THE MANAGEMENT CHALLENGES OF USING INFORMATION COMMUNICATION TECHNOLOGY FOR ADMINISTRATION AT SECONDARY SCHOOLS IN KIRINYAGA COUNTY, KENYA

by

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DECLARATION

I declare to the best of my knowledge that THE MANAGEMENT CHALLENGES OF USING INFORMATION COMMUNICATION TECHNOLOGY FOR ADMINISTRATION AT SECONDARY SCHOOLS IN KIRINYAGA COUNTY, KENYA is my original work. All sources cited or quoted here in have been acknowledged.

Stephen' ---------- 11th June 2015 ----------

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May God Almighty abundantly bless you all.

SUMMARY

This thesis sought to address the management challenges of using ICT in advancing secondary school administration in Kirinyaga County, Kenya. Despite the Kenyan government taking an initiative towards transforming her education sector to be ICT compliant, much emphasis has been laid on the pedagogical aspect at the expense of managerial and administrative functions. This study sought to investigate the underlying challenges in the use of ICT in secondary school administration.

A mixed mode method was used in which both qualitative and quantitative approaches were applied. The target population comprised 18 principals and 54 teachers; inclusive of two heads of departments and one computer teacher in each school. Sampling was done using the purposive technique. Structured and semi-structured questionnaires, administrative documents and face-to-face interviews were used. The principals responded to questionnaire one whereas the HoDs and ICT teachers responded to questionnaire two and three respectively. Statistical Package for Social Sciences (SPSS) was used for data analysis.

The findings from the literature review and the empirical study attest that;

a) The government in its ICT policy formulation has not adequately defined the roles and responsibilities of various key actors in education for tangible integration.
b) A relatively high number of principals (41.2%) and HoDs (36.1%) had only undergone ICT training at informal levels despite their attendance to ICT integration courses in school administration.
c) ICT integration in school administration saved time for easy monitoring and evaluation of the school programmes.

The conclusion was that vivid ICT policy framework, school administrators and teachers' ICT training play a crucial role in the integration of ICT in schools' administrative functions.

Key Terms: Change Management, ICT Policy, ICT Literacy Development, ICT Access, ICT Skills, ICT Integration, Continuity and Change, Leadership in Education, School Administrators.

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LIST OF ABBREVIATIONS

C-C:	Continuity-Change
CTTC:	Cyber Teacher training Centre
CF:	Continuity Forces
EC:	Education Continuity
ESOL:	English for Speakers of Other Languages
ETS :	Education Testing Service
GOL:	Government on Line
GPS:	Global Positioning System
HoD:	Head of Department
ICDL:	International Computer Driving Licence
ICT:	Information Communication and Technology
ICDL:	International Computer Driving Licence
IEA:	International Evaluation for the Evaluation of Educational Achievement
ITC:	Information Technology and Communication

IT: Information Communication

KEMI: Kenya Education Management

LwCT: Learning with Communication Technology

M & A: Mergers and Acquisition

MOE: Ministry of Education

MoEST: Ministry of Education Science and Technology

NCST: National Council for Science and Technology

NEPAD: New Partnership for Africa's Development

NGO: Non-Governmental Organisation

NRDC: National Research and Development Centre

SAP: Situation-Actor-Process

SIS: School Information System

SMIS: School Management Information System

SSBA: Saskatchewan School Board Association

TCO: Total Cost of ownership

TTC: Teacher Training College

TV : Tele-Vision

UNESCO: United Nations Educational, Scientific and Cultural Organization

UNESCO - UIS: UNESCO Institute for Statistics

CHAPTER 1

ORIENTATION OF THE STUDY

1.1 INTRODUCTION

The profound advancement in Information and Communication Technology (ICT) is a major world landmark in modern day history as computer manufacturing firms re-invent new computer technologies at a tremendous rate. Visscher (1996: 291) states that "the tangible advantages of computer use in terms of efficiency and effectiveness have led to the wide utilisation of computer technology for the operation and management of school organisations". ICT in educational management is rapidly increasing in importance worldwide and is becoming an enterprise of importance in its own right (ibid.). "There is universal recognition for the need to use ICT in education as we enter the era of globalisation where the free flow of information via satellite and the internet hold sway in global information dissemination of knowledge" (Ogiegbaen & Iyamu 2005:104).

The Kenyan government is committed to ensuring ICT integration in education through the formulation of a National Information and Communication Technology (NICT) policy which acknowledges an ICT literate workforce for knowledge based economy (MOE 2005). The government has therefore made education the natural platform for equipping the nation with ICT skills. The intention is to start with the transformation of school leaders as well as teachers to enable them embrace ICT as an integral component in school management as well as a tool for teachers in work planning, teaching and learning.

Menjo and Boit (2008) observe that "educational institutions in Kenya in the 21st century are increasingly becoming complex multi-dimensional organisations requiring tremendous input in terms of human, financial and physical resources". Such school working environments are bound to overwhelm the abilities of today's teacher and administrator who is the person in charge of the overall school management, if they are not aided in the performance of their school administrative duties. These developments therefore demand that educational institutions modernise their tools of conducting business to enhance the effectiveness of management and

leadership (ibid). In view of the above, it is imperative for support staff, teachers, heads of departments and principals to be able to readily identify and access computer literacy that meets their skills and requirements.

According to Pelgrum and Plomp (1993:152) as cited in Maki (2008:18), the International Association for the Evaluation of Educational Achievement (IEA), conducted a study of computers in education in two stages; 1989 and 1992. Stage one of the study was a descriptive survey that investigated computer use at the elementary, lower-secondary, and upper-secondary levels. It focused on how computers were used, the extent and availability of computers in schools, the nature of instruction on computers; and estimates of the effects that computers had on students, the curriculum, and the school as an institution.

Stage two of the study consisted of two parts. The first part was a follow-up of Stage one and studied changes over time. The second part involved assessing the effects of schools, teachers, and classroom practices on student outcomes in the domain of computer usage in schools. Based on results, the most notable finding regarding administrative uses of computers in schools is that it is considerably lower than instructional uses. At all populace levels and in all countries, the use of computers for administration only is decidedly lower than instructional uses. “Most schools with ICT infrastructure acquired it through initiatives supported by parents, the government, NGOs, development agencies and the private sector including NEPAD e-school programme” (Farrel 2007:1).

Mere installation of computers and networks in schools is insufficient for educational reform and initiatives, according to Flanagan and Jacopsen (2003) cited in Ahmad, Komputer and Utara (2010:3). Therefore, school leaders should have awareness on the obstacles that limit ICT integration and translate the knowledge into effective leadership approaches. Rapid technological changes have left many school administrators at cross roads as they handle a wide range of managerial and administrative challenges in the running of schools.

Ahmad *et al*. (2010:4) observe that “many school leaders have not been prepared for their new role as technology leaders”. This has led to school leaders struggling to develop both the human

and technical resources to achieve ICT outcomes in their schools. Very few principals have used computers in meaningful ways with learners; therefore they lack the requisite pedagogical vision and experience to guide teachers (ibid.). The advent of ICT integration in the Kenyan school curriculum has come at a time when most education administrators in secondary schools are reluctant, ignorant and technophobic in embracing this new technology.

This study's focus was the role of secondary school administration in the management of ICT and the means of coping up well with current and emerging technological challenges in Kirinyaga County, Kenya. The study sought to address, among others, the continuity and change management in the use of ICT, leadership, administrative and managerial functions of the principal and ICT Literacy. These are meant for effective and efficient quality leadership in influencing school compliance in ICT technological advancement of modern time.

Maki (2008:18) notes that "ICT plays a vital role in supporting powerful school leadership and efficient management and administration". Despite wide spread access of ICT utilities in schools, most of them are hardly utilised effectively by teachers and the school administrators in handling crucial tasks. While few doubt that they have the potential to enhance teaching and learning, there is no agreement on how technologies should be used to boost academic productivity, according to Massy and Zemsky (1997) as cited in Obijiofor and Inayatullah (1998). The same scenario applies to the administrative aspect of ICT where many administrators are ignorant about harnessing its benefits to boost their routine service delivery. "Within schools, administration needs to provide a solid base in which school functioning and decision making are supported" (Obijiofor & Inayatullah 1998).

Pelgrum and Plomp (1993) cited in Maki (2008:18) posit that "the administrative use of computers in schools is considerably lower than instructional uses as in the case of pedagogy. At all population levels [individual or group], the use of computers for administration only is decidedly lower than instructional use". Kipsoi, Chang'ach and Sang (2012:18) posit that "Kenyan schools hardly use ICTs to manage the quality of output, or to raise teacher productivity, or to reduce costs through analysing spending". This has resulted in a slow rate of technology adoption despite its promise and potential for use in educational management in

schools. In view of this, it is imperative to assess the challenges facing secondary school administrators while coping with the new phenomenon of ICT in their administration.

The Kenyan government appreciates and recognises that an ICT literate workforce is the foundation on which the status of a knowledge economy can be acquired (Republic of Kenya 2005:77). The government is therefore desirous to making education the natural platform for equipping the nation with ICT skills through formulation of a national ICT policy (2006). Notwithstanding this, it is regrettable though that despite the Kenyan government taking several steps toward realisation of transforming all education institutions in the country to be ICT compliant (ibid.78), much emphasis has been laid on the pedagogical aspect at the expense of managerial and administrative domain.

For the last decade, several secondary schools in Kirinyaga County have zealously embraced the use of ICT which has been characterised by infiltration and the introduction of computer studies. However, ICT has been mainly based in pedagogy and those computers are hardly used by teachers and principals to facilitate their administrative tasks.

The section that follows discussed the literature preview justification for effective and efficient ICT integration in secondary school leadership, which is of paramount importance to snowballing the rest of the school organisational set up. Since literature on ICT integration in secondary schools administration is scarce in Kenya, the review was drawn from some selected countries of the world and Kenya. These included; - Ghana, Nigeria, South Africa, Cyprus, Turkey and India among others.

1.2 LITERATURE PREVIEW

This section provides a preview of related literature from various authors in order to conceptualise the research theme. This literature gives an overview of the concept of challenges of using Information Communication and Technology (ICT) in the administration and management of secondary schools as an emerging discipline in Kenya. The literature preview was guided by the following sub-topics derived from the research theme and objectives.

1.2.1 Meaning of ICT

Apart from explaining an acronym, there is no universally accepted definition of ICT because the concepts, methods and applications involved in ICT are constantly evolving on an almost daily basis. However, several authors have defined ICT in numerous ways. According to a United Nations Report (1999) cited in Kok (2006), "ICTs cover internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services, and other related information and communication activities".

From an educational perspective, ICTs refer to satellite-based television, telephony, video cassette recorders, and computer-based interactive technologies such as electronic messaging systems, tele-text and videotext (Obijiofor & Inayatullah 1998). In relation to this study, ICT addressed the use of electronic gadgets, mainly the computer and computer interactive skills, for effective and efficient school administration.

1.2.2 History of ICT in education

Leinonen (2005) cited in "International Institute for Communication and Development" (2007:21) outlined four phases in the history of ICT in education:

(i) "Late 1970s - early 1980s: Programming: This was the era in which the pedagogical reason to use the computer focused primarily on programming, assisting in the development of students' logic, and mathematics skills.

(ii) Late 1980s - early 1990s: Computer Based Learning**:** When multimedia computers with graphics and sound applications became available, the computer began being used to support learning processes in basic subjects such as mathematics, reading and writing.

(iii) Early 1990s: Web-based Learning: The third wave of using ICT in the education sector came with the advent of the World Wide Web (WWW). The use of the

Web is partially a product of the challenges in updating content on CD-ROMs. Web-based information allows for educational content to be updated frequently.

(iv) Late 1990s: E-Learning: E-learning combines computer-based and web based learning applications for the student. It also provides facilities for interaction between the teacher and the student, and between students themselves".

Pelgrum and Law (2003) cited in Kok (2006) observed that "towards the end of the 1980s, the term 'computers' was replaced by 'IT' (Information Technology) signifying a shift of focus from computing technology to the capacity to store and retrieve information. This was followed by the introduction of the term 'ICT' (Information and Communication Technology) around 1992, when electronic mail (e-mail) became available to the general public". In relation to the history, this study focused on ICT literacy in secondary school set up and the role it plays in school administration.

1.2.3 Challenges facing the use of ICT in secondary schools in Kenya

Kinuthia (2009) notes that "for ICT to be effectively adopted it requires good governance and appropriation of allocated government and foreign aid". In many developing nations lack of ICT policy, poor project management and corruption has led to ineffective implementation, duplication of efforts and wastage of technology resources (ibid.).

Visscher (1996: 294) states that "although a number of computer applications supporting clerical work have been developed in many countries, there is still much to be done in this area". This is even truer for applications assisting the school management activities. Since full utilisation of School Information Systems (SISs) has not been realised, investment in exploring ways that will lead to more successful systems implementation is needed. Examples can be alternative design strategies generating better SISs, implementation approaches that let schools staff benefit more fully in the potential of these systems (ibid.).

The cultural context of ICT adoption, language barriers, and attitudes toward ICT affect the rate at which it is adopted (Fourie & Alt 2002 cited in Kinuthia 2009). Perceived difficulty in the

integration of ICT in education is based on the belief that technology use is challenging, its implementation requires extra time and that technology skills are difficult to learn (ibid.).

Gichoya (2005: 183) maintains that as many arguments for ICT planning prove, ICT project implementation is a complex exercise and more research is needed to identify challenges, good practice and solutions for successful implementation. Use of ICT in key areas such as school library, finance and school accounting needs to be adequately researched.

According to Obijiofor and Inayatullah (1998), implementation of ICTs is occurring in a context where the cultural and institutional barriers are not well addressed. The assumption often made is that if one purchases a few computers and modems, a post-industrial society can magically result. Africans and those in the Asia-Pacific are generally in the position of consumers and thus in a position where they cannot yet define media in their terms (ibid.). In relation to this, it's worth noting that ICT implementation handicaps are unique in different set ups. This study intended to establish the pertinent challenges affecting effective and efficient use of ICT in the administration of secondary schools in Kirinyaga County, Kenya.

1.2.4 Policies on the use of ICT in schools

Milli, Fayad, Brugali & Dori (2002) Cited in Mensa (2005: 46) define a framework as "a set of interacting objectives that together realise a set of functions". A framework for educational policy and practice is therefore a working objective that highlights the participants, the relationship between the participants, and the set of interaction scenarios between the participants. An educational policy framework can help to define the roles and responsibilities of educational actors; which include policy makers, administrators, teachers, students, funding agencies, development organisations and civil society.

According to the Republic of Kenya (2010: 2), the critical role played by ICT in Education calls for comprehensive policy measures that can enable focus on:

- Knowledge access and relevance - supportive of training critical mass of skilled innovative workforce which future economic growth and jobs depend on;

- Science, Innovation and Techno - entrepreneurship culture to realise better use of knowledge and skills as well as developing new ones with changing global competitiveness.

There are many areas of policy and practice in schools that can change by the presence of ICT in Education. Educational actors, students, teachers, administrators and school principals need to explore ways through which ICT-inclusive educational policies will foster and produce a direct rise of a more equitable society (ibid.: 51).

Mensah (2005) observes that "as a blueprint, an educational policy framework can be a process through which various actors and policy makers translate educational policy into practice". This study intended to unravel whether the existing national and individual school policies support the use of ICT in education administration in secondary schools in Kenya.

1.2.5 ICT infrastructure in secondary schools

School's ICT infrastructure typically has numerous interconnected technology components. The four key categories of ICT infrastructure are: access devices, network infrastructure, application software and support resources, according to Hagley Community College (2012).

Poole (1996) cited in Ogiegbaen and Iyamu (2005:104) indicated that "computer illiteracy is now regarded as the new illiteracy". This has actually awakened a new and strong desire to equip schools with computer facilities and qualified personnel necessary to produce technologically proficient and efficient students in developed countries of the world (ibid.).

Mensa (2005:44) observes that availability of an appropriate environment for ICT facilities is another issue that will determine accessibility of ICT for rural schools. He further contends that some schools have successfully implemented ICT projects because they possess the infrastructure to accommodate ICT equipment donated by benevolent organisations. This study sought to establish the efficacy of ICT infrastructure in secondary school administration in Kirinyaga County, Kenya.

1.2.6 Types of administrative uses of ICT by teachers and administrators of secondary schools

Ogiegbaen and Iyamu (2005:105) posit that "in a rapidly changing world of global market competition, automation, and increasing democratisation, basic education is necessary for an individual to have the capacity and capability to access and apply information". Such ability and capability must find bearing in information and communication technology in the global village. Maki (2008) states that ICT enables managers and administrators to update and record changes in the school environment; to produce documents regarding operational activities of the school; to support decision and decision making due to the fact that ICT systems present reality at the moment; to communicate data, that is exchange messages and data between school staff and other schools or organisations.

Visscher (1996:291) contends that "computers can help school managers in finding creative solutions for complex allocation problems, for example teacher allocation, timetable construction; and supporting them in carefully monitoring how the school operates". School Information Systems (SISs) can provide managers with the information required for informed planning, policy-making, and evaluation. In addition, SISs can assist in improving the efficiency and effectiveness of schools (ibid.).

Serhan (2007: 46) observes that "when school principals feel comfortable using the technology and realise its possible applications in education, then they can help facilitate its incorporation into the curriculum". A positive attitude starting from school leadership can spread to teachers in the school and hence to the classrooms. Training workshops help raise school principals' awareness and build their confidence in their abilities to use technology and therefore facilitate its adoption as a complementing part in the curriculum. There is a need for research on the role of principals and administrative support staff. For example the accounts clerks, store keepers, librarians and cateresses in enhancing ICT use for effective school management. No matter how technologically literate teachers are, it is difficult for them to practice without effective leadership, according to Dowson and Rakes (2003) as cited in Demir (2006).

The following are some of the areas where computers can be used for effective educational administration as listed by Ben-Zion, Moshe and Yaffa (1995) cited in Krishnaveni and Meenakumari (2008: 282).

- General Administration
- Pay Roll and Financial Accounting
- Administration of Student Data
- Inventory Management
- Personnel Records Maintenance
- Library System

This study sought to establish the types of ICT administrative use and their efficacy in secondary schools.

1.2.7 Impact of ICT use on secondary school administration

Krishnaveni and Meenakumari (2008: 283) points out that the various research studies conducted to evaluate the extent of usage of ITC's in multiple aspects of higher education revealed that heads of faculties utilised technology in planning. To a large extent, utilisation has also been revealed in the supervision and evaluation of academic, student, financial and administrative affairs. It was concluded that ICT's have an impact on the increase of the scientific level of faculty members, students, and staff.

Ogiegbaen (2005:105) observes that "although the chalkboard, textbooks, radio, television and film have been used for educational purposes over the years, none have quite impacted on the educational process like the computer". ICT has the capacity to provide higher interactive potential for users to develop their individual, intellectual and creative ability (ibid.). Maaki (2008:18) notes that ICT plays a very vital role in supporting powerful school leadership, efficient management and administration. The following section addressed the research problem that was identified for this study.

1.3 THE RESEARCH PROBLEM

While few doubt that ICTs have the potential to enhance teaching and learning, there is no agreement on how the technologies should be used to boost academic productivity, according to Massy and Zemsky (1997) as cited in Obijiofor and Inayatullah (1998). The same scenario applies to the administrative aspect of ICT where many administrators are ignorant about harnessing its benefits to boost their routine service delivery.

Pelgrum and Plomp (1993) cited in Maki (2008: 8) observe that "the most notable finding regarding administrative use of computers in schools is that it is considerably lower than instructional uses". In view of this, it was imperative to assess the challenges facing secondary school administrators while coping with change in the new phenomenon of ICT in their administration.

The Kenyan government appreciates and recognises that an ICT literate workforce is the foundation on which the status of a knowledge economy can be acquired (Republic of Kenya 2005:77). The government is therefore desirous to making education the natural platform for equipping the nation with ICT skills through formulation of a national ICT policy (2006). Notwithstanding this, it is regrettable though that despite the Kenyan government taking several steps towards realisation of transforming all education institutions in the country to be ICT compliant (ibid.78), much emphasis has been laid on the pedagogical aspect at the expense of managerial and administrative domain.

