   |   |   |
| 7.12 The level of confidence displayed by students shows the extent of acceptance and satisfaction using ICT in this institution |   |   |   |   |   |

**Thank you!**