For the last decade several secondary schools in Kirinyaga County have zealously embraced the use of ICT which has been characterised by infiltration and the introduction of computer studies in classes. However, ICT has been mainly based in pedagogy and hardly are those computers used by teachers and school administrators to facilitate their administrative tasks. This paved the way for this research problem in unravelling the challenges of using ICT in advancing secondary school administration in Kirinyaga County, Kenya.

1.3.1 THE RESEARCH QUESTIONS

As a follow up of this research problem, the following main research question was addressed: what are the challenges facing the use of ICT in the administration of secondary schools in Kirinyaga County, Kenya? The main research question was subdivided into the following sub questions:

- Is the use of ICT in secondary school administration well guided by clearly spelt out policies and guidelines in Kirinyaga County?
- How effective are teachers and principals in the use of ICT in advancing secondary school administration in Kirinyaga County?
- What is the impact of the use of ICT in secondary school administration in Kirinyaga County?

1.4 RESEARCH AIMS AND HYPOTHESIS

1.4.1 Research aims

The main aim was to establish the challenges of ICT use in the administration of secondary schools in order to identify the potential of integrating ICT in secondary school administration for effective and efficient service delivery. The study objectives were to:

- Analyse the policies governing effective use of ICT in secondary school administration
- Investigate ICT competencies of teachers and principals in advancing secondary school administration in Kirinyaga County?
- Assess the impact of ICT use in secondary school administration.

1.4.2 Research hypothesis

The following was the hypothesis for the study;

- $H_{a1:}$ There is a significant relationship between ICT policies in education and effective integration of ICT in advancing secondary school administration

1.5 LIMITATIONS AND SCOPE OF THE STUDY

1.5.1 Limitations of the study

- The study confined itself to few teachers who are heads of departments, computer teachers and principals who are in schools with access to computers and computer studies.
- Although there are other areas of ICT integration in a school set up, this study only focused on challenges facing the use of ICT in advancing secondary school administration as the main topic out of the other school areas and not ICT in pedagogy, technical challenges or general use of ICT

1.5.2 Scope of the study (demarcation of research)

- Although Kenya has 47 counties that are units of local government administrative subdivisions, the study limited itself to only one county out of which 18 schools were studied from a total of 107. In order to get more conclusive results, all schools in the central province where Kirinyaga County is located should have been studied. However, this was not possible due to financial constraints, time limitations and other logistical problems such as lack of access to computers in some schools and vastness of the area to be researched.
- Literature on ICT integration in Kenyan secondary schools administration is scarce. The literature review was therefore drawn from some specific countries of the world and Kenya. These countries included; Ghana, Nigeria, South Africa, Cyprus, Turkey and India.

1.6 THEORETICAL FRAMEWORK

The study discussed three theories to conceptualise and cast light on the research theme in various key areas. These included;

1.6.1 Kast and Rosenzweig Open Systems Theory

This addressed "the school as an open system comprising of various subsystems and focuses on the interchange between a system and its environs with the intent of seeking continuous improvement and not stability" (Ansari 2004). Various variables play complimentary roles in ICT integration in a school administration. Significant among these include; the principal and teachers' ICT literacy, attitude towards ICT, ICT infrastructure and ICT policies. These provided the frame work for visualising internal and external environmental factors as an integrated whole in relation to ICT use in education administration in further review of literature in this study.

1.6.2 The Expectancy Theory

This theory relates to "the mental processes regarding choice, or selection and explains the processes that an individual undergoes to make choices. Individuals are motivated to work harder to receive a reward if they believe that increased effort will produce greater performance and if they believe that performance will be rewarded" (Holdford & Elmore 2001: 8). They further argue that individuals must also believe that the reward is worth the effort needed. Determinants of teachers and principals' successful use of technology in education administration in this context included self confidence in the ICT use and the perceived degree of satisfaction with the ease of technology among others. Acceptance of the system therefore is reliant on the individual's belief that the technology is beneficial, provides capabilities to complete tasks and management will provide support to use the system (Eveleth & Stone 2008:138).The interplay between various variables associated with individual's instrumentality in ICT use for outcome was established in a school setup.

1.6.3 Kurt Lewin's Force Field Theory

This theory intimates that organisations are balanced between forces for change and resistance to change, and has a related perspective on how managers can bring change to their organisation (scribd.com.).

School administration plays a very crucial role in change management in the adoption of ICT for administrative purposes which would involve both learning and unlearning to overcome organisational culture and other barriers. Change not only involve learning, but unlearning something that is already present and well integrated into the personality and social relationships of the individuals (Harwood: 2012). If the principal plays an instrumental role in ICT integration in secondary school administration, it becomes easy for the other teachers to make effective and efficient use of it and vice versa, where the former does not have the driving force in its use.

1.7 CONCEPTUAL FRAMEWORK

The study focus was based on various key variables and how they relate to one another in enhancing effective and efficient ICT use in secondary school administrative context as well as the challenges encountered there off. These include; - ICT Users, ICT Use and ICT Enhancers. The ICT users included principals, deputy principals, departmental heads, teachers and administrative support staff such as the accounts clerks, store keepers, librarians and cateresses, among others. The enhancers included: - relevant software applications, peripheral devices and the general ICT infrastructure.

1.8 THE SIGNIFICANCE OF THE OF THE STUDY

This study is regarded as important because its findings will be able to;

- Assist the government and school administration in formulating ICT policies that will address effectively ICT integration in school administration.

- Acquaint teachers and school principals or administrators with the use and application of modern ICT trends in coping with the administration of secondary schools for effective and efficient service delivery.
- Analyse the role of ICT infrastructure in effective secondary school administration.
- Suggest various strategies for school administrators to cope with this new phenomenon of integrating the use of ICT in school administration to effectively harness the benefits of modern day technology.

1.9 RESEARCH DESIGN

1.9.1 Research design

The study used survey design method for collecting, processing and analysing data. The researcher collected data from the participants as it relates to study variables which include: ICT policies, teachers' and principals' competencies in ICT, ICT infrastructure and impact of ICT in secondary school administration from where he inferred. The researcher used primary and secondary data as well as observation and semi-structured interviews. He therefore adopted both qualitative and quantitative approaches.

1.10 RESEARCH METHODOLOGY

1.10.1 Population

Kirinyaga County comprises 107 secondary schools in the following composition; 10 Boys schools, 27 Girls schools and 70 mixed schools (Kirinyaga County Education Office). Forty eight out of 107 secondary schools are equipped with computers and have access to computer studies. The researcher used purposive sampling and selected 18 secondary schools from the 48 with access to computers and computer studies. Six boys, nine girls and three mixed schools were researched. The purpose was to establish the challenges of using ICT in advancing secondary school administration in Kirinyaga County, Kenya.

1.10.2 Sampling

The researcher used purposive technique from the sample to get the participants from girls, boys and mixed secondary schools. The reason was that when the researcher uses purposive sampling, information rich respondents can be identified. The subjects in the study comprised 18 principals and 54 teachers inclusive of two heads of department and one computer teacher in every school.

1.10.3 Instrumentation and data collection techniques

In this study, the following research instruments were used to get the required information, namely: the questionnaires, interviews and observation schedules. Specific documents were also analysed as they related to the study. These included the; School Strategic Plan, School ICT Policy Guidelines, Donor Policy Guidelines on ICT, National ICT Policy of 2006, Ministry of Education Science and Technology Strategic Plan (2006-2011), Sessional Paper N0.1 of 2005 and Kenya Vision 2030.

1.10.4 Data analysis and interpretation

Data analysis was done on each questionnaire through descriptive and inferential statistics. Statistical Package for Social Sciences (SPSS) was used for data analysis and supplemented by interview results. Results from observation were used for verification of information gathered from the questionnaires and interview schedules through coding of structured responses by the participants and inference made for presentation of findings.

1.10.5 Reliability and Validity of research

1.10.5.1 *Reliability of the research*

Reliability of the research instruments for consistency was gauged through Test –Retest reliability method on the participants within a considerable time lapse between the first and the

second test. The research instruments captured a broad scope of the school administration to increase their reliability.

1.10.5.2 *Validity of the Research Instruments*

The researcher conducted a pilot study using questionnaires in order to cross-check the suitability of each questionnaire. The following areas were addressed:

- Period of the year and term; that is whether first, second or third term.
- Specific target audience who included; Principals, HoDs and Computer teachers.
- Official language of instruction used, that is whether English or Kiswahili (national or indigenous or vernacular languages)
- Simplicity of the language to the teachers that was precise and not ambiguous.
- The clarity of each question and the choices in the responses which were clearly understood by the participants with limited number of options to respond to.
- The length of the questionnaire; that is neither too long nor short ranging between 10 and 19 questions.
- Time taken by each participant in completing the questionnaire; that is not too long or short ranging between 25 to 30 minutes.
- The adequacy of the spaces provided for the written responses which was subject to the nature of the questions (structured or semi-structured).
- The participants' personal view of the area under study; that is independent sentiments but related to the questions under investigation.

The researcher brainstormed with colleagues on various issues in the related field of study, consulted and obtained expert views from the supervisor to streamline the validity and reliability of the instruments. The questionnaires were then revised and the final version distributed to the respective participants in the pilot schools which did not comprise the same schools in the final study. This was done at the participants' convenient time during the schools term.

1.10.6 Ethical considerations

The term ethics refers to "norms for conduct that distinguish between acceptable and unacceptable behaviour. It focuses on the disciplines that study standards of conduct, such as philosophy, theology, law, psychology, or sociology" (Resnik 2007). The focus of the study was based on acceptable research norms. The significance of ethics in this study is to promote the aims of research**,** values that are essential to collaborative work, accountability to the public and support for the research.

The researcher adhered to the following ethical considerations in the course of his research;

- Sought research authorisation from the Ministry of Education Science and Technology.
- Sought voluntary participatory consent from the participants through a letter.
- Explained the purpose of the study to the participants and the rationale behind their sampling.
- Assured participants full confidentiality and anonymity of the information they provided.
- Created good rapport with the participants as a way of ensuring free flow of the information.

1.11 CLARIFICATION OF TERMS

Effective administration-well coordinated system of school management by principals and teachers.

ICT- Refers to technologies which assist in the storage, processing and transmission of digitalised information and delivery of such information and communication services to users.

ICT Access –Presence of ICT infrastructure for use by teachers and principals.

ICT Application or Use – Ability to harness and effectively utilise ICT knowledge by teachers and principals.

ICT Infrastructure– A network to describe all the computer and communications hardware and software used to manage clerical, administrative, and management tasks.

ICT Integration in School administration- Incorporation and adoption of digitalised information for storage, processing and transmission for effective school management.

ICT Knowledge- Literacy level of ICT information by teachers and principals.

ICT Policies- Refers to government or school published documents which sets out the standards, guidelines and strategy for ICT implementation in schools.

School Administration- School management headed by principals and departmental heads.

Principal- A person appointed by Teachers' Commission to oversee the administration of a secondary school.

Teacher- A person imparting knowledge to a learner and assisting the principal in school administration.

1.12 CONCLUSION

The introduction of ICT in schools has been a major priority to the government of Kenya in harnessing the potential of a knowledge based economy in her vision 2030 strategy. This is mainly spearheaded by the school administrators led by principals who play a major role in the implementation of ICT alongside other government policies in the pedagogical and administrative domains. Integration of ICT in school administration will require an informed and focused administrator who can strategically merge theory and practice in his or her approach to successfully see the whole process to its fruition. This will not only enhance school administrative mechanisms but also put the school abreast with the global trends in information communication and technology.

The principal acts as a key agent of change in the integration of ICT in a school. The principal bridges the gap between the existing pedagogical and administrative machineries vis-à-vis the new wave of change in the use of ICT in a school set up. It is therefore imperative to address the various aspects of ICT Literacy, Continuity and Change Management in the use of ICT in educational leadership and administration as an integral part of this study.

CHAPTER 2

CONTINUITY AND CHANGE MANAGEMENT IN THE USE OF ICT IN EDUCATION LEADERSHIP

2.1 INTRODUCTION

This chapter provides literature review on continuity, change management and quality leadership for educational change in secondary school administration. The first section discusses the concept of continuity in school administration and the role of continuity in transition for change. The second section discusses, among others, change and ICT, change management in ICT integration, process of planned change management, approaches to change management and factors and dilemmas in the use of ICT in educational administration. The last section discusses performance in terms effective or quality leadership in educational change and effective leadership for performance improvement.

2.2 CONTINUITY

2.2.1 Defining education continuity

Saskatchewan School Board Association (SSBA) (2008:3) defines Education Continuity (EC) as a management and operational process that identifies education activities that are essential and critical. It notes that continuity in education identifies potential influences that affect critical activities, provides a framework for building resilience, and creates effective responses that will safeguard the safety and interests of employees, students and the community.

Dave (2008) in SSBA (2008:1) posits that “Education Continuity (EC) management includes the processes, procedures, decisions and activities to ensure that school divisions continue to function throughout disruptive events such as an emergency, a disaster or a crisis”. The EC programme includes an-ongoing process of risk assessment and management. While the likelihood of a business disruption or disaster occurring is uncertain, there is need to have the

capability to continue to provide essential services and to ultimately resume the delivery of all educational services (ibid.). SSBA (2008:3) notes that "continuity planning provides an organization with a disciplined capability to continue to operate in the face of significant business interruption". Whereas ICT is pertinent in educational management as a new global trend, the process, procedures and mode of its integration in secondary schools is not quite clear to ascertain its effective infusion process as part of continuity. Strategic measures require to be well addressed in ushering in the much desired change alongside the continuity process.

2.2.2 Concept of continuity in secondary school administration

Taylor (2011:2) posit that "adaptability in the form of flexible work arrangements is seen as a core competence for modern organisations working in fast moving markets". Leaders must make and enact the best contingent choice taking into account the desire of the organisation for change and continuity and the competence of leaders to manage both. In order for managers to play an active role in change and continuity, continuity must be seen as an organisational dynamic. Managing continuity is about recognising the forces that bring stability in a changing environment in order to move the organisation ahead effectively and efficiently (ibid: 4). Leana and Rosseau in Taylor (2011:2) concur with this view by arguing that "stability enables rather than impedes change and progress. For any change to occur there must be an existing status quo situation that the initiators of change need to put to consideration".

Policy Note (2005:13) on ICT education in Turkey argues that while the learning medium may change from the textbooks to web-based books or software or from presentations in class to presentation via the internet, the learning paradigm remains the same. Although ICT may make easy independent self-paced learning, the potential of ICT is not optimised if there is no shift in the learning paradigm. In addition to change in the learning paradigm, ICTs provide possibilities for changing the way children learn and teachers teach (ibid.). Proponents of change are enthusiastic about its introduction but evasive in exhaustively addressing the existing school major structures or practices that are compatible with the said change. There is need to infuse continuity and change management practices in ICT integration in the school administration to

avoid high turbulence in its implementation, which may derail the whole process if not well calculated.

Kolb (2002) in Taylor (2011:4-5) contends that "managing continuity is not only about recognising forces of resistance or stability in organisations, but also concerned with connecting the past to the present". This is done by consciously nurturing elements of stability within a changing environment. For instance, proposed changes to working patterns or restructuring can be given credence and find acceptance by intentionally referring to previous changes in the firm's history. In so doing, fear and anxiety can be dispelled as staff understands the historical necessity of the change; that they are not the first to be "subjected to it" and "everything turned out alright". Similarly, trust is based on consistency in relationships over time and is a great asset to leaders who seek change. Without it, change is often resisted and takes much longer to enact. "This connection to the past is a progressive tool that leaders can utilise to build trust and increase the chances of successful change" (ibid.). Every successful venture must have its past in the continuity process for a meaningful quantification of progress. Connectivity to the past forms the basis of rationalising the current strategies in the change process of integrating ICT in secondary school administration.

Sushil (2005:22) observes that "even in a highly turbulent and chaotic business environment, a discontinuous change may not always be desirable, as it may add to more turbulence and chaos". This is supported by Thompson, Strickland and Gamble (2005) in Sushil (2005:22) who attest that crafting strategy involves stitching together a proactive or intended strategy that covers new initiatives plus on-going strategy. These initiatives are active or adaptive strategies to accommodate changing circumstances. Meaningful change in the integration of ICT in school administration requires sound orientation that not only recognises but also borrows from some of the existing strategies for efficient and effective implementation. The past complements the present in this case.

James (2001) in Kipsoi, Chang'ach and Sang (2012:25) observe that ICTs have clearly made new demands on an already stretched sector while simultaneously offering opportunities in support of current difficulties. They add that the enthusiasm for ICTs may well ultimately be the

catalyst for transforming dominant education practices. In a similar view, Earle (2002) in Yalin, Karadeniz and Sahin (2007:4036) contends that integration of ICT is not a product but a process. He further notes that the integration of ICT into schools means using ICT effectively and efficiently in all dimensions of the process including the necessary infrastructure, teaching programmes and teaching-learning environments.

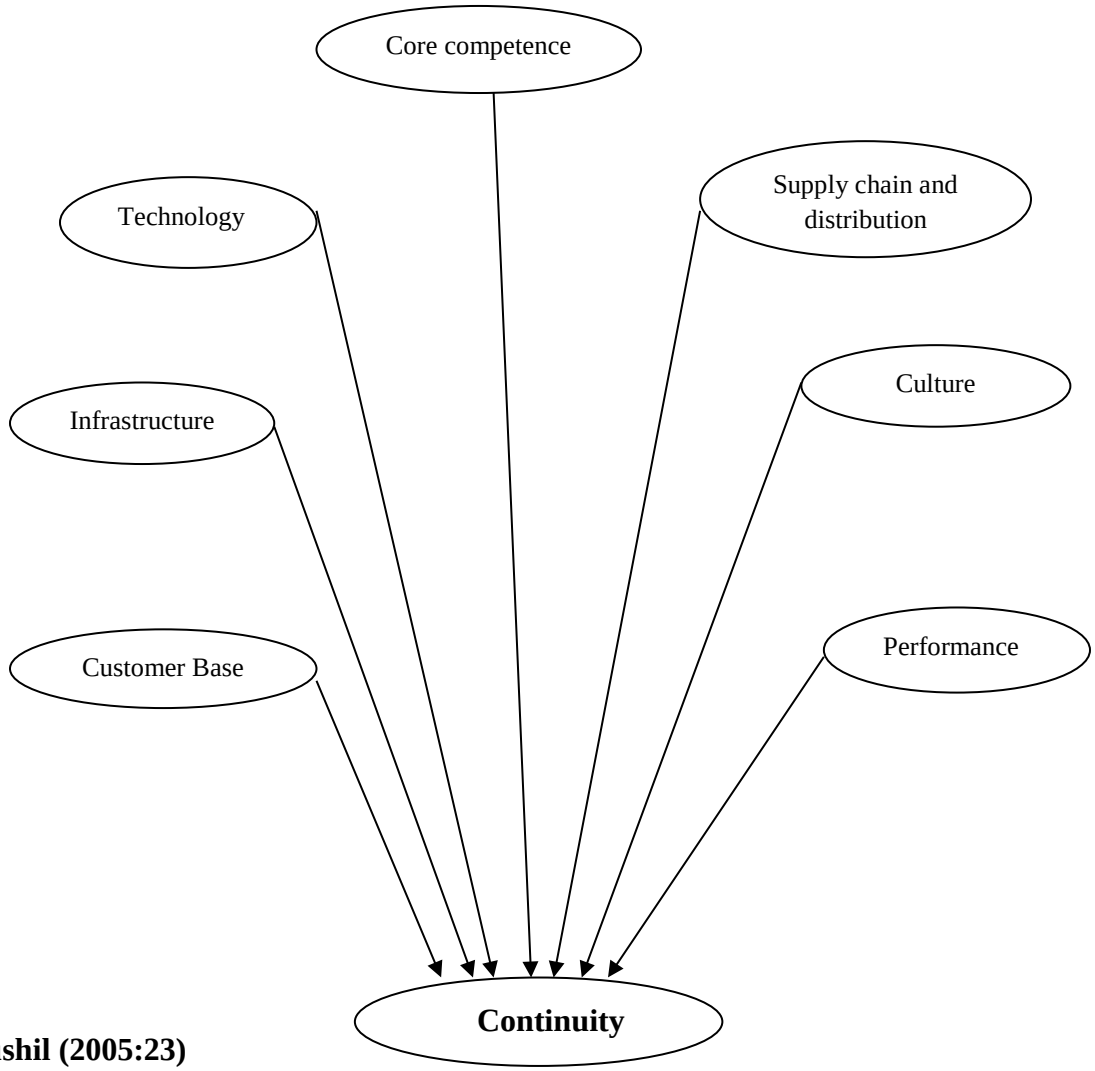
Taylor (2011:4) posits that "managers need to perceive continuity as a dynamic companion to change and be active in propagating that mind-set". For instance, leadership that emphasises corporate identity and purpose provides great consistency when peripheral change is being made. Within the context of this constancy, the leaders' role is to choose the appropriate parts of an organisation that should be transformed and those that should be kept constant like the central vision and values. "The choice will vary from company to company, from place to place and from time to time" (ibid.). In support of this, Policy Note (2005:22) notes that **t**raining education staff at all levels ensures that ICT use in schools is implemented in an efficient and complementary way. It concludes that continuing training for policy makers and school administrators in technology planning and management is essential. Strategic measures need to be put in place within a policy framework that ensures the school administration and their key support staff are well trained in technology management in the roll out process.

Taylor (2011:1,7) argues that instead of seeing change as a continuous series divorced from any appearance of constancy, change can be viewed as having a parallel partner called continuity. Although less glamorous than change management, continuity management deserves equal enthusiasm and professional diligence among today's leaders. Sushil (2001) in Sushil (2005: 23) notes that "in view of the Situation-Actor-Process (SAP) framework, the continuity forces are generally linked with the 'actors' and 'processes', whereas the change forces largely emanate from the change 'situation'. The combination of continuity and change forces are mapped on a continuity-change (C-C) matrix". The former will be discussed in this section whereas the latter will be discussed in the next section dealing with change and ICT.

2.2.3 Continuity Forces

Sushil (2005: 23-25) postulates that continuity forces are the forces of inertia caused by the organisations themselves. The larger and better performing the organisation is, the larger would be this flywheel of inertia. In the current education domain, this momentum helps the school to steer through the obstacles and grow overtime. Some of the important continuity forces, according to Shushil (2005:23) are: large customer base, huge infrastructure, investment in technology, well established culture, core competence, supply chain and distribution network and higher level of business performance. These are presented in Figure 2.1 and discussed in the sub-sections that follow.

Figure2.1. Major Continuity forces



Source: Sushil (2005:23)

2.2.3.1 *Customer Base*

One of the important objectives of any organisation would be to increase its market share in its business domain. The larger the market share it captures, the larger the current customer base it has to serve. Growth is always one of the major corporate objectives of any business entity. But the higher the organisation soars its growth curve, the higher the inertia for it to cling with the current products and services and its delivery mechanisms. “The increasing size of customer base flywheel creates higher inertia to maintain continuity” (Shushil 2005:23). School administrators in this case may find it challenging and may be reluctant to embrace and apply new technology in their administrative tasks in a scenario where the existing methods seem to be effectively working in expanding its clientele.

2.2.3.2 *Infrastructure*

Infrastructure is a major physical flywheel of any business enterprise. The larger the manufacturing and service infrastructure an organisation creates; it demands larger continuity of operation for higher capacity utilisation and amortization of fixed costs by achieving economies of scale. On the one hand, sound infrastructure aids in business performance and makes it a desirable investment, whereas on the other hand, it acts as a major inertial force for organisations to move to another growth curve even if it may appear more lucrative.

2.2.3.3 *Technology*

Technology is a major strategic driver for leveraging the success of any enterprise. It requires technological excellence to achieve the performance objectives of cost, quality and choice. The manpower capabilities to handle particular types of technologies and associated technical capabilities provide an organisation with cutting edge and competitive advantage. Technological capabilities pull the organisation to move largely around them and aspire for higher developments in similar areas. The same applies to a school set up where ICT is applied in administrative duties for efficiency and marketing the school competitively to the wider community.

2.2.3.4 *Core Competence*

Leading organisations concentrate their efforts to create a bundle of skills and technologies that are competitively unique and provide a distinct value to the customer. Since these core competencies are unique, the organisations try to defend them and make them harder to imitate. In the process, organisations gain competitiveness in the current business with a possibility for future extendibility. It is extremely difficult for any organisation to go for a major strategic unlearning to turn the tide of the core competencies and thus these core competencies, at times, may also act as a major continuity force for leading organisations. A school that posts credible overall results (academic and non-academic) in this case may be reluctant to embrace any change for fear of the unknown, which may offset the existing traditions.

2.2.3.5 *Supply Chain and Distribution Network*

In order to add value to the entire value chain and pass it onto the customer, a huge supply chain and distribution network is usually created for existing products. The contractual arrangements across the network would bind it to perform the current services excellently and hold from any major departure or experimentation. However, "huge investment in information technology across the whole network makes it function smoothly; it becomes a major stabilising force as well" (Shushil 2005:23). A competitively well performing school with a large number of students entering university, tertiary institutions and the alternative labour market may cling to its traditions and be complacent to any move that is likely to alter its status quo. This may pose a challenge in the integration of ICT for both pedagogical and administrative purposes in such schools.

2.2.3.6 *Culture*

The culture of any organisation is a major unifying force to maintaining continuity. Cultural change in any organisation is a cumbersome and slow process. Good work culture is always considered to be a major contributor to organisational performance, but it also acts as a stabilising force inhibiting major change efforts and usually creating a resistance to change. It is

advocated that it is not wise to focus directly on culture for a cultural change, rather it would be effective to focus on the components shaping it, such as changing people, incentives, controls and organisational structure (Hrebiniak 2005 in Shushil 2005:24). A stable school culture that realises good examination results and service delivery may impede change in ICT integration as it is perceived as a threat to the already efficient systems. This calls for a change of attitude and mind sets of the key ICT implementers for efficacy and efficiency in its integration process.

2.2.3.7 *Performance*

Every organisation aims to enhance its business performance in terms of profitability, growth, customer satisfaction and other business objectives. However, at the same time, higher business performance may be tricky and may force the organisation to adhere to the current high performing framework. This does not create any dissatisfaction with the current state, which is a prerequisite of change. "Why should we go for a change if we are at our best", may be a normal attitude of any organisation. In the education scenario, principals of well performing schools with less ICT application may be tempted to be complacent and reluctant to embrace technological change for fear of the unknown threats and maintain the status quo in performance.

2.2.4 Role of continuity in transition for change

Sushil (2005: 22) observes that "continuity and change are hallmarks of strategic thinking". In view of this, Quinn (1978, 1980) in Sushil (2005:22) notes that, "some important strategies in this respect are that of 'continuity' and 'logic incrementalism'. The organisations used to form strategies so as to survive and grow by maintaining continuity in their business domain. The strategy of 'incrementalism' also focuses on continuity with an incremental change to dynamically evolve" (ibid.).

Bush (2008:9) posits that "while a clear vision may be essential to establish the nature and direction for change, it is equally important to ensure that innovations are implemented efficiently". He adds that the school's residual functions should be carried out effectively while certain elements are undergoing change. Vital Wave Consulting (2009:17) argues that as

technology continues to evolve, new advances should be factored into the requirements to make use of innovative solutions and to keep pace with tools used in society. ICT, when integrated in the schools, needs to factor in the key administrative structural elements that are responsive to these new innovations. This will ensure that continuity and change are well blended as the latter gradually navigates the turbulent wave of resistance and uncertainty with ease.

Burchell and Kolb (2006) in Taylor (2011:2) are of the opinion that "understanding how an organisation's appetite for stability and change matches its environment may be the key to finding the sustainability zone – the balance that will enable the organisation to survive and drive". If a firm is 'here to stay' it must practice 'constant change' and achieve internal and external balance. "The role of managers is to gauge and manage the inherent tensions of this challenge and lead the organisation through necessary change whilst providing consistency" (ibid.). Any change management strategy that undermines the role of the key flexible organisational structures cannot usher in change with stability. There is therefore the need for more research on the role of continuity in embedding and managing change in ICT integration in secondary school administration.

Policy Note (2005:3) posit that in the face of intense competition, countries no longer rely on the accumulation of capital and labour for economic growth sustenance. He notes that the capacity of the workforce to generate new knowledge has to be continuously encouraged. ICT education policy should not be formulated in isolation but should be planned to complement and support other development strategies when implemented (ibid.). Infusion of ICT in secondary school set up should not be perceived as a deviation from the norm but rather as an integral part of the whole that not only complements but also enhances other development strategies in secondary school administration.

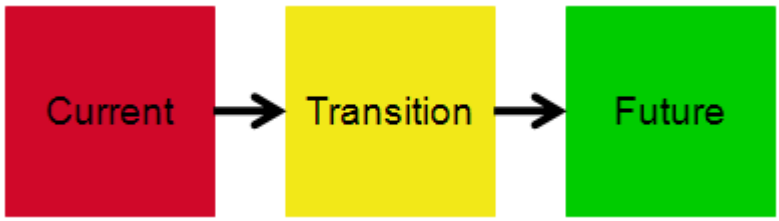
A study by Vital Wave Consulting (2009:17) suggests that, "change management and communications efforts should continue long after the technology is deployed and operating". It further contends that these strategies are most effective if continued over the life of the deployment, to ensure a long-term commitment to the programme and to keep people informed as each phase of the deployment occurs. ICT integration in school administration requires

concerted efforts of various key players for it to be a success in a flow. It not only requires capital and physical facilities but also a continuous behavioural and attitudinal change among the implementers (ibid.). This therefore creates a close link between ICT implementation, continuity and change as a crucial component of this study.

2.3 CHANGE AND ICT

Prosci Change Management Centre (2011) defines change as "a movement out of a current state (how things are today), through a transition state and to a future state (how things will be done)". Change can be internally motivated or externally motivated. Change can be a dramatic departure from what we know or it can be minor. Changes can be anticipated or unexpected. But in all cases, the fundamental nature of change is a movement from the current state through a transition state to a future state (ibid.).

Figure2.2 Organisational states of change



Source: Prosci Change Management (2011)

Regardless of the nature, shape and size of the change, they all are an attempt to move the organisation from a current state, through a transition state, to a future state. And, each change is an attempt to improve performance (Prosci Change Management Centre 2011).

Fullan (2002) in Gewerc (2011:66) notes that "change is a process involving the organisation as a whole and each one of its members has to learn new ways of thinking and acting". According to Beach and Reinhartz (2000) in Makhanu (2010:24) change is a part of life for both individuals and organisations. The existing school administrative mechanisms forms the basis and a

generation point for a change in ICT integration in secondary schools as individuals have a reference point in the change process.

Vital wave consulting (2004:24) posit that "change must be institutionalised or it risks being lost as government administrations change over time". In addition, getting buy-in for technology deployments at the local government and school levels helps to solidify support for the deployments and encourages governments to stay with the deployments even when there is a change in political administration (ibid.). There is dire need for further research on how best to institutionalise change in the use of ICT in management of secondary schools to ensure stability in innovative practices.

Stoner, Freeman and Gilbert (2001) in Makhanu (2010:24) describe three types of change. "One is planned change, which is a conscious and the deliberate attempt to manage events so that the outcome is redirected by design to some predetermined end. The second is spontaneous change, an alteration that is the result of natural circumstances and random occurrence. The third is evolutionary change which refers to long-range, cumulative consequences of major and minor alterations in the organisation". These three types of change have not adequately covered the most appropriate one for ICT integration in secondary school administration. There is need for further research in establishing the best suited type of change in the integration of ICT in education administration.

In a related view, Rogers (2003) in Al-Sharija (2012:33) argues that there are three types of change decisions. These are: optional: a decision that is made individually and independently by some organisation members; collective: a decision that is made consensually among organisational members; and authority: a decision that is made by a powerful member, such as an organisational board and managers. Irrespective of which type of change, ICT in a school set up is meant to improve various domains of administration for a better outcome as the school keeps pace with the global trend.

It is important to recognise that in order for change to represent an improvement, it has to be grounded in practice, and this is defined within the cultural meshwork of the organisation

(Gewerc 2011: 66 -67). A change based on this underlying philosophy in ICT could represent a catalyst but it cannot be merely the sum of individual changes, or a solitary event in the school. Nothing changes if the organisation's processes of construction and interpretation are not altered (ibid.). There is a need for proper planning strategies that will gradually alter the school administrative structures to accommodate change in the use of ICT in a secondary school environment.

Makhanu (2010:24) argues that "whether change is planned or occurs spontaneously due to natural circumstances, there are cumulative consequences for an organisation". Ming, Hall, Azman and Joyes (2010:13) note that "school improvement fundamentally involves the process of change and transformation and not [just] change for change's sake but to improve the quality of teaching and learning which students receive". The same would apply to the quality of service delivery in the administrative functions of the school while integrating ICT in the transformative process of its management.

Gewerc (2011: 66) views the organisation as "a cultural artefact, not simply a structure. Therefore, the most invisible and determinant dimensions in the life of a school are the result of how people build and configure organisations". He adds that it is not a question of doing new things just because they are new, but rather a commitment to change. This is to be done through an understanding and consensus on philosophy and goals where there must be a clear commitment to new ways of understanding and working within the school (ibid.). There is a dire need for policy makers in education to rationalise the change and its management among key implementers while putting their views into consideration to ensure their commitment to change.

2.3.1 Concept of change in the use of ICT

Peansupap and Walker (2005:198) posit that the "change management concept highlights three main issues". First, the concept of change management is required as an additional IT implementation process. Second, it is a dynamic activity that facilitates and maintains continuous change. Third, it involves interaction between strategy, structure or process, technology and people. The interaction of each factor provides the basic understanding of how change occurs".

However, it is also necessary to focus on how to manage and control change (ibid.). Change process must not only be manageable but sustainable as its fruition takes the centre stage along the set parameters.

In order to embrace change, people need to understand it (Vital Wave Consulting 2004:22). It is essential, therefore, to create a comprehensive communications plan that lays out what the technology in education programme is trying to achieve and what steps are needed to achieve this. Communications must be timely and clear, and they must reinforce core messages and the programme's vision stressing how the programme will benefit teachers, administrators, parents and primary-school students (ibid.).

The introduction of ICTs has to be accompanied by far reaching reorganisation of the learning structures (Policy Note (2005:3). In addition, it is important that technological innovation is developed to serve education in a diverse learning context, while respecting linguistic, cultural and social differences. A receptive education system helps in the successful implementation of ICTs in schools. The education structure must be open to the evolving technological changes (ibid: 5). Using ICT in education seeks fundamental reform and change in traditional instructional programmes (Afshari, Bakar, Bahaman, Samah & Fooi 2008: 645). This reform requires a well-planned integration plan that can gradually be infused alongside other key structures of the school that are compatible with change or can meticulously be integrated to suit the said change in ICT use in secondary school administration.

Taddeo (2006:2) argues that **"**the integration of ICTs do not merely require the implementation of government initiatives, nor is there a definitive end to the process of integrating ICTs". He notes that ICT integration is not isolated in its impact but rather has wide reaching implications for learning across all curriculum areas and for all members of a learning community. ICT in education has influenced the traditional approaches of dealing with daily-tasks, thus enabling change in the methods of managing and educating (Al-Sharija 2012:27). This is attested by the way in which the use of ICT enables gathering and storage of huge volumes of data that is swiftly processed and information disseminated to various recipients of the school community

for necessary action. Manipulation and customisation of such information to suit each individual school in its execution of pedagogical and administrative skills becomes easy.

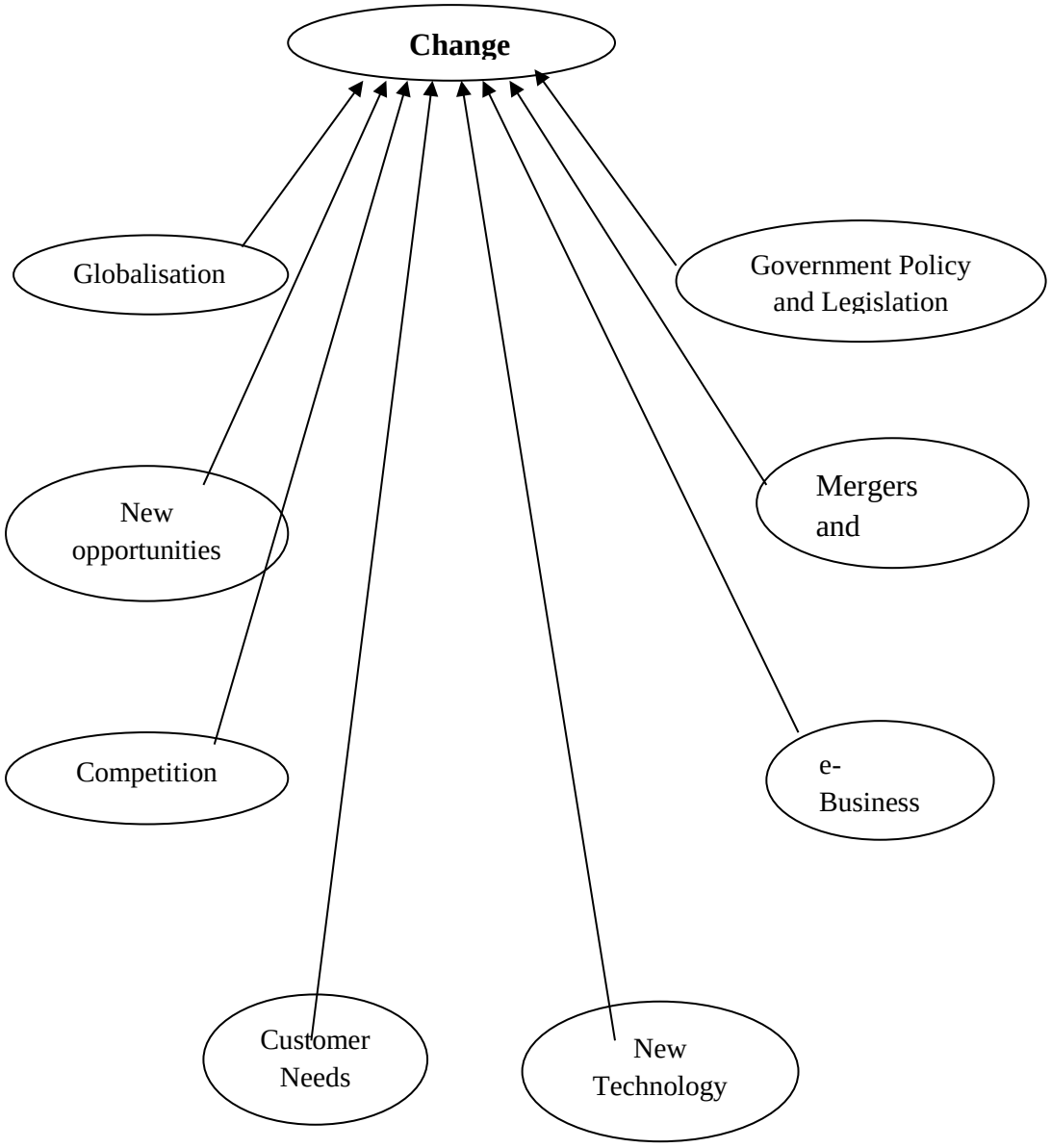
Kipsoi, Chang'ach and Sang (2012:9) posit that by its very nature the ICT phenomenon is relatively new in the developing world. They further argue that the quest for adoption of ICT in educational management has been problematic and will require fundamental shifts in the regulatory environment, as well as renewed attention to public-private partnerships and social services. It is, therefore, necessary to focus on the change forces in addressing the role of ICT in advancing secondary school administration in this study.

2.3.2 Change Forces

Sushil (2005:25) notes that "although the 'actors' and 'processes' linked with the enterprise create forces to maintain continuity, the continuously changing business situation, in particular due to globalisation, generates forces that direct the organisations to strive for change". In relation to this example education as knowledge based enterprise is in a changing technological environment. The situational change forces could be both external and internal. "The external change forces may emanate from changes on political, economic, social and/or technological fronts, whereas the internal change forces may be because of poor performance (low profitability, loss of market share), change in top management, and so on" (ibid.).

Holbeche (2006) in Al-Sharija (2012:32) observes that change is driven by the convergence of social demands, market demands, political intervention, and evolving attitudes towards work. As earlier indicated in this study, the combinations of continuity and change forces are mapped on a continuity-change (C-C) matrix (Sushil 2005: 25-27). In this study, seven of these forces of change are discussed. They include; globalisation, new opportunities, competition, customer needs, new technology, e-business, mergers and acquisitions.

Figure 2.3: Major Change forces



Source: Sushil (2005:25)

2.3.2.1 *Globalisation*

Globalisation forces are continuously strengthening due to liberalisation of trade and investments, multilateral agreements, increased economies of scale, homogenisation of customer needs, reduced cost of coordination due to telecommunications and IT developments, and so on (Gupta & Westney 2003, Lasserre 2003 in Sushil 2005:25-26). The process of globalisation

creates global competition and pushes domestic companies to move out of the shell (Sushil 2005:25-26). He adds, even though the organisations might be leading in the domestic market, the globalisation forces demands a major strategic and organisational change from such well-established organisations. As a consequence, organisations in the recent past moved from domestic strategy to multi-domestic strategy, global strategy or transnational strategy. Thus, globalisation can be seen as a major change driver that is influencing all other change forces, either directly or indirectly (ibid.). In relation to the education sector, schools being a part of the global village are compelled to keep abreast with the modern global trend of new ICT technology use for effective and efficient service delivery.

2.3.2.2 *New Opportunities*

New opportunities are emerging on the scene and are getting multiplied due to globalisation and liberalisation of business. The liberalisation of tariff and non-tariff barriers and multilateral treaties are throwing a range of opportunities for the business enterprises. However, it requires to make major changes in the strategies, structure and systems to en-cash these opportunities. The organisations subject to low continuity forces may quickly jump and strategically transform to align with new ways of doing business. However, the organisations being pulled by their massive continuity forces need to develop more innovative strategies to take immediate benefit of these new opportunities. Change in this case requires to be infused as continuity in moderation as new opportunities gradually take centre stage in school administration. There is need for schools to lay good ICT strategies, structures and systems so as to amass these opportunities through technological innovations.

2.3.2.3 *Competition*

It is not only the opportunities that act as a major change driver; the changing face of competition may also drive organisations to change. In the wake of globalisation, the competition of domestic companies suddenly starts coming from global competitors as well as the unknown quarters in the transformed industrial landscape. This may be due to substitute products or services, or vertical integration by existing players. In addition to the new

competitors, the basis of competition is shifting in various industries. Rather than only cost, other performance areas such as quality, choice and speed are also emerging important competitive advantages. This would require the organisations to completely transform their competitive strategies. Effective and efficient use of ICT would create a substantive consumer confidence in the implementing school thus giving it competitive advantage over other schools. For example schools without ICT infrastructure or those that are not implementing ICT use adequately in gaining more clientele.

2.3.2.4 *Customer Needs*

The customers are becoming more aware, quality conscious and demanding. In a competitive environment, 'customer orientation' is becoming the mantra of success. The needs and tastes of customers are changing which are fuelled by the range of competitive choices available in the market place. These are also governed by new product features and options available with technological innovations in the industry. For example, in case of mobile phone handsets, new product models are launched quite often with attractive features. The mobile phones have changed from simply telecom equipment to internet connectivity, colour option, camera and so on.

Nowadays, customers want more value for money and are not merely looking at the price tag. They are expecting total customised solutions to their requirements rather than a merely product, and are also willing to pay for it. Thus, the customer driven organisations are under great pressure to renew and upgrade their offerings and value addition as compared to the competitors. In order for schools to remain afloat in the academic global village, they must not only use ICT for pedagogical purpose but also utilise it effectively for their respective administrative tasks. This will facilitate school marketing, expansion and maintenance of their wider clientele.

2.3.2.5 *New Technology*

Market-pull is not only a change force but also technology-push is another greater force in the era of globalisation. Globalisation brings out new technology in the market place which forces

existing organisations to upgrade their technology portfolio. How far the organisation can go with the existing technology and when the progression is to be done, is the key question of continuity-change faced by a large number of organisations. The organisations in services sector, dealing with soft technology (such as IT), can opt for a quicker change as compared to organisations dependent upon hard core products and process technologies. Schools in relation to this context can use new ICT innovations to enhance their administrative performance in service delivery where they can retain their competitiveness in the local and national scenes. This would help to bring on board many education stakeholders to exploit the potential of new technological advancement.

2.3.2.6 *e-Business*

Developments on the front of information technology (IT) have led to the emergence of a new business paradigm, that is, e-business. The e-business model has shown tremendous advantages in terms of speed, accuracy, lower transaction cost, larger customer reach, any time-anywhere business, and so on. What should be the level of e-business transformation; that is information, automation of processes, transaction and integration, would depend upon the e-business maturity of the enterprise (Sawhney & Zubin, 2001in Shushil 2005: 27). E-Business can be effectively applied in various monetary transactions of school administration ranging from floating and awarding of tenders, payment of school fees, workers' salaries and school creditors, among others.

2.3.2.7 *Mergers and Acquisitions*

As the markets are maturing, the industries are getting consolidated and Mergers and Acquisitions (M&A) are becoming a major drive. M&As are taking place due to a variety of reasons, such as efficiency, diversification market power, control and others. Some organisations have grown globally via this route, such as 'Electrolux'. The M&A revolution is acting as a big change force for the organisations to either go for acquisition or get acquired. The 'Tata Tetley' merger is a unique example of Indian tea industry getting globalised in an inorganic manner. The M&A activity, on the one hand, changes the nature of competition in the market and creates

cross-cultural integration pressures within the organisations. M& A can be used in cost efficiency of running educational institutions in a case where two or more schools can be merged together in the provision of pedagogical and administrative services using ICT. This can reduce the cost of hiring more personnel in school management and avoid duplication of duties.

2.3.2.8 *Government Policy and Legislation*

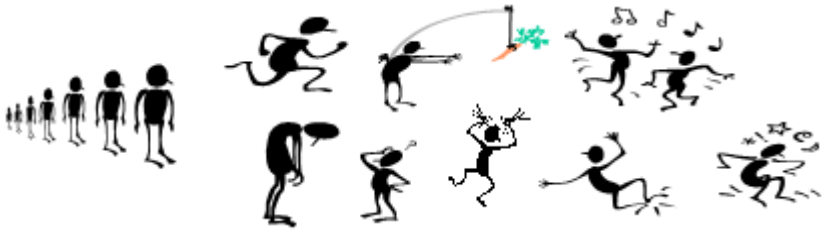
Government fiscal policies, by way to setting levers of taxes and duties, promote or restrict certain products and sectors, encourage foreign trade, facilitate technology flow, and so on. The working of industry is greatly influenced by change in governmental policies which may be either favourable or adverse to it in the current business frame work and thus force the organisations to change their strategies. The imposed strategies may also be resultant to a consequence of some legislative measures. Government policy and the Legislation Act may act as key facilitator or inhibitor of change in ICT implementation for advancing secondary school administration in Kenya. There is need for more research to address the role of government policy and legislation Act in the use of ICT in secondary school administration to come up with how best the said ICT can be used to enhance secondary school administration.

2.4 CHANGE MANAGEMENT IN ICT INTEGRATION IN SECONDARY SCHOOL ADMINISTRATION

Whatls.com (2010) defines change management as “a systematic approach to dealing with change, both from the perspective of an organisation and on the individual level”. It posits that change management has at least three different aspects, including: adapting to change, controlling change, and effecting change. A proactive approach to dealing with change is at the core of all three aspects. “For an organisation, change management means defining and implementing procedures and/or technologies to deal with changes in the business environment and to profit from changing opportunities” (ibid.).

Prosci Change Management Centre (2011) contends that change management is about supporting individual employees impacted by the change through their own transitions, their own current state to their own future state that has been created by the project or initiative.

Figure 2.4: Employees reaction to change



Source: Prosci Change Management (2011)

Some employees will rapidly embrace change. Others will be reluctant. Some will be happy with the change and others will be upset by it. Some employees will change quickly, others may take some time, and there may be a group that will not embrace the change. Change management provides the process, tools and principles to support the individual transitions precipitated from an organisational future state (Prosci Change Management Centre 2011). The existing school administrative structure forms not only the basis but also the rationale for change and its management. Individuals implementing change must be able to relate to the past and present to identify strength and weaknesses of the intended change in the use of ICT and offer solutions for possible challenges.

Vital Wave Consulting (2009:22) posits that "change management is an approach for ensuring that people and processes are prepared to succeed in a new environment". They further argue that developing a comprehensive plan for change management allows planners to navigate the potential problems that may occur during implementation and to avoid some problems entirely. The characteristics of change concern realistic needs, clarity of goals, navigation and vision, complexity of change, and the quality or practicality of the change introduced (Fullan 2007 in Al-Sharija 2012:35). A comprehensive ICT integration plan forms the roadmap for ushering in the intended change. However, changes in schools are many a time introduced without proper planning that ends up disappointing the enthusiastic implementers. Change management in the

use of ICT in secondary school administration if not well planned can become a white elephant project or black-hole for monetary, physical and human resource in the name of new global trend. There is therefore a need for further study on the role of planning in change management.

Gewerc (2011:66) points out that "change in the didactic approach or in the way of using new materials is more difficult when new skills and new ways of conducting teaching activities are required". He further notes that it is also important to recognise that in order for changes to represent an improvement, they have to be grounded in practice, and this is defined within the cultural framework of the organisation. A change based on this underlying philosophy in ICT could represent a catalyst but it cannot be merely the sum of individual changes, or a solitary event in the school (ibid.). "Change management is possible through changing the culture or the ethos of the organisation, whether to make it more competitive or efficient under new conditions" (Mohlokoane 2004 in Makhanu 2010:25). This requires a gradual process because a change that does not put into consideration the pertinent role of the existing culture in its implementation can backfire and be counter-productive. Change management in the use of ICT in school administration is not an exception in this case.

Gewerc (2011:66-67) argues that "the most invisible and determinant dimensions in the life of a school are the result of how people build and configure organisations". With this in mind, it is not a question of doing new things just because they are new, but rather it is a commitment to change through an understanding and consensus on philosophy and goals. There must be a clear commitment to new ways of understanding and working within the school (ibid.). Commitment to change in the use of ICT in school administration by its implementers is of paramount significance if it is to impact positively in a school environment in enhancing education administration.

Unless technology advances brings with it an attitude shift towards learning, computers cannot be properly used to enhance education quality (Policy Note 2005:3). The old models of traditional rote method of learning do not optimise the integration of ICT in education. To get maximum value from new technologies, there has to be a shift in the attitudes governing education. Educators and teachers have to figure out new ways to take advantage of the fast

evolving technology. It is imperative that space and resources are given directly to teachers and learners to find innovative ways to use technology (ibid.).

Senge, Kleiner, Roberts, Ross, Roth and Smith (1999 in Peansupap & Walker 2005:197-198) identify the learning concept as a key part of managing change within organisations and propose four key management issues: (1) motivation, (2) training and technical support, (3) supervisor support and rewards, and (4) open discussion and learning environment. The details of these factors have been discussed in the progression of the study in 2.4.2 and in chapter three.

Hermans, Tondeur, van Braak, and Valcke (2008) in Gewerc (2011:66) note that changes in beliefs are very complex: they put into question individuals' fundamental values regarding the objectives of education. These beliefs are often not explicit nor the object of discussion, but they are rather buried deep at the level of presupposition (Gewerc 2011:66). However, Al-Sharija (2012:30) argues that ICT implementation in schools requires much effort for successful integration such as behavioural and practical amendments which can be challenging for educators. It is therefore imperative to focus on several approaches to change management in addressing challenges of using ICT in advancing secondary school administration.

2.4.1 Approaches to Change Management

Taddeo (2006:1) argues that "while approaching change proactively is important, change needs to be approached from an informed perspective. He adds that decision makers and all educational stakeholders need to be informed of current and future trends of ICTs in education". Policies formulated and practices encouraged in schools should be founded on and supported by relevant and current research (ibid.). Information on the current trends of ICT in education plays a key role in the genesis for change management approach. Leadership is a key factor in bringing about effective change in an education setting (Al-Sharija 2012:42). Administrators may also embrace change if they understand how technology can improve their own ability to do administrative tasks. This is especially true in primary and secondary schools, where administrators may be quite overburdened (Vital Wave Consulting 2009:23). Understanding the

various benefits of technology motivates the change agents in not only advocating for change but also playing a key role in its implementation.

Vital Wave Consulting (2009:25-26) suggest that change management strategy is most effective when it has both a short and long-term component. In the former, an effective teacher change management strategy is needed to ensure that teachers embrace the introduction of technology in the classroom. The best way to achieve these goals is to involve teachers in the initial planning stages of the programme. For example, a primary school in Uttar Pradesh, India required that teachers participate in technology workshops far in advance of the deployment of technology in their school. It was noted by the school that the success of the subsequent primary school technology programme was largely due to the teachers' increased familiarity and comfort with technology. In the latter, the study observed that continued effective use of the computers in the classroom depends largely on the sustained motivation and abilities of teachers (ibid.).

Tearle (2004) in Afshari *et al* (2008:646) notes that in relation to the implementation of ICT, not only staff needs to operate them, but also they must have an understanding of the pedagogy required to use them and to meet teaching and learning needs. Successfully implemented reforms require leaders to participate as active learners in dynamic changing environments (Fullan 1998 in Afshari *et al*.., 2008:646). Educational leaders can therefore have a major impact on the success, coherence and sustainability of the change process. Vital Wave Consulting (2009:12) posit that "mapping the education ecosystem allows officials to understand who will be most affected by a technology deployment and how". Once these stakeholders have been mapped, their specific change management needs can be identified (ibid.). This will form a strategic roadmap in change implementation approach.

The principal can adopt the strategy of distributed or shared leadership by which secondary level teacher leaders emerge and get involved in the ICT policy-making process in order to facilitate change (Prain & Hand 2003 in Chung 2005:3). The principal needs to delegate to other teachers and instil a sense of change ownership among them. Gronow (2007:5) points out that "principal's delegation of an ICT leader promotes the personal belief in the importance of ICT in the school. The ICT leader as the expert supplies the principal with advice on ICT". The

principal, with the support of the ICT leader and school community, can develop an ICT vision and e-Learning plan, aimed at developing a sustainable direction for ICT in teaching and learning, administration and business of the school organisation (ibid.). In support of this, Bush (2008:7) contends that teachers and leaders are more likely to be enthusiastic about change when they 'own' it rather than having it imposed on them. Ownership of change by its agents becomes one of the major driving forces in its implementation and its sustenance in ICT integration in secondary school administration.

Taddeo (2006:10) posits that "if change is constant in the world of education, then building capacity at all levels and across all domains may provide some of the solutions to the problem of maintaining and sustaining reforms". ICT has the potential to individualise student learning and revolutionise the way educational communities exist, function and relate to each other. With this amount of potential, ICT deserves to be an on-going focus in our educational institutions and of government policies. Educational leaders, policy makers, governments and learning communities need to develop visions, combine efforts and pool resources in order to build the necessary capacities to support transformative ICT integration (ibid.). Capacity building for change agents is crucial in the integration and sustenance of ICT in education administration of secondary schools as it equips them with the necessary skills and confidence to work.

Vital wave consulting (2009:6) notes the need for participants in a technology deployment who are members of the education and technology ecosystem. Successful technology programmes require the inclusion of each of these members, from hardware and software, supplemental learning content and curricula-providers to governments to the students and teachers themselves. There is a need for a total solution approach as it reflects the interests and responsibilities of each party in a unified and comprehensive fashion (ibid.).

Taddeo (2006:2) argues that "in conjunction with building ICT capacity there is a need to devise strategies to deal with resistance to change, coping with continuous change, and providing support structures in change rich environments in order to sustain reforms". He adds that these aspects can be addressed in educational settings by building change capacities. This will equip

change agents with the necessary knowledge, skills and attitude to ensure change transition with ease and less resistance in integrating it in the school administration.

Vital Wave Consulting (2009:22) points out that as with any fundamental change, technology deployments are exciting but potentially threatening, as they result in altering long-standing practices with which people feel comfortable. A structured change management approach allows individuals to feel as though their needs and concerns are being understood and responded to during the technology deployment, which may reduce institutional resistance and even increase enthusiasm (ibid.).

Kipsoi Chang'ach and Sang (2012: 19) observes that the use of ICTs in educational management is greatly under-emphasised. They further argue that a more holistic approach requires that schools be receptive and open to the changes ICTs may make, and to the on-going evaluation of these changes for the schools' purposes. For any change to be effective and efficient, it requires a driving force from within or without the implementers.

2.4.2 Role of motivation in change and ICT use

Motivation as earlier indicated in the expectancy theory in this study (1.6.2) relates the mental process regarding choice, or selection and explains the processes that an individual undergoes to make choices. Alignment of aims, purpose and values between staff, teams and organisation is the most fundamental aspect of motivation. The better the alignment and personal association with said aims, the better the platform for success (businessballs.com).

Chapman (2013:1) posits that **"**where people find it difficult to align and associate with the organisational aims, then most motivational ideas and activities will have a reduced level of success". Motivational receptiveness and potential in everyone changes from day to day, and from situation to situation. Since people are motivated towards something they can relate to and something they can believe in, motivational methods of any sort will not work if people and organisation are not aligned (ibid.). Motivation has been commonly described as the most significant force to "mobilize people's commitment to putting their energy into actions designed

to improve things" (Fullan, 2001 in Al-Sharija 2012:58). For any change to occur there must be a driving force that motivates the change agents to act in a given way, either for or against it.

Ming *et al*., (2010:6) posit that teachers' efforts to introduce ICT into their professional practice are influenced both positively and negatively by two important variables; extrinsic and intrinsic. Ertmer (1999) in Ming *et al.*, (2010:6) describes extrinsic factors as first-order barrier to ICT integration, which includes obstacles such as: the lack of access to required hardware and software; insufficient time for teachers to plan instruction and to familiarise themselves with ICT; and inadequate technical training and administrative support. Second-order barriers, on the other hand, are obstacles that impede fundamental change towards ICT integration into the learning environment or school culture. These obstacles are usually rooted in teachers' underlying beliefs and values about teaching and learning but may not be immediately apparent or in the consciousness of teachers themselves (ibid.).

Motivation ensures the execution of a given strategy to achieve the desired goals. Al-Sharija (2012:5) observes that "the Ministry of Education in Kuwait adopted a seven-part strategy to introduce ICT in Kuwaiti schools". This strategy incorporated phases that allowed academic staff to maintain and build their abilities to gain essential ICT skills over a five-year period, starting in 2002. The strategy included a number of features to foster implementation, such as: incentive rewards for implementation before the due date; preferential promotion of principals who completed the implementation before the due date; mandating the implementation as an essential requirement for promotion after the due date; and, finally, an International Computer Driving License (ICDL) certificate for employment in teaching after the due date became essential (Ministry of Education in Kuwait 2002).

Gurr, Drysdale and Mulford (2006) in Gronow (2007:6) argue that "shared decision making, distributed leadership and professional learning will motivate and empower others". In this way, the principal is able to set a goal for the development of ICT in the school by delegating the promotion and development to an ICT leader (ibid.). Moderate delegation in distributed leadership is very vital in motivating various change agents in integrating the desired change in the use of ICT in education administration.

Vital Wave Consulting (2009:26-27) contends that teachers may be more motivated to be involved in the changeover if they can gain additional certification and skills. They further argue that increased compensation or recognition might make this new technology more appealing and more likely to be fully adopted. “Compensation or recognition could be based on the amount of training a teacher receives, the performance of their students or their own use of the technology. Incentives could include one or more of the following items: financial incentives, professional development and/or certification, Increased status, non-monetary goods” (ibid.).

Policy Note (2005:2-24) observes that “having a recognition system for innovative and effective use of ICT integration in schools will motivate teachers to use ICT in teaching. The schemes can be in the form of awards or grants for teachers, heads of department or principals. It can be at the school, regional or national level. The sponsors could be schools, higher education institutes, private companies or educational organisations”. National awards for outstanding teachers are a good strategy to encourage teachers’ dedication. Support and recognition within and outside schools help to sustain their perseverance and enthusiasm. However, other incentives related to the merit system of promotion could be more sustainable in the long run (ibid.).

Continued effective use of the computers in the classroom depends largely on the sustained motivation and abilities of teachers (Vital Wave Consulting 2009:26). Teachers who are rewarded for embracing the technology will be more likely to meaningfully integrate it into the educational environment. “The potential long-term economic and social benefits that ICT can help deliver are also a major motivator for decision makers” (ibid.). It is therefore the duty of educational managers to ensure that key change agents are motivated accordingly to ensure successful integration of ICT in secondary school administration.

2.5 THE PROCESS OF CHANGE MANAGEMENT IN THE USE OF ICT

Taddeo (2006:6) contends that “educational leaders have the responsibility to be active participants in the integration of ICT”. To appreciate the importance of the change process in ICT integration, educators need to acknowledge that the learning potential will not be realised

unless there is incorporation of knowledge of the change process (Fullan & Smith 1999 in Taddeo 2006:6).

Tearle (2004:9) posits that the characteristics of the process through which change is managed is important in change process. Rogers (1992) in Tearle (2004:9) cites five characteristics significant in the speed and ease of adoption of change: relative advantage, compatibility, complexity, trialability and observability. There is sometimes a reason for resistance which is important and can alert change managers to the need to re-assess their strategy (Ellsworth 2000 in Tearle 2004:9). Resistance to change in the use of ICT in this case should not be perceived as a threat but as a challenge and an eye opener in navigating strategies of the change management processes to attain the set goals.

Vital Wave Consulting (2009:11) contends the need to perform a readiness assessment which will require an understanding of the gaps between the ICT in primary education plan and existing infrastructure. Identifying the actions required bridging those gaps and learning about the technological and pedagogical advances that can be incorporated into the ICT plan is also a crucial requirement (ibid: 5). This will ensure focused change management with strategies that addresses the identified gaps in facilitating the use of ICT in secondary school administration.

Wango (2009) in Makhanu (2010: 27) explains that "there is a considerable increase in knowledge and innovations which have had an impact on education". He elaborates that education policy makers will have to combine the knowledge of individual schools with an understanding of administrative and managerial factors and skills so as to influence the process of change.

Rogers (2003) in Al-Sharija (2012:33) identified and described a five-step process for the nature of change in which change flows through particular channels, over time, among the members of a social system. He also believes the process of change evolves sequentially from initiation, collecting information, conceptualising, planning for the adoption of an innovation, to making the decision of change implementation in the organisation. There are two broad categories of decision making; one is the official or policy instigated method, and the other is the democratic

and practitioner initiated method. According to Rogers (2003), "each member of the organisation faces making decisions about innovations based on the following five factors:

- Knowledge: a person becomes aware of an innovation and has some ideas of how it works;
- Persuasion: a person takes a positive or negative attitude toward the innovation or change in a system;
- Decision: a person engages in actions that lead to a choice to adopt or reject the innovation or change;
- Implementation: a person puts an innovation or change into use; and
- Confirmation: a person assesses the outcomes of an innovation-decision already made". (Rogers, 2003).

If the adopters are not aware of the change structures, implications and skills needed, they will not react effectively (Ellsworth 2000 in Al-Sharija 2012:33). Since these factors play important roles in disseminating change, the importance of the organisational leadership emerges. Thus, leadership appears critical for making each member of the organisation receptive to change (Al-Sharija 2012:33). Informed and focused leadership in this case will ensure transition to change with ease in the use of ICT among the various change agents.

"The implementation of a new technology project in a school does not end with buying computers" (Vital Wave Consulting 2009:14). While the technology deployment will bring significant learning and socio-economic benefits, many stakeholders may find it disruptive in the short term. Defining and executing the change management strategy early will ensure that the stakeholders are brought on board and prepared for the ICT in the Education Plan (ibid.).

Kokay (2004:17) posits that "ICT decision-making requires faster decision-making procedures than other issues within the school such as property development, staffing needs and teaching programmes. Additionally ICT decisions may also need to be revisited and changed more quickly than decisions relating to other school issues. This adds to the pressure on secondary school leaders who already find themselves faced with juggling other decision-making portfolios, such as curriculum and assessment (ibid.). Decision making process on the use of ICT

in secondary school administration needs to address the current global trend of schools being part of the wider global community. If this is not addressed on time, the strategies adopted in the change process may become obsolete and a waste of physical and human resources all together.

Al-Sharija (2012:34) argues that “the change needs to be led by informed leaders who: understand the change processes; can solve conflicts; know the nature of change; and can generate the forces involved”. Since change is always associated with contradictions and dilemmas, it is necessary to be aware of these factors (ibid.). For any meaningful Change Management Process in the Use of ICT in secondary school to take effect, it requires several key agents some of which are discussed in the next sub-topics of this literature review.

2.6 AGENTS OF CHANGE

IMPACT Greensboro (2011) defines a change agent as “someone who knows and understands the dynamics that facilitate or hinder change as she or he defines, researches, plans, builds support, and partner with others to create change”. They have the courage and the willingness to do what is best for the community.

Ask.com (2013) contends that a change agent may be a leader of a division, a full time organisational development professional or a middle manager charged with the responsibility of bringing about a change in his or her area. A change agent may perform many roles, depending on the type of change he or she is tasked with. These include the desired future ideal state, dreams, goals and values of the key stakeholders within the organisation, organisation's future strategy or the organisation's values (ask.com).

A change agent is a person whose role includes the responsibility of initiating and facilitating change or a professional whose major function is the advocacy of innovations into practice (Fullan & Hargreaves 1998; Adam 2005 in Makhanu 2010:27). A change agent diagnoses group problems, plans for change, implements the plans and evaluates the results (Smith 2008:6 in Makhanu 2010:29). This is a way of strategising as the agent of change will be able to identify and address the existing gaps in change management.

In a complex and rapidly changing world, the most important role of a change agent is to develop and sustain the change strategy (Adams & McNicholas 2007 in Al-Sharija 2012:71). They note that the case of the rapidly developing and transforming technological change is a good example. In a related view Fullan (2000) in Makhanu (2010:29) posit that "an effective change agent must understand group dynamics to reduce bureaucracy and change leadership styles to adapt to information innovations".

Al-Sharija (2012:71) argues that there is the need to sustain change through promoting and establishing, or re-establishing, a creative and open educational environment. Without competent users and an effective leader who facilitates ICT change in schools, most of the advantages of ICT integration would not be achieved (ibid: 3). Key agents of change in ICT integration in secondary schools in this study includes; teachers, heads of department, deputy principals and principals.

2.6.1 Teachers

School teachers are change agents who help sculpt children's foundational skills and even their personalities (Vital Wave Consulting 2009:14). Technology is simply one more area where teachers can work as change agents. "Given that teachers are vital to the success of the programme as well as to the realisation of the intended curriculum and the transmission of 21st-century skills and competencies to students, they warrant a specific change management strategy" (ibid.).

Ming *et al*. (2010:5) contend that **"**the full integration of ICT into professional practice requires teachers who themselves understand and believe in the capacity of the new technologies to transform learning in positive ways". This is undoubtedly an emotional challenge for some teachers if it is seen as a threat to their sense of identity and self-worth (ibid: 13). For school improvement to occur, teachers need to be committed to the process of change which will involve them in examining and changing their own practice, Harris (2002) in Ming *et al*. (2010:13). Self-evaluation plays a very vital role in ushering in the desired change to suit the

current trend in the use of ICT in secondary schools. One is able to know his strength and weaknesses and how to overcome the latter.

The teachers are ongoing learners of ICT and consequently, as they accept and adjust to ICT as an essential component of their work place, they will improve their ICT understanding leading towards its pedagogical advantages (Gronow 2007:3). In order to reap the benefits of ICT, it is essential for teachers to be technologically literate hence they need to be able to use computers, the internet, websites, networking and software programmes (Al-Sharija, 2012:30). In support of this, Pedretti, Mayer-Smith and Woodrow (1999b) in Divaharan and Ping (2010:743) argue that teachers need knowledge of appropriate ICT integration strategies and ICT skills to effectively integrate ICT into their lessons and optimise the benefits for their students' learning. Whereas teacher's knowledge of ICT integration in school is important, there is need for further research on the role of appropriate ICT knowledge and skills in the integration of ICT in secondary school administration.

Ming *et al*.(2010:9) contends that "teachers need to embrace new teaching-culture such as keeping up-to-date with current practices and participation in professional networks, allowing exchange of experiences and ideas, and open discourses on effective methodology". The task of developing an education system with internationally recognised standards of excellence requires teachers who constantly strive to be excellent through professional learning and development. These are the ones who share the values and aspirations of the nation as well (ibid.).

2.6.2 Principal

The principal leads the incumbent administration and management of the school's affairs, as a whole, through the regulations and instructions of the Ministry of Education (Al-Sharija 2012:23). In addition, the principal is assumed to work in accord with the framework of the general goals of education. He or she is required to supervise all the school staff and to follow up their actions to ensure that they meet the appropriate standards. The principal can also be seen to motivate staff to raise the efficiency of the school's performance in various fields (ibid.).

Gronow (2007:7) argues that the essential aspect of being the principal of the school as the dominant leader is about commitment to set a vision, to share and work with others in bringing the vision to fruition. ICT in schools is emerging as a central factor for schools to operate efficiently as organisations and as a teaching and learning tool for teachers and students. The principal who is able to create a vision for the development of an ICT learning community will be a 21st leader and learner (ibid.). His or her vision is very prime in coordinating the school administrative functions to ensure quality standards in service delivery in the integration of ICT in schools.

Using ICT in education seeks fundamental reform and change in traditional instructional programmes (Afshari *et al*. 2008:645). Principals are the on-site educational leaders who shape and communicate visions of teaching and learning within their schools, and by their action or inaction influence school activity. Therefore, knowledge of how principals effectively manage staff and student use of computers is essential (ibid.). For school managers to implement the use of educational technology in a constructivist manner, they must have opportunities to construct pedagogical knowledge in a supportive climate (Taylor & Todd, 1995 in Kipsoi, Chang'ach & Sang 2012:21)

Al-Sharija (2012: 3) contends that "principals need to assume major responsibilities for leading change in curriculum development, developing a learning organisation, and fostering staff capabilities". The principal's vision of the possibilities of ICT in teaching and learning are realised through supporting and developing the skills of others (Gronow2007:4). Effective communication ensures that the staff have a clear understanding of the vision which, in turn, helps to shape their identity and passion (Avolio & Bass 2004 in Al-Sharija 2012:57), and increase their commitment toward the desirable goals (ibid.). A road map to successful integration of ICT in schools cannot be realised without clear communication about the school vision as the change implementers are brought on board.

Ely (1990 1999) in Al-Sharija (2012:38) recognized the importance of leadership and notes that "the principal plays a key role in facilitating the following seven key conditions in ICT implementation:-

- Dissatisfaction with the status quo: the condition requires the principal's involvement in campaigning and supporting the change, as well as helping the staff to see the status quo has limitations, and evaluating the situation in a way that reflects his or her passion for change.
- Adequate time allocation: because the staff needs time to explore and learn about the change, there is the need to increase the level of staff knowledge and skills. The principal, as leader, must facilitate and prove the value of the change. As a result, the principal should assign enough time, and manage the timing of the school activities, so that learning and practice is achieved. The principal should control such conditions.
- Resources allocation: the principal undertakes an important and powerful role in providing the necessary resources and budget. Therefore, their role is vital in eliminating the negative impact of such conditions by providing, and effectively managing the school resources.
- Knowledge and skills development: this condition relates to the staff acquiring the needed skills and knowledge to utilize the innovation. The principal's task of ensuring appropriate staff development is, therefore, essential.
- Reward and incentive: as leader, the principal is responsible for and the initiator of the reward process. Therefore, the principal's role is important in motivating and providing incentives for staff to employ the innovation.
- Participation: by allowing staff to take part in the decision making process, the principal motivates and empowers the staff to actively adopt the innovation.
- Commitment: this condition relates to the manner and type of support offered to the staff by the principal. Such support includes communication, involvement, the dedication of resources, and the principal's attention to the development of the school plans".

All these conditions ensure the principal's fundamental roles facilitate innovation implementation (Ely 1990; 1999 in Al-Sharija 2012:38). These conditions supplement one another to come up with an integrated whole as none can solely be adopted on its own by the principal to attain the desired change in ICT integration.

Gronow, (2007:2) argues that implementing ICT into schools is the responsibility of the school principal. They need to ensure that the best interests of the students and administrators are served through effective ICT infrastructure and staff professional development. The principal is responsible that the investment, financial and otherwise, of ICT in the school is beneficial to the whole community (ibid.). Effective integration of ICT in schools requires a focused principal who is knowledgeable in adopting meaningful approaches aimed at attaining the desired objectives.

2.6.2.1 *The approaches for school principals in facilitating change*

From their analyses of moment-to-moment and day-to-day interventions by principals over time, Hall, Rutherford, Hord and Hulling (1984) in Schiller (2003) found that the overall pattern and tone of intervention behaviours led to different Change Facilitation (CF) styles. They classified these styles as initiator, manager, and responder:

> ***Initiator principals*** publicly demonstrated a strongly held vision of where their schools were heading and what was best for students. They had high expectations of their staff, and they made these expectations clear through many forms of communication.
>
> ***Manager principals*** focused on the administrative aspects of the school to ensure that it was well-organised and efficient. They tended to resist change until all components of the change were ready for implementation.
>
> ***Responder principals*** focused on current concerns of the staff and the school community without looking at the "bigger picture." They tended not to intervene as much as their counterparts. In simplistic terms, initiator principals "made it happen," managers "helped it happen," and responders "let it happen." (ibid: 2003).

A focused school principal requires a blend of these three styles as none of them can stand alone for any effective ICT integration in the day-to-day school management functions.

Principal's knowledge of ICT is essential so that systems can be in place to make organisational processes more efficient including the employment of personnel to manage and administer the ICT infrastructure (Gurr 2000 in Gronow 2007:2). The principal should be well informed about

change in ICT and its requirements so that he or she can focus his energies in mobilising his or her team members in attaining the desired shared vision.

2.7 THE IMPLICATION OF CHANGE IN ICT INTEGRATION IN EDUCATIONAL ADMINISTRATION

Twinomugisha (2010) contends that "ICT can contribute to solving some of the major challenges currently facing educational systems globally especially in the area of improving access, quality and efficiency of education". He further argues that "successful integration of ICTs in education requires a careful consideration of several issues such as curriculum, pedagogy and teacher preparation strategies".

Taddeo (2006:3) posits that "the level of ICT integration will vary depending on factors such as the support structures established, the approach to change and the acceptance and willingness to change, the available infrastructures, the access and participation in training and development", and many more. To some extent the impact of ICTs in education can be attributed to greater accessibility of ICTs, and the increase in internet speed and availability of broadband (ibid.). However, positive attitude towards ICT by change agents is of paramount significance as it will facilitate the willingness to change. Without the will power, no meaningful change can be able to take sound effect despite the presence of ICT facilities, internet speed and man power on the ground.

Gewerc (2011:57) observes that "the incorporation of ICT into schools can represent a qualitative jump that disrupts the meaning of the school institution". He is also of the view that if this is to occur in the not too distant future, it would be due to the fact that ICTs are not merely tools. These technologies entail a new way of accessing knowledge and disseminate referents and values that do not exhaust (ibid.).

Whether individual, group dynamic or organisational set up, any kind of change is many a time absorbed with mixed sentiments, tensions and anxiety for fear of destabilising the status quo of the existing culture or beliefs. Leaders must bear in mind that such dilemmas need to be

addressed with objectivity, patience and tolerance for any fruition of ICT implementation in secondary school administration to be efficient and effective. The following subsection addresses some of the pertinent factors and dilemmas affecting change in the use of ICT in secondary school administration.

2.8 FACTORS AND DILEMMAS AFFECTING CHANGE IN THE USE OF ICT IN EDUCATIONAL ADMINISTRATION

Taddeo (2006:7) argues that **"**previous descriptions of leadership roles in education do not address many of the issues that are associated with the integration of innovations". This is because the impact of ICT on education and in society has previously not been experienced to the extent reached by schools and society today. The literature does not identify specific role descriptions for leaders involved in the ICT reform process. A need exists for every one with the potential to impact and influence the ICT integration process, including educational leaders, to be clear about their personal responsibilities and roles in this process. They also need to acknowledge the overall responsibility of schools to prepare students for a technology enriched future. Clear expectations may help to avoid misunderstandings and may provide foundations for smoother transitions in a changing climate (ibid.).

As with organisations outside education, the impact of change on technology decision-making in secondary schools is evident (Kokay 2004:17). There is little time to enable schools to gather information required to make a decision, nor time to reflect on the effect of the decisions once made. Often other issues arrive on the scene before there has been time to deal adequately with the previous one. Unlike other decisions made within a school that can be reviewed and changed if required, changes in technology occurring outside education dictate the speed and currency of the decision-making process within the school (ibid.). The dictates of time lapse poses a big challenge in the integration of ICTs in schools as some programmes and approaches may become obsolete in the transition period which may take two to three years. A year in the ICT arena is a very short period as new innovations take centre stage in the world of competition by various software companies.

Swarts (2006:1) posits that "ICTs can be powerful, essential tools for learning: understanding, interpreting and communicating about the real world or they can be black holes into which money is poured, intelligence and time, getting very little in return". Kokay (2004:15) notes that because of the pace of technology, it is difficult to produce technical plans that look ahead and determine which forms of hardware, software and support will be required to meet the future needs and goals of the school. Implementation of a new policy can often be plagued by a range of problems. An incorrect perception can impede the successful outcome of any change (Al-Sharija 2012: 36). Technical plans based on uncertainties owing to high speed of innovations can be daunting for change agents as trial and error takes toll on their very confidence necessary for ICT integration process.

One major limitation for change in ICT and education is that many of those involved in helping people to learn in both formal and non-formal contexts have little or no skills in the appropriate use of new technologies (Unwin 2005:48). This is particularly so in poorer countries, and most notably in Africa. He notes that there have, to date, been rather few effective and sustainable schemes designed to enhance ICT for e- literacy among teachers. To be sure, there are numerous projects that have sought to provide teachers with ICT skills, but many of these have been developed externally, often in the private sector, to develop skills that are relevant primarily in office environments. These are not necessarily those skills of most relevance in the classroom (ibid.). Customising an external programme can be painstaking as some of its concept may be non-existent in a school scenario in Kenya. This will take the change agents more time as they comprehend the programme(s) before interpreting it in their respective backgrounds for implementation.

Taddeo (2006:8) observes that "there is little, if any, literature that explores how leadership manages and implements the change process. This is in a bid to achieve the type of ICT integration that alters the pedagogies and becomes firmly embedded into the structures of the learning institution, into the ICT approaches, policies, visions and skills demonstrated by the learning communities" (ibid.).

ICT implementation requires a visionary and focused leadership. However, this can be an intricate issue. Fullan (1992a) in Bush (2008: 7) says that 'vision building is a highly sophisticated dynamic process which few organisations can sustain'. In another observation, Fullan (1992b) in (Bush 2008:7) posit that "vision building is even more critical, suggesting that visionary leaders may damage rather than improve their schools":

> "The current emphasis on vision in leadership can be misleading. Vision can blind leaders in a number of ways … The high-powered, charismatic principal who 'radically transforms the school' in four or five years can …be blinding and misleading as a role model … my hypothesis would be that most such schools decline after the leader leaves … Principals are blinded by their own vision when they feel they must manipulate the teachers and the school culture to conform to it" (ibid.).

Sustaining vision becomes an uphill task than building it as its builder exits the operation zone. The already manipulated change agents may feel a sigh of relief and fold back their arms as they slowly adopt a 'wait and see attitude' to have a critical look at the very vision they were coerced to build in the absence of its initiator.

Al-Sharija (2012:31) argues that when it comes to policy development practitioners, including teachers, are often at the end of the food chain and so the change is often barely noticeable. "Resistance occurs as the practitioners are not given adequate information about the implications or the impact of the change on them and their task of teaching students" (Burke 2008; Hall & Hord 1987 in Al-Sharija 2012:31). It's imperative to involve some of the key ICT integration agents in the policy development for them to own change hence easing resistance in the integration process. However, who to include or omit in this exercise among the key change agents remains a challenge as their selection criteria will still remain a subject of close scrutiny by those with vested interests. If not well checked, this can derail the integration process.

Hawkins (2002) in Mensah (2005:46) argues that while many educational ministries around the world have made commitment to computerise schools, few have developed coherent strategies to integrate its use fully as pedagogical tools in the classrooms. Amenyo (2003) in Mensah

(2005:46) cautions that “any attempt to implement a well-meaning ICT project in a haphazard and context-independent manner would not help in sustaining it”.

If appropriate decisions are to be made, leaders must be able to obtain advice and accurate information (Kokay 2004:18). However, leaders seeking advice for decisions relating to ICT development may find themselves confronted by those with a personal interest in preserving their status as ‘computer experts’. The confusion created by those who appear to have knowledge is often achieved by creating an aura of mystique that is difficult to challenge (ibid.). Trotter (1997) in Kokay (2004:18) observes that although information is available, it is difficult to determine which way to proceed because of the jargon. Mcclure (2000) in Kokay (2004:18) warns that “leaders must not tolerate ‘the arrogance of the ‘tekkie’ elitism that has often been the modus operandi of many’”. He considers it is essential to learn what one needs to know about information technology so that one can ask good questions and assess the answers she or he gets.

Educational leaders need to build an understanding and appreciation for all that needs to be addressed if communities are to build multifaceted ICT capacities **(**Taddeo 2006:9). A concerted effort must be made to ‘link technology and educational objectives’. It is via the means of research that the transformative integration process can be an informed, relevant and achievable process that permanently alters teaching and learning practices, policies and beliefs. The many components that need consideration in the building of ICT capacities can be quite daunting for educational leaders (ibid.). This has necessitated the researcher to address the issue of leadership in education change in order to seek a way forward in addressing dilemmas affecting change in the use of ICT in education administration.

2.9 LEADERSHIP IN EDUCATIONAL CHANGE

Leadership can be understood as a process of influence based on clear values and beliefs leading to a vision for the school (Bush 2007:403). This is articulated by leaders seeking to gain staff commitment and stakeholders to the ideal of a better future for the school, its learners and stakeholders. “Leaders are people who shape the goals, motivations, and actions of others.

Frequently they initiate change to reach existing and new goals. Leadership takes much ingenuity, energy and skill" (ibid: 392).

Taddeo (2006:7) argues that "the actions, attitudes and visions of leaders and administrators have the potential to greatly impact and influence the integration of innovations". He further contends that "leaders need to have access to training programmes, frequent practical experience and support structures. These will enable them to develop the understandings, skills and resources that will lead to appropriate positive reform in their school setting" (ibid). Whereas actions can be seen in the integration process, quantifying attitudes and vision is quite daunting in the evaluation of ICT integration processes as they are only deep-rooted in the minds and thoughts of individual change agents.

"Since organisations are social constructs, leaders ought to be aware of the human propensity to destabilise stable situations and seek constancy in changing environments" (Taylor 2011:4). The innate proclivity is to move from one state to another for organisation to tend towards change, and for change to tend towards organisation. The task of leadership is to identify these trends in various facets of organisational life and assess the desirability of facilitating them (ibid.).

Leaders can exercise a stabilising influence by initiating change through intent and action or by steadying the naturally occurring changes (ibid.). Bush (2008:15) contends that "educational leadership and management have progressed from being a new field dependent upon ideas developed in other settings to become an established discipline". This includes its own theories and significant empirical data testing their validity in education. This transition has been accompanied by lively arguments about the extent to which education should be regarded as simply another field for the application of general principles of leadership and management, or should be seen as a separate discipline with its own body of knowledge (ibid.). Gronow (2007: 2) argues that "leaders in schools are challenged by the integration of technology into education particularly principals as they need to be aware of government expectations". This will act as a gauge to ICT integration because managers can either intervene to reverse the action or act as a catalyst to manage the situation to the intended outcome over the appropriate time frame (Taylor 2011:4).

Kokay (2004:18) notes that successful ICT development within the school, that takes into account advances occurring outside education and incorporates these meaningfully, will require skillful management of the decision-making process by the school leader. Taddeo (2006:1) concurs with this view by arguing that "leadership for cohesive ICT integration requires an appreciation and consideration of the influencing factors on ICT integration and their subsequent alignment. This calls for a well informed and articulate principal who is capable of mobilising his or her team change agents in ICT integration in education administration by exercising the various components of leadership practices wisely".

2.9.1 Components of leadership practices

Leithwood *et al*. (2006) in Al-Sharija (2012:53-71) identifies five components of leadership practices from the literature on leadership practices for school principals, namely:

- Finance Management,
- Setting Direction,
- Developing Staff,
- Building Collaboration; and
- Principal Agency.

These five components of leadership practices interact with each other on a continuum. For example, principals need to organise ICT technical support to ensure that teaching staff are not frustrated because of a lack of equipment. Here, the principal eliminates one of the demotivating extrinsic factors which represent the nature of the interactions among the five components (Al-Sharija 2012:53). Principals ought to be prudent in their leadership practices along the five components identified by Leithwood *et al.* He or she would require to set clear direction in the ICT integration process in the school administration, promote staff development through training the administration staff on ICT integration in school administration. He or she can also play principal agency in the coordination of these activities through building collaboration with the government of the day, Kenya Education Management Institute (KEMI) and private

organisations dealing with staff training programs on ICT integration in school administration. Principals' prudence in the coordination of all these activities is crucial.

Leadership and management need to be given equal prominence if schools are to operate effectively and achieve their objectives (Bush 2007:392). In spite of rapid changes in the new knowledge-based global society and associated educational expectations, there remains tardiness in addressing the need for leadership. Educational technology domain is an example of this as observed by Steed, Hollingsworth and Marzek (2005) in Taddeo **(**2006:7). The actions, attitudes and visions of leaders and administrators have the potential to greatly impact and influence the integration of innovations. Principal's positive approach towards ICT use in school's administrative functions is crucial for the integration process by the other co-implementers who in this case include among others, HoDs, Teachers, non-teaching administrative support staff and management staff.

Sergiovanni (1984) in Bush (2007:398) underscores the importance of a participative approach in leadership noting that this succeeds in bonding staff together and in easing the pressures on school principals. He further observes that the burdens of leadership will be less if leadership functions and roles are shared and if the concept of leadership density were to emerge as a viable replacement for principal leadership. This leadership approach can be well exercised where there are clear-cut boundaries so that the administrative powers of the principal are not usurped by teachers in key decision making areas; that is out sourcing and signing agreement for ICT integration aid for the school.

Yukl (2002) in Bush (2007:402) notes that "the managerial job is too complex and unpredictable to rely on a set of standardised responses to events". Leadership requires effective diagnosis of problems, followed by adopting the most appropriate response to the issue or situation (Morgan 1997 in Bush 2007:402). This reflexive approach is particularly important in periods of turbulence when leaders need to be able to assess the situation carefully and react as appropriate rather than relying on a standard leadership model (Bush 2007:402). A reflexive approach would be a welcome move in relation to Kenyan secondary school administrative context as the government policy on the ICT implementation is not quite elaborate on when to start nationally

and the elaborate approaches to be used. Due to diversity of secondary school setups, customising leadership practices to suit the local set up where necessary becomes an integral part of effective and efficient administration in change management in integrating ICT in education administration of secondary schools.

2.9.3 Effective leadership in education change and performance improvement

Motivational theory (2012:7) posits that "good leadership demands good people motivation skills and the use of inspirational techniques". Motivational methods are wide. They range from inspirational quotes and poems, to team building games and activities, as ice-breakers, warm ups and exercises for conferences, workshops, meetings and events, which in themselves can often be helpful for staff motivation too (ibid.).

Afshari *et al*. (2008:646) contends that exploring leadership structures that compliment transformative ICT integration is valuable. Redefining roles and expectations, and exploring options for relevant on-going professional development for leaders are all aspects that can be addressed in the building of Leadership Capacity (ibid.). Schiller (2003) in Afshari *et al*. (2008:646) notes that educational leaders have a major responsibility for initiating and implementing school change through the use of information and communication technology. He adds that educational leaders can facilitate complex decisions to integrate them into learning, teaching and school administration. This calls for an informed and focused leadership.

Leadership is about vision; change; using one's intuition, influence, persuasive and presentation skills; and rewarding people with personal praise and providing opportunities to learn new skills (Burke 2008 in Al-Sharija, 2012:41). Informed leadership is pertinent for effective leadership in educational change. Policy Note (2005:19) contends that **"**at the core of informed leadership is a person who has internalised the complexity of effective technology integration and who exercises his or her influence to ensure that the various enabling factors are in place or being addressed". Internalising the complexity of technology becomes the driving force for effective leadership in educational change.

Fullan (2002) argues that effective school leaders are crucial to large-scale, sustainable education reform. He also adds that for some time, educators believed that principals must be instructional leaders if they are to be the effective leaders needed for sustained innovation. Leaders have a deeper and more lasting influence on organisations and provide more comprehensive leadership if their focus extends beyond maintaining high standards (ibid.).

Al-Sharija (2012:39) posits that the common portrayal of the leaders as influential people can affect the followers' achievements, actions, attitudes, and beliefs, either negatively or positively. The change, brought about by the increased use of ICT, requires mobilising the teachers' energy and ability. Effective leaders are needed to improve the teachers' working conditions and to create fundamental transformation in the learning cultures of schools (Fullan 2002b in Al-Sharija 2011:39). The vision of an informed leader can be actualised through not only sharing it but also through motivating, influencing and mobilising his or her team members to strategically attain that vision.

School leaders, while quick to acknowledge the significance of ICT in learning, should not be hindered by setbacks or disturbance caused along the way, but try out alternatives and "workarounds" for ICT improvement (Chung 2005:4). The will-power to soldier on should outweigh the fear of the unknown. Set-backs and disturbances caused along the way can act as eye openers to possible solutions to ICT integration in the administrative set up of secondary schools.

Bush (2010:6) contends that leaders are expected to ground their actions in clear personal and professional values. Lee, Gaffney and Schiller (2001) in Gronow (2007:3) in a related view listed the qualities of an ICT leader as:

- Understanding quality education in a networked world.
- Understanding of ICT as it relates to teaching and learning.
- Valuing the effectiveness of integrating technical and human resources.
- Able to operate within a networked paradigm.
- Appreciative of the importance of knowledge management.
- An excellent networker.

- Having high level analytical skills.
- Having good interpersonal and management skills.
- Able to oversee the work of other ICT staff.
- Able to lead the change management process.
- Able to provide education for all students in a digital world.
- Able to operate as an assistant or deputy principal.

An effective and efficient ICT leader is able to blend the above qualities in integrating ICT in secondary schools.

The principal, as a learner and user of ICT, is a role model to the school community demonstrating the importance of ICT (Gronow 2007:4). Implementation of ICT in schools embraces the successful principal as a transformational leader who can set goals, organise and monitor others and build relationships. Sweeney (2005) in Gronow (2007:7) described the qualities of an effective leader as the ability to lead change, a clear vision and being ICT proficient. Bush (2010:7) concurs with this view and adds that vision has been regarded as an essential component of effective leadership for more than 20 years. Leadership for cohesive ICT integration requires an appreciation and consideration of the influencing factors on ICT integration and their subsequent alignment (Taddeo 2006: 1)

Besterfield, Michna and Sacre (2003) in Makhanu (2010:45) discuss nine characteristics of quality leaders in organisations that manage change as follows:

- "Give priority attention to internal and external customers as they continually evaluate customers' changing needs.
- Empower rather than control subordinates.
- Emphasise improvement rather than maintenance. This can be done through improving ICT skills while doing other normal school duties.
- Emphasise prevention, where principals establish a balance between preventing problems and improvement.

- Train and coach rather than direct and supervise. When principals are ICT literate, they can indirectly train others to appreciate ICT skills.
- Learn from problems and find ways of preventing them or ways of solving them. Principals can learn from slow systems and improve on them through ICT integration.
- Continually try to improve communication. ICT in schools can improve communication, for example, by making use of mobile phones, e-mail and the internet.
- Continually demonstrate their commitment to quality. The ICT literacy level of principals can be a demonstration of quality.
- Establish an organisation system to support the quality effort. A principal can encourage ICT integration in the school system to improve its quality".

A quality principal is a leader who gives priority to the learners, empowers school staff through use of ICT, improves communication with staff and continually demonstrates commitment to quality by being ICT literate (Makhanu 2010:46). They also promote literacy by encouraging staff to be ICT literate and to apply it in school operations (ibid: 7). This enhances teamwork in realising the dreams of the school.

Afshari (2008:649-650) observes that "by taking an active approach to innovation, principals can foster an environment in which such innovation has greater benefits for their staff and students. This reinforces the need for policy makers and educational leaders to have access to current, relevant data that can provide insights into attitudes towards ICT and possibly also expose stages of progression in ICT integration in the different contexts" (ibid.).

Gronow (2007:5) contends that the principal who delegates the responsibilities of leadership is able to create a learning community where everyone is given an opportunity to contribute to decision making, thus empowering people by allocating ownership to the shared vision. However, Kokay (2004:15) tends to slightly differ with Gronow's (2007:5) view by arguing that "the leader must remain with some part of the planning and decision-making processes and not totally delegate this responsibility to another member or group of staff". Some administrative issues in ICT integration require the principal's special exclusive attention as the chief

administrator of the school. These include; authorisation of expenditure, signing of contracts with partners and key public relations exercises, among others.

Chung (2005:1) observes that technology leadership is becoming a more important issue in successful ICT implementation. DEST (2001) in Afshari (2008:648) argues that leadership and ICT integration are multifaceted, complex processes that often require the questioning of practices and beliefs, the building of capacities and support networks that will assist the learning community make the transition to ICT integration. "Educational leaders, policy makers, governments and learning communities need to develop visions, combine efforts and pool resources in order to build the necessary capacities to support transformative ICT integration" (Taddeo 2006:10).

Effective leadership and management are essential if schools and colleges are to achieve the wide-ranging objectives set for them by their many stakeholders, notably the governments which provide most of the funding for public educational institutions (Bush 2010:18). In an increasingly global economy, an educated workforce is vital to maintaining and enhancing competitiveness. This will call for quality education and service delivery.

2.12 CONCLUSION

The introduction of any change in an organisational set up disrupts the existing administrative mechanisms in one way or another, either progressively or retrogressively. Amid this ambiance, integration of ICT in a school's organisational mechanisms is a relatively new phenomenon that requires to be infused gradually within the existing frame work of learning and the administrative schedules. Change in the use of ICT will require to be ushered in the school administration by some strong forces of continuity for it to have strong orientation and long lasting foundation. Various approaches to change management in the use of ICT in educational management will require to be clearly spelt out and must not only be flexible but responsive to particular school circumstances for customisation and adoption.

Informed and focused leadership plays a major role in the ICT integration process by enacting the best contingent measures as they take into account the desire for organisational change and continuity value of the various key implementers. ICT integration in secondary school administrative set up will require to be effected alongside other educational reforms considering other pertinent elements of continuity that will match the required changes during the transition process. Various aspects of ICT acquisition will be discussed in the next chapter to shed more light on the challenges of using ICT in advancing secondary school administration in the Kirinyaga County of Kenya. Crucial among these will include; Concept of ICT literacy, ICT knowledge, Skills and Application and strategies for developing ICT strategies.

CHAPTER 3

EDUCATION AND INFORMATION COMMUNICATION TECHNOLOGY

3.1 INTRODUCTION

This chapter provides a literature review of Information Communication and Technology (ICT) literacy from books, journal articles, government documents, sessional and conference papers. It reviews ICT literacy, monitoring and evaluation of ICT literacy and determinants of ICT literacy. The literature review creates the context for discussion on the concept of ICT literacy, scope of ICT literacy and strategies for improving ICT literacy development in secondary school administration.

3.2 ICT LITERACY

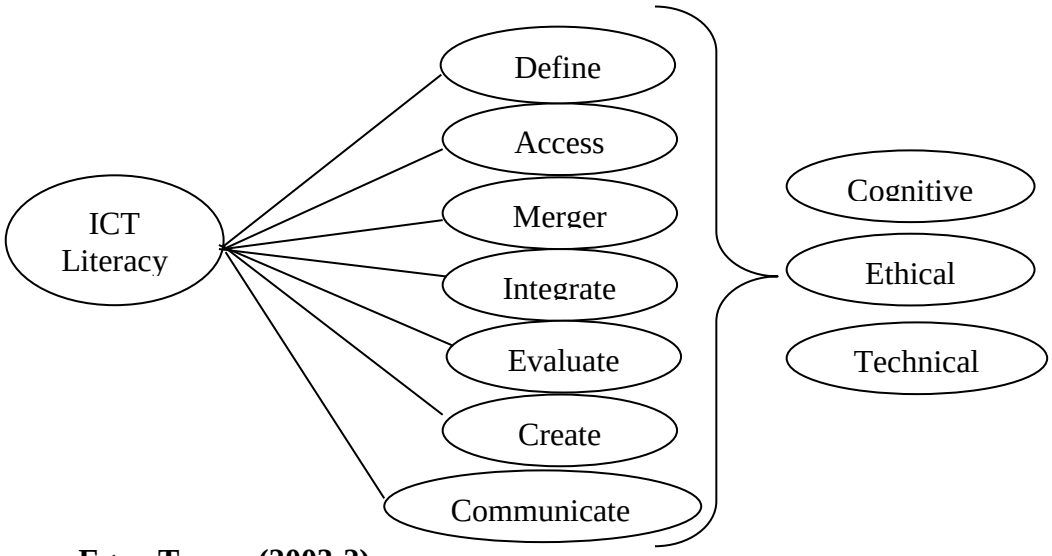
Manitoba Education (2013) defines literacy as "the ability to identify, understand, interpret, create, communicate, compute and use printed and written materials associated with varying contexts". Literacy involves a continuum of learning to enable an individual to achieve his or her goals, to develop his or her knowledge and potential, and to participate fully in the wider society as cited by the United Nations Educational, Scientific and Cultural Organization (UNESCO-2009) in Manitoba Education (2013). The meaning of literacy evolves with time thus it is not about reading, writing, listening, speaking, viewing and representing. It is also about developing literacy with Information, Communication and Technology (ICT) and therefore it is a continuum of learning (ibid).

The International ICT literacy panel (2002:2) defines ICT literacy as "the aspect of using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society". The panel's definition reflects the notion of ICT literacy as a continuum, which allows the measurement of various aspects of literacy, from daily life skills to the transformative benefits of ICT proficiency. This definition lists five critical components of ICT literacy which represent a set of skills and knowledge presented in a sequence that suggests increasing cognitive complexity. These include;-

- Access - knowing about and knowing how to collect and/or retrieve information.
- Manage - applying an existing organisational or classification scheme.
- Integrate - interpreting and representing information. It involves summarising, comparing and contrasting.
- Evaluate - making judgments about the quality, relevance, usefulness, or efficiency of information.
- Create - generating information by adapting, applying, designing, inventing, or authoring information.

Oliver & Towers (2000:383) embraced the contemporary view of ICT literacy, as "the set of skills and understandings required by people to enable meaningful use of ICT appropriate to their needs". In a related view, Egan (2003:2) notes that "ICT literacy implies the ability to use digital technology, communication tools, and/or networks to define, access, manage, integrate, evaluate, create and communicate information ethically and legally in order to function in a knowledge society".

Figure 3.1 ICT Literacy Proficiency Model



Source: Egan Teresa (2003:2)

There is a close correlation in Egan Teresa's ICT proficiencies and their application in various school functions. This is because administrators, teachers and clerical staff members comprehend

the concept of ICT and its application in secondary school administration as they blend the selected skills. They adapt these skills to their respective administrative tasks like data analysis and interpretation.

The Association of College and Research Libraries (2000: 2) contends that "information literacy forms the basis for lifelong learning. It is common to all disciplines, to all learning environments, and to all levels of education. It enables learners to master content and extend their investigations, become more self-directed, and assume greater control over their own learning". An information literate individual is able to:

- Determine the extent of information needed.
- Access the needed information effectively and efficiently.
- Evaluate information and its sources critically.
- Incorporate selected information into one's knowledge base.
- Use information effectively to accomplish a specific purpose.
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally.

It is worth noting that the interplay between these proficiencies makes the school administrators, teachers, students and other interested persons to be ICT literate as no single proficiency can stand alone to justify any person's ICT competencies.

The introduction of ICTs has to be accompanied by far reaching reorganisation of the learning structures, according to Gewerc and Lourdes (2011:3). In addition, it is important that technological innovation is developed to serve education in diverse learning contexts, while respecting linguistic, cultural and social differences (ibid.). ICT literacy should also be re-organised in various administrative structures of the school and customised to enhance service delivery.

3.2.1 The Concept of ICT Literacy

The Association of College and Research Libraries (1989:2) views information literacy as “a means of personal empowerment”. It allows people to verify or refute expert opinion and to become independent seekers of truth. It provides them with the ability to build their own arguments and to experience the excitement of the search for knowledge. Moreover, the process of searching and interacting with the ideas and values of their own and others' cultures deepens people's capacities to understand and position themselves within larger communities of time and place (ibid.). ICT literacy as a global phenomenon offers a forum for people from diversified cultures to freely interact and exchange ideas, views and opinions over the internet from different corners of the world.

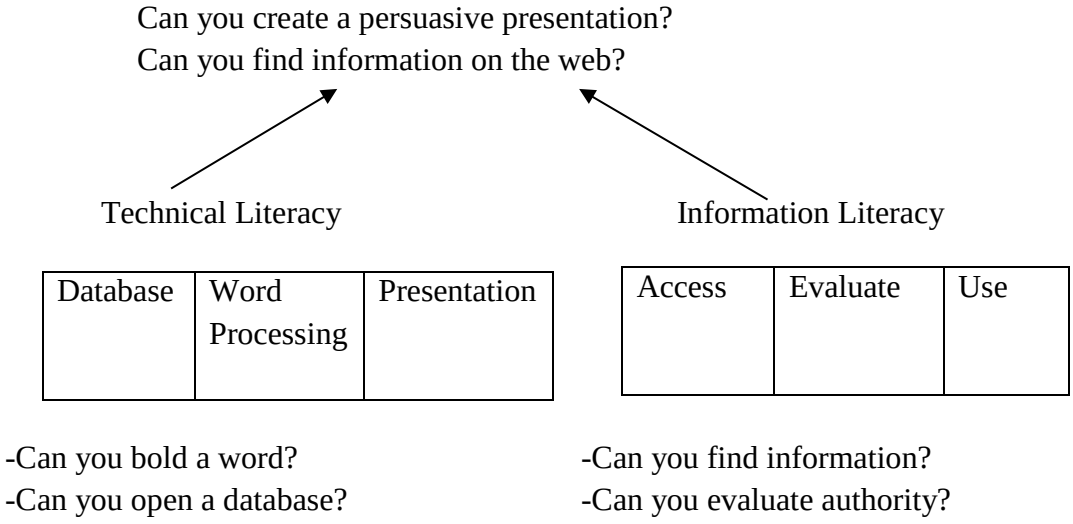
“Information literacy is an intellectual framework for understanding, finding, evaluating, and using information” (The Association of College & Research Libraries 2000: 3). Information literacy initiates, sustains, and extends lifelong learning through abilities which may use technologies but are ultimately independent of them. Information literacy competency extends learning beyond formal classroom settings and provides practice with self-directed individuals (ibid.). Ministry of Education (2012:227) Vision 2030 of Kenya asserts that ICT extends boundaries of the classroom to beyond the fixed time and space of school. This is done as individuals explore the world outside the school environment in the ICT world informediaries. However, not all information is reliable to the end users from the informediaries as some of it may be misleading, harmful and subject to disclaimers. There is therefore a need for further research on the effects of web based information on various end users in school administration, key among them being the principal, teachers and support staff.

ICT Literacy has mainly been associated with computer literacy. Oliver and Towers (2000:381) note that the term computer literacy has long been used as a description of people’s skills and predisposition to the use of computers and information technologies. They further contend that competencies and skills still remain the underpinning elements of computer and ICT literacy and are those that still provide the basis for explorations of the extent and scope of ICT applications and uptake among the different cohort of computer users. However, Manitoba Education (2013)

argues that “ICT is more than just computers and keyboarding. ICT is any Information and Communication Technology (ICT) that helps us to find process and communicate information”. ICT tools include the internet, cell phones, Global Positioning Systems (GPS), texting, video games, digital cameras, MP3 players, wikis, blogs and many more. Literacy enables us to understand ourselves and the world around us, to interact with others and to share thinking (ibid).

Egan (2003:3) is of the view that ICT Literacy serves as a bridge between information and communication literacy where various ICT knowledge and skills are applied.

Figure 3.2 ICT Literacy: a bridge between Information and Communication Literacy



Source: Egan Teresa (2003:3)

The Ministry of Education (MoE) (2012: 227) Vision 2030 of Kenya notes that there are two dimensions to ICT in education, that is teachers and learners learn about ICT and teachers and learners learn with ICT. Learning about ICT allows learners to contribute to the development of ICT technology and also become ICT literate. On the other hand, learning with ICT is aimed at enabling learners to acquire knowledge and skills that they can use effectively. These two approaches have been assimilated into education in Kenya. The Ministry‘s policy is to integrate ICT in education and training in order to prepare learners and education managers for the 21st century education and knowledge economy (ibid.). Although learning with ICT is secondary in

ICT literacy acquisition and integration in this case, it eases dissemination and application of knowledge and skills in the school administrative set up unlike learning about ICT.

Literacy with Information and Communication Technology (LwICT) according to Manitoba Education (2013) means "thinking critically and creatively about information and about communication, as citizens of the global community, while using ICT responsibly and ethically". It further observes that whereas ICT literacy is about demonstrating ICT skills, literacy with ICT is about thinking critically and creatively, about information and communication as citizens of the global community. This is done while knowing how to use technology to meet our needs using ICT responsibly and ethically (ibid.).

Figure 3.3 Relationship between ICT Literacy and Literacy with ICT

Source: Manitoba Education (2013)

Pernia (2008:13-14) argues that ICT literacy differentiates among three major dimensions: one pertains to knowledge of technology, the second to skills relevant to using the technology, and the third to attitudes accruing from critical reflection of technology use:

- The knowledge dimension of ICT literacy is characterised by a user's awareness of ICTs and appreciation of the relevance of these ICTs in either his or her personal and professional life. It is familiarity with the technologies and understanding how these are actually or can be potentially beneficial to her or his own and other people's lives.
- The skills dimension of ICT literacy pertains to, and often results from the use of or experience with the technologies. For many, the abilities "to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in

networks via the internet" are hallmarks of an ICT-literate individual (European Commission, Directorate for Education and Culture 2004, in Pernia 2008:13).

- The attitude dimension represents the product and process of a person's critical assessment of her or his use of ICT for information and knowledge. In recursive fashion, the continued use of ICTs increases and deepens the user's critical reading of the information and knowledge that is accessed, managed, integrated, created, and communicated through ICT. The attitude dimension according to Pernia reflects a higher level of ICT literacy than either the knowledge or skills dimensions

Pernia (2008:12) further notes that technology is of increasing importance in people's everyday lives and that presence will most certainly increase in the coming years.

Chan (2002**)** posits that "the concept of ICT in education, as seen by the Ministry of Education in Malaysia's Vision 2020, includes systems that enable information gathering, management, manipulation, access, and communication in various forms". Naidu and Jasen (2012) in Kipsoi, Chang'ach and Sang (2002:20) further emphasize that "education management and development is an intricate process that requires reliable, timely, user-friendly data". This would require ICT literate administrators who can be able to read and interpret this data for effective application in the respective dockets of school administration.

Many of the indices used to rank countries on knowledge economy competitiveness and preparedness use the level of investment in ICT as a factor in determining a nation's standing (Vital Wave Consulting 2009:5). The World Bank's Knowledge Economy Index uses access to the internet in schools and overall investment in ICT as two of the indicators with which it ranks countries. Others such as the World Knowledge Competitiveness Index and the Global Competitiveness Index use measures of technology readiness as proxies for nations' ability to compete for knowledge economy jobs. These indices are important because they often either reflect or influence the opinions and decision making of corporations whose opinions may in turn influence foreign investment decisions (ibid.).

Using ICTs in higher education administration is fundamentally about harnessing technology for better planning, setting standards, effecting change and monitoring results of the core functions (UNESCO 2009:27). Although the benefits of ICT use in education cannot be clearly measured, many countries continue to introduce it based on the assumption that citizens should be able to function adequately in a rapidly evolving information society (ibid.16). There is need for policy makers to set up standard criteria as parameters for evaluating ICT literacy from where principals, teachers and clerical staff (accounts clerks, secretaries and store keepers among others) can be assessed and gauged so that a suitable capacity building can be organised and tailor made for them.

Kipsoi, Chang'ach and Sang (2012:20) argue that ICTs can help school administrators and school principals to streamline operations, monitor performance and improve use of physical and human resources. More than other technologies, computer related technologies have the potential to support the management of complex, standards-related instructional processes in relatively simple ways. They also can promote communication among schools, parents, central decision makers and businesses thus fostering accountability, public support, and connectivity with the market place (ibid.).

To be information literate, a person must be able to recognise when information is needed and have the ability to locate, evaluate, and use effectively the needed information (The Association of College & Research Libraries 1989). "Producing such a citizenry will require that schools and colleges appreciate and integrate the concept of information literacy into their learning programmes. They should also play a leadership role in equipping individuals and institutions to take advantage of the opportunities inherent within the information society" (ibid.).

Pernia (2008:16) postulates that however high the regard and expectation is for the role ICTs play in development among countries in the Asian and Pacific regions, wide disparities exist among these countries' socio-economic circumstances. This also applies to their levels of ICT preparedness, availability, use, and literacy. Hence the thrusts or objectives, contents, and delivery mechanisms of ICT literacy education cannot be uniform across countries or possibly even within countries in the region. The same also applies to ICT literacy in various secondary

school set ups as their social-economic circumstances vary from one geographical region to another. There is, therefore, the need for every school to customise its ICT integration approaches in line with the set school and national ICT policies as well as the legal and regulatory framework for ease in their pedagogical and administrative tasks based on ICT literacy.

3.2.2 The Scope of ICT Literacy

The scope of ICT Literacy in this study will address; ICT Knowledge, ICT Skills, ICT Access and ICT Application in secondary school administration.

3.2.2.1 *ICT Knowledge*

(Pernia 2008:14) argues that knowledge is a feature of the user and a product of the interaction between the information supplied through ICT and the user of such information. People with knowledge have vital information at their disposal (ibid.). The Association of College and Research Libraries (1989) asserts that, “information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organised, how to find information and how to use information in such a way that others can learn from them”. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand (ibid.). These are people who can be able to harness the benefits of ICT in carrying out their personal, official or administrative duties.

Using ICT in education seeks fundamental reform and change in traditional instructional programmes (Afshari 2008:645). Principals are the on-site educational leaders who shape and communicate visions of teaching and learning within their schools, and by their action or inaction influence school activity. Therefore, knowledge of how principals effectively manage staff and student use of computers is essential (ibid.). This is relevant and applicable in the use of ICT in secondary school administration where the principal plays an instrumental role in inspiring teachers, support staff members and students.

ICT integration will take teachers and students beyond seeing ICTs as computer studies and computer literacy skills (Kipsoi, Chang'ach & Sang 2012:21). "Although these are important skill sets, they are not sufficient in leveraging the true potential of ICTs to improve creativity, innovation and collaboration – key capacities in the new knowledge economy" (ibid.). More research is required in unravelling the strategies of using ICT in nurturing creativity and innovations in pedagogy and administrative duties.

3.2.2.1.1 *The Concept of ICT Knowledge*

The Association for Progressive Communications (2003:84) argues that "human knowledge, including the knowledge of all peoples and communities, also those who are remote and excluded, is the heritage of all humankind and the reservoir from which new knowledge is created". A rich public domain is essential to inclusive information societies. Knowledge is a tool for not only learning with ICT but also applying ICT knowledge and skills in secondary school administration for effective and efficient service delivery. This helps to boost consumer confidence in secondary school management.

The cultural and educational opportunities available in an average community, for example, are often missed by people who lack the ability to keep informed of such activities (The Association of College & Research Libraries 1989). They further observe that lives of information illiterates are more likely than others to be narrowly focused on second-hand experiences of life through television. Ignorance plays a key role in failure of knowledge acquisition in relation to ICT integration even among the literates in the school society who are resistant to change.

In an attempt to reduce information to easily manageable segments, most people have become dependent on others for their information (The Association of College & Research Libraries 1989). Information pre-packaging in schools and through broadcast and print news media, in fact, encourages people to accept the opinions of others without much thought. When opinions are biased, negative, or inadequate for the needs at hand, many people are left helpless to improve the situation confronting them (ibid.). It is imperative that school administrators and teachers seek first-hand information by acquiring ICT literacy so as to effectively search,

interpret interrogate or criticise the opinions of others from an informed point of view. Where possible, apply that knowledge in school administration.

Chen (2000) underscores the importance of knowing whether teachers are knowledgeable for computer use. He further notes that teachers not having enough knowledge about how to use computers well would result in the lack of self-confidence and then limit the integration of using computers into the curriculum. Teachers might feel uncomfortable to use computers and then be reluctant to use them in their daily teaching (ibid.). Besides pedagogy, teachers can also use computers for classroom administration as in the case of analysing general class lay out by age, gender and school duties allocation among other administrative tasks.

Pernia (2008:14) identifies the following key competencies that an ICT knowledgeable person should have;

- "Familiarity with mobile phones, computers, the internet, and other ICTs
- Ability to identify ICTs
- Appreciation of actual and potential functions of these technologies in everyday life (that is personal fulfillment, social inclusion, and employability)
- Understanding basic features or uses of ICTs (for example for mobile phones: voice calls and SMS; for computers: word processing, spreadsheet, database, information storage; for internet: web browsing, e-mail, and instant messaging)
- Ability to distinguish between the virtual and real worlds
- Awareness of need for "phonethics," and "netiquette."

An ICT knowledgeable person is able to identify various basic ICT equipment or gadgets and service utilities, their respective use and how they relate to his or her area of application as per his or her acquired skills. Countries that are better positioned to thrive in the new economy are those that can rely on widespread access to communication networks, the existence of an educated labour-force and consumers (Braga 1998 in Adeya 2002:3). This also includes the availability of institutions that promote knowledge creation and dissemination (ibid.).

According to The Association of College & Research Libraries (1989), “information literacy is a survival skill in the Information Age”. Instead of drowning in the abundance of information that floods their lives, information literate people know how to find, evaluate, and use information effectively to solve a particular problem or make a decision. Whether the information they select comes from a computer, a book, a government agency, a film, or any number of other possible resources. Libraries that provide a significant public access point to such information and usually at no cost, must play a key role in preparing people for the demands of today's information society (ibid.).

All stakeholders must promote the maintenance and growth of the common wealth of human knowledge as a means of reducing global inequality and of providing the conditions for intellectual creativity, sustainable development and respect for human rights (The Association for Progressive Communications 2003:84). Since knowledge is power, there is need for principals and teachers to harness it in fully exploiting their ICT potentials in their various pedagogical and administrative duties in school by applying the skills learnt.

3.2.2.2 *ICT Skills*

Information literacy is related to information technology skills, but has broader implications for the individual, the educational system, and for society (The Association of College & Research Libraries 2000: 3). Information technology skills enable an individual to use computers, software applications, databases, and other technologies to achieve a wide variety of academic, work-related, and personal goals (ibid.). There is, therefore, a dire need to train the school principals, teachers and key clerical support staff members (accounts clerks, secretaries and store keepers among others) to equip them with ICT skills necessary for ease in secondary school administration.

Pernia (2008:18) is of the view that “ICT literacy training could center on developing and/or deepening technical skills development”. The curriculum content in this case includes using internet-based services, collecting and processing, converting data into graphic presentation

and other visual formats; and using ICTs to support critical thinking, creativity, and innovation for educational, work-related, and leisure purposes.

"Equipping the workforce with the necessary skills for better job opportunities and for the competitiveness of the economy should be a major concern of employment policies" (The World Bank 2005:8). These initiatives should cross the traditional borders of school education, higher education, vocational training and adult learning. A sustained, productivity-driven growth can only be achieved with a technologically literate workforce that is capable of critical and independent thinking (ibid.). Frequent capacity building for school administrators and teachers for day to day running of the school is necessary as technology is dynamic.

3.2.2.2.1 *The Concept of ICT Skills*

Vital Wave Consulting (2009:18) argues that technology deployments in schools do not end with the installation of new computers. Ensuring that everyone in the education ecosystem: students, teachers, administrators and parents benefits from deployments requires a strategy for sustained operations. This plan involves building a model for on-going technical support and teacher training, creating mechanisms for learning from implementations and adjusting ICT in Primary and Secondary Education Plan accordingly, and maintaining regular communications with all involved in the deployment (ibid.).

ICT foundation skills for school administrators, teachers and students should include file management, word processing, spread sheets, e-mail and internet skills (Selwood *et al.*2003 in Makhanu 2010:76). Lack of technical skills may make teachers reluctant to use technology in front of students (Venezky (2001:15). A study in a Canadian secondary school noted that some teachers admitted they were reluctant users because they would be embarrassed that the students knew more about the technology than they did (ibid). Teachers and school administrators would have to equip themselves with at least basic ICT knowledge and skills prerequisite for boosting their confidence and morale in their pedagogical and administrative duties where applicable.

The Association of College and Research Libraries (2000: 2) contends that uncertain quality and expanding quantity of information pose large challenges for society. The sheer abundance of information will not in itself create a more informed citizenry without a complementary cluster of abilities necessary to use information effectively (ibid). To this end, Pernia (2008:15) identifies the following key competencies for a person equipped with ICT skills as illustrated on Table 3.1 below.

Table 3.1 Key Competencies for Technical Skills

Dimensions	**Conceptual Label**	**Key Competencies**
Skills	Technical Skills	➢ Ability to use ICT features and applications (e.g., for mobile phones: voice calls, SMS, still camera, video recorder and/or player, voice recorder and/or player, radio, music player, multi-media service, word processing, spreadsheet, presentation, infrared, Bluetooth, and internet connectivity; for computers: word processing, spreadsheet, database, information storage; for internet: web browsing, e-mail, and instant messaging ➢ Ability to access and search website (e.g., log on to the internet, use search engines, refine search using keywords, etc.) ➢ Ability to use internet-based services (e.g., create an account, compose e-mail, attach and download files, participate in discussion forums and social networking sites, create blogs, etc.) ➢ Ability to collect and process (e.g., create database, organise, store, filter out irrelevant information, etc.) electronic data for immediate or later use ➢ Ability to convert data into graphic presentation and other visual formats ➢ Using ICTs to support critical thinking, creativity, and innovation for educational, work-related, and leisure purposes (e.g., make the most of multi-media information, cross-reference information across websites, dealing with spam and fraud, etc.) ➢ Ability to distinguish credibility (e.g., differentiate between relevant vs. irrelevant, subjective vs. objective, real vs. virtual, filter out porn and other offensive content, check for and guard against plagiarism, etc.)

Source: Pernia (2008:15)

ICT literacy skills need to be integrated appropriately into curricula addressing cognitive skills as well as those addressing IT and technical skills in order to ensure improved ICT literacy (International ICT literacy panel 2002:4). Vital wave consulting (2009:37) posits that "technology, like other tools, is only powerful if it is used correctly". It further notes that teachers will often use technology if instructed to do so, but computers will be most effectively used when coupled with adequate training.

The World Bank (2005:8) posit that "equipping the workforce with the necessary skills for better job opportunities and for the competitiveness of the economy should be a major concern of employment policies". These initiatives should cross the traditional borders of school education, higher education, vocational training and adult learning. A sustained, productivity-driven growth can only be achieved with a technologically literate workforce that is capable of critical and independent thinking (ibid.).

The adoption of ICT requires more than infrastructure and has led to a focus on teacher readiness which may be understood as two distinct strands (Venezky 2001:15). First, teachers need sufficient ICT skills to make use of the technology and to feel confident enough to use it in a classroom setting. Second, teachers require insights into the pedagogical role of ICT, in order to use it meaningfully in their teaching (ibid.). In a related view, Vital wave consulting (2009:18) contends that "digital content and computer-aided learning could be structured to tailor instruction to the user's individual level and pace". This can only be attained in schools when the principal and teachers have a good and reliable access to ICT facilities in the day-to-day running of their institution.

3.2.2.3 *ICT Access*

The Association for Progressive Communications (2003:2) defines access as the opportunity to make use of ICTs, meaning not only technology but also information and knowledge.

3.2.2.3.1 *The Concept of ICT Access*

The Association for Progressive Communications (2003:2) argue that with the convergence of ICTs and the emergence of what is being called the 'information' or 'knowledge' society, knowledge and information have become a more important determinant of our economic, social and cultural lives. Therefore the means of control of production and dissemination of information have also become vital (ibid). Measuring ICT access and use by households and individuals is key to monitoring the progress of countries towards becoming information societies (International Telecommunication Union 2014:1). Access to ICT accessories therefore becomes a crucial part for ICT integration in schools.

Pernia (2008) in Makhanu (2010:72) reports that the access dimension of ICT is characterised by a user's awareness of ICT and availability and the relevance of these ICT in either her or his personal and professional life. Access to digital content includes user accounts, personal file storage and communication tools such as e-mail and discussion forums (ibid.9). ICT access has to do with making it possible for everyone to use the internet and other media (Association for Progressive Communications 2003:11)

Access to ICTs is typically divided along traditional lines of development resulting in unequal access that has become known as the 'digital divide' or 'digital exclusion' (Association for Progressive Communications 2003:2) This divide is often characterised by high levels of access to technologies including the internet while infrastructure in less developed nations is at a very low level due to problems of poverty, lack of resources, illiteracy and low levels of education (ibid.). Government subsidy is crucial in bridging the digital divide by assisting schools in ICT infrastructural installations and internet connectivity due to its high costs.

Marker, McNamara and Wallace (2001) in (Adeya 2002:10) posit that access to ICTs should not be seen as an end in itself. Instead, the measure of success should remain as progress towards reaching the International Development Targets and not the spread of technology, or the bridging of the digital divide. They note, however, that if properly deployed, ICTs have enormous potential as tools for increasing information flows and for empowering poor people.

In a related view, The Association of College and Research Libraries (1989) observes that, "out of the super-abundance of available information, people need to be able to obtain specific information to meet a wide range of personal and business needs. These needs are largely driven either by the desire for personal growth and advancement or by the rapidly changing social, political, and economic environments" (ibid).

However, UNESCO (2009:21) is of the opinion that "inexperience in procuring institution-wide hardware and software as well as attendant services may cost institutions dearly. They may end up with wares that are outdated and subject to unworkable but binding supplier contracts". Using unlicensed software can be very problematic, not only legally but in the costs of maintenance, particularly if the pirated software varies in standard formats (ibid). Wider consultation from various ICT expatriates is important for school managers before procuring and installing ICT accessories in the school to ensure quality service delivery from an informed point. This will help alleviate wastage of capital in purchases of obsolete hard and software.

3.2.2.4 *ICT Application*

Venezky (2001:4) contends that the application of ICT in education refers to an array of technologies that can be applied in a variety of ways, not to a single approach. Kenney (2006) in Makhanu (2010:75) describes ICT application as the ability to use technology as a tool to research, organise, evaluate and communicate information.

Leadership plays a very pertinent role in the application of ICT in secondary school administration. Manitoba Education (2013) argues that "effective leaders understand how to balance growth through change while, at the same time, practicing aspects of culture, values and norms worth preserving. They know which policies, practices, resources and incentives to align and how to align them with the organisational practices". They know how to gauge the magnitude of the change they are calling for and how to adjust their leadership strategies accordingly (ibid).

3.2.2.4.1 *The Concept of ICT Application*

According to Twinomugisha (2010) ICTs can contribute to solving some of the major challenges currently facing education systems globally especially in the areas of improving access quality and efficiency of education. He further alludes to the fact that "the successful integration of ICTs in education requires a careful consideration of several issues such as the curriculum, pedagogy and teacher preparation strategies". Zhao, Pugh, Sheldon and Byers (2002) in Al-Sharija (2012:28) in a related view observe that ICT in education improves teaching, learning and administrative processes to qualify students for the modern day era.

The applications of ICTs are particularly powerful and uncontroversial in higher education's research function (UNESCO 2009:5). Communication links make it possible for research teams to be spread across the world instead of concentrated in a single institution. The combination of communications and digital libraries is equalising access to academic resources, greatly enriching research possibilities for smaller institutions and those outside the big cities (ibid.).

Kate Wild and Association for Progressive Communications (2003:4) argue that "applications and content are the reasons for investing in ICT". Applications enable users to carry out functions: sending e-mails, producing documents, creating web pages, managing databases and keeping financial records. Applications can also be tailored to specific needs, for example e-government, e-education, e-health and e-commerce. The content delivered by applications must satisfy the needs of local markets and users and be presented in an understandable form – if necessary using local languages and graphics (ibid.).

Manitoba Education (2013) asserts that, when provided with timely access to ICT, teachers can use it professionally to do the following;

- preparation of learning experiences
- development of learning resources
- sharing with colleagues
- collaborative planning

- teaching and assessment for learning

Policy note (2005:3) of Turkey posits that the key critical factor in successful integration of ICTs in schools is the creation of a responsive education system. A receptive education structure that is open to the evolving technological changes (ibid.). Taddeo (2006: 2) contends that "the integration of ICTs does not merely require the implementation of government initiatives, nor is there a definitive end to the process of integrating ICTs; it is not isolated in its impact but rather has wide reaching implications for learning across all curriculum areas and for all members of a learning community" (ibid.). Each school in this case requires to strategise its own ICT integration measures that are customised to address the existing technical needs, physical and monetary conditions of their respective set ups.

UNESCO (2009:19) postulates that ICTs can facilitate action research in communities and make it possible to involve the general public in research, for instance by collecting data or pooling the power of hundreds of personal computers. The expansion of multi-media centres, ICT kiosks and cyber cafés into rural areas creates new possibilities for extension services and the application of university research (ibid.). Therefore ICT fundamentally changes the way we live, learn, and work according to the International ICT Literacy Panel (2002:4). As a result of these changes, technology tools and the creative application of technology have the capacity to increase the quality of people's lives by improving the effectiveness of teaching and learning, the productivity of industry and governments (ibid.). In relation to this case, school administration can be able to gauge the level of ICT integration process as they relate its application to service delivery rendered.

3.2.2.4.2 *Relationship between ICT application and service delivery in school administration*

Opoku-Mensah (1998) in Adeya (2002:41) argues that the impact of information technologies depends on attitudes, expectations, organisation and management, which is a research-worthy area. However, research in attitude and expectations can be daunting more so in their quantification process. While ICT is about enhancing teaching, learning, and administrative

processes, it also provides a forum for communicating and interacting socially, thinking critically, and building a lifelong learning culture (Creighton 2003 & Lee 2006 in Al-Sharija 2012:30).

UNESCO (2009:27) in relation to service delivery identifies several benefits of ICT;

- "ICT technology can process voluminous records quickly, meticulously and impeccably
- technology can generate reliable and consistent records
- records and data produced are searchable and quickly retrievable
- digital records save space, a premium cost to institutions
- technology saves human resources for data entry and servicing student admission and registration. With advanced scanning technology, completed application forms can be read into the databases in a matter of seconds
- technology can expand the geographical boundary for student intake and facilitate cross-border higher education" (ibid.).

These perceived ICT benefits cast light to compare the relationship between ICT application and service delivery in secondary school administrative set up as the administrators can be able to relate the outcome of services rendered to them. This will provide a timely feedback for further planning in the ICT integration process in school administration.

Pernia (2008:1) contends that apart from radically changing the modes of educational information delivery, ICTs can perform critical roles in knowledge construction by making possible the creation, management, and sharing of knowledge. Hennessy Onguko, Harrison, Ang'ondi, Namalefe, Naseem and Wamakote (2010:62) argue that ICTs are vital in accessing, using and disseminating information. Back and Westrom (2001) in Al-Sharija (2012:30) notes that ICT helps in the training of teachers and instructors. For example, the Cyber Teacher Training Centre (CTTC), developed in Korea, provides many effective online vocational training programmes for teachers. The training programmes help teachers think creatively and learn new ideas for teaching their students (ibid.).

The Association for Progressive Communications (2003:15) argues that ICTs are no substitute for real face-to-face interaction, but when this is not possible they can provide alternatives. And they often make closer human communication easier by bringing people together. The use of ICT also saves time, as teachers can avoid the time required to initiate and attend face-to-face meetings (Jung, 2001; Karal, & Celik, 2010 in Al-Sharija 2012:30). Data from the monitoring of the learning achievement of school children undertaken periodically by Ministries of Education of many countries, some of which have sample sizes in hundreds of thousands, can be processed quickly and accurately only through the use of powerful computers (UNESCO 2009:5).

ICTs can help school administrators and school principals to streamline operations, monitor performance and improve use of physical and human resources (Kipsoi Chang'ach and Sang 2012:20). More than other technologies, computer related technologies have the potential to support the management of complex, standards-related instructional processes in relatively simple ways. They can also promote communication among schools, parents, central decision makers and businesses thus fostering accountability, public support, and connectivity with market place (ibid).

In a related view, Pernia (2008:1) observes that not only have ICTs become increasingly ubiquitous, each generation of these technologies expands its range of applications and runs at speeds that outpace and outmode previous models. Use of these new technologies has created dependency for many individuals who have embraced and integrated ICTs into their daily communication and information-seeking and giving activities. This has greatly facilitated school administration in carrying out their administrative tasks where ICT is well integrated and exploited abreast changing technological arena.

3.3 MONITORING AND EVALUATION OF ICT LITERACY IN SECONDARY SCHOOL ADMINISTRATION

The heart of a successful feedback loop is a strong monitoring and evaluation mechanism (Vital wave consulting 2009:44). Monitoring and evaluation tools and strategies allow planners to understand what is working in an ICT in education programme and what is not. Success metrics

must be established for shorter-term educational goals, which can align with goals laid out in the ICT in education plan (ibid.).

Unwin (2005:45) posits that good management is essential for the successful implementation of monitoring and evaluation activities in the field of ICT.

- These intertwined themes need to be carefully understood and negotiated if ICT programmes are to be implemented successfully
- Above all, it is essential for all those involved in teaching and learning to adopt appropriate monitoring and evaluation processes to ensure the successful delivery of their aspirations.

Unwin (2005:46) further argues that for monitoring and evaluation to be effective, all participants in the learning process need to be involved. Measuring the impact of change can be seen by teachers as being very threatening, and it often alters the relationships between them and learners. It is therefore critically important that monitoring and evaluation are seen as a shared activity in which everyone learns how they can achieve better and more through the introduction of new technologies (ibid.). The Ministry of Education Science and Technology (MoEST) would require to develop an all-inclusive monitoring and evaluation policy document for school administrators and Quality Assurance staff. The school administrators in this case would therefore need to rationalise the monitoring and evaluation process to the teachers and clerical administrative staff to minimise the negative perception of this exercise.

The relationships between 'monitoring and evaluation' and 'capacity building and management' are crucial for the successful implementation of technology-enhanced learning programmes in three specific ways (Unwin 2005:45).

- "First, it is essential for monitoring and evaluation activities to be well-managed and led so that they can be used effectively for the improvement of technology-enhanced educational programmes. Those involved in monitoring and evaluation likewise need to be well trained so that they can deliver sensitive and appropriate recommendations.
- Second, monitoring and evaluation have a direct impact on capacity building and management. Used effectively, monitoring and evaluation provide a key mechanism

to enable those involved in both formal and informal educational systems to improve their practices.

- Third, capacity building and management activities themselves need to be monitored, so that their role in delivering technology enhanced learning can be better understood and enhanced".

In light of these three ways, it is imperative to address monitoring and evaluation of ICT literacy in secondary school administration in this study.

3.3.1 Monitoring of ICT Literacy in Secondary School Administration

Vital wave consulting (2009:23) in view of Feedback and Recognition argues that "programmes that are set up to provide quick wins, or early measures of success, may be more sustainable". People like to feel that their efforts are producing tangible results, and that they are making progress toward the ultimate goal. Similarly, recognising positive efforts towards change and discouraging efforts aimed at blocking change reinforces leadership's commitment to technology in education deployments.

Constant monitoring category incorporates individual consideration as an indicator of the effective principal; one who recognises individual differences and understands staff strengths and weaknesses (Yee's 1999 in Al-Sharija 2012:61). He further observes that such recognition provides the principal with clear insights of staff capacities, which can be enhanced and supported accordingly.

Under the changing conditions, the teaching staff needs should be assessed and training activities or programmes developed accordingly. Often, teacher training programmes focus more on basic literacy skills and less on the integrated use of ICT in teaching (The World Bank 2005:22). Teachers are also more likely to integrate ICT in their courses, when professional training in the use of ICT provides them with time to practice with technology and to learn, share and collaborate with colleagues (ibid.). Given that there is continuous development of ICTs and the people who use them, so should there also be continual assessment of ICT education and

curricula by the educational systems or institutions that offer them (Pernia 2008:1). Monitoring of the ICT integration in secondary schools acts as a check control for it provides a timely feedback to the school administrators as they chart a way forward for their respective institutions. It also paves a way for a well-informed evaluation exercise for it provides a reliable on site feedback.

3.3.2 Evaluation of ICT Literacy in Secondary School Administration

Monitoring process looks at what is being done and how it is being done whereas Evaluation looks at performance against goals (Wagner, Bob, Tina, Robert, Jonathan & Tim 2005). They further note that the latter can and should take place while the programme or research is underway, and is concerned with evaluating how the intervention is meeting its performance goals.

Vital wave consulting (2009:43) contends that "almost as soon as the planning for a technology in education programme is set in motion, information about how it is working starts to accumulate. Each programme experiences some of the successes foreseen by educators and officials, along with unanticipated benefits and unwanted surprises. All of this information is useful. Some of it may support assumptions made at the start of a deployment, while some may challenge those assumptions. No deployment goes exactly according to plan, but maintaining a feedback loop, or mechanism for adjustment is essential to sustaining the operation (ibid).

It is important to assess users' training requirements to reduce the knowledge gap between what they already know and what they need to know to best perform their job through undertaking a personalised user needs analysis (Nelson, Whitener & Philcox 1995 in Peansupap and Walker 2005:200-201). In relation to this, Egan (2003:3) underscores the value of evaluation on the following grounds;-

- "The nature, value, and availability of information has changed enormously, and this change impacts the way we live, learn, and work.
- To succeed, it is not enough to master technical skills: you must know how to apply them within an information society.

- There is a lack of information about the ICT literacy of students, and debate about how best to address this issue in academic curriculum".

Education Testing Service (ETS -2002) in Makhanu (2010:78) posit that while progress has been made in properly situating ICT skills within the overall skills continuum, ICT skills have eluded measurement. Setting the ICT competency standards can help ensure effective integration of ICT in schools according to The World Bank (2005:22). The ICT learning standards for the ICT curriculum should focus on basic understanding and skills, value and ethics, and effective applications of ICT in handling information, communications and developing problem solving skills (ibid.).

Educators and administrators may use exams to assess whether academic goals are being met, or they might use surveys to determine the impact of the deployment on students, teachers and staff attitudes, practices and knowledge (Vital wave consulting 2009:43). Non-academic measures of success, such as changes in the community's feelings toward ICT, are important as well since they may affect a school's ability to sustain technology programmes. Finally, methods of determining how performance on short-term goals impact longer-term social or economic goals may also be considered (ibid.). Evaluation of ICT integration in secondary school administration is very crucial for a meaningful feed-back in the roll-out process. It should be planned along both short and long term goals just like any other major school project.

The use of new technologies in learning has far more fundamental influences on people's lives than can be measured simply in terms of traditionally defined educational attainment targets (Unwin 2005:46). It is therefore difficult to design comprehensive 'measurement' procedures to evaluate the 'effectiveness' of such initiatives. Managers should therefore identify exactly what it is that they want to measure in any such programme, and also that they are open to considering a far wider diversity of influences than they might envisage simply from an 'educational' perspective (ibid.). Through this way, they will be able to customise their own set criteria in determining their ICT literacy acquisition level in tandem with the school and national ICT policies.

All stakeholders, from teachers to parents, government officials and the funders of the technology in education programme, have a vested interest in the programme's performance (Vital wave consulting 2009:43). Continually evaluating and communicating the results, and making real-time adjustments to better ensure positive results, will increase the likelihood of the sustained operation of the current programme and continual investment and interest in future programmes (ibid.). In relation to this, Unwin (2005:48) posit that in addition to service providers, there is also a need for the building of human capacity in the monitoring and evaluation sector. Many of those involved in monitoring and evaluation particularly in poor countries have little experience of such work, and it is crucial that simple but effective schemes are developed to enable them to contribute to, and benefit from, such activities (ibid). Training of monitoring and evaluation personnel in ICT integration in schools is of paramount importance as it sets and maintains standards in the ICT infusion process in both pedagogy and overall school administration processes. In line with this, MoEST, KEMI and accredited the private organisations would require to offer special training programmes for school administrators and Quality Assurance staff. This will help equip them with monitoring and evaluation tools for practical ICT integration in secondary school administration.

3.4 DETERMINANTS OF ICT LITERACY ACQUISITION & DEVELOPMENT

Gewerc and Lourdes (2010:58) posit that innovation processes with ICT are potentially disruptive instruments that can affect the practices in force at educational institutions, noting that changes in school teaching and organisational practices are multi-determined and complex. He further observes that one of teachers' most deeply rooted beliefs regarding innovation with ICT may be reinforced by the administration (ibid.66). This will help in assessing and determining the level of ICT literacy acquisition.

Studies have indicated that many different factors can influence an individual's level of computer literacy (Lowe & McAuley 2000:7).The determinants of ICT literacy level in this study will address the following factors; - government policy, capital, infrastructure, education level, training and technical support, technology characteristics, attitude towards ICT literacy and

knowledge sharing environment. This section will focus on how these key factors affect ICT literacy acquisition and development.

3.4.1 Government policy on ICT

Kate Wild and Association for Progressive Communications (2003:1) define policy as a set of principles or a broad course of action that guides the behaviour of governments, organisations, corporations and individuals. It bridges the gap between the vision of where we want to be and the plans that enable us to get there. For governments, policy is a tool to promote national vision and the basis for the legislation and regulation through which it is implemented (ibid.).

In a related view, Kandiri (2014:4) defines a policy as “a plan of action to guide decisions and actions that may apply to government, private sector organisations and groups, and individuals”. He further views a policy as a set of decisions which are oriented towards a long-term purpose or to a particular problem. Such decisions by governments are often embodied in legislation and usually apply to a country as a whole rather than to one part of it. ICT policies may encourage or discourage the application of ICTs. If ICTs are to be part of a sustainable activity there will need to be a suitable policy environment (ibid.23). A policy that caters for both the technical training and strategies for implementers should be put in place to enhance ICT integration in secondary schools as a matter of major concern by the government. This will require involving both pedagogical and administrative aspects of ICT integration for its effective realisation as one of the key educational goals.

The Association for Progressive Communications (2003:10) observes that “an ICT policy generally covers three main areas: telecommunications especially telephone communications, broadcasting especially radio and TV and the internet". It may be national, regional or international. Each level may have its own decision-making bodies, sometimes making different and even contradictory policies (ibid.). Besides the national ICT policy, there is a need for each individual school to have its own ICT policy framework that addresses the immediate needs of the school subject to its unique environmental set up.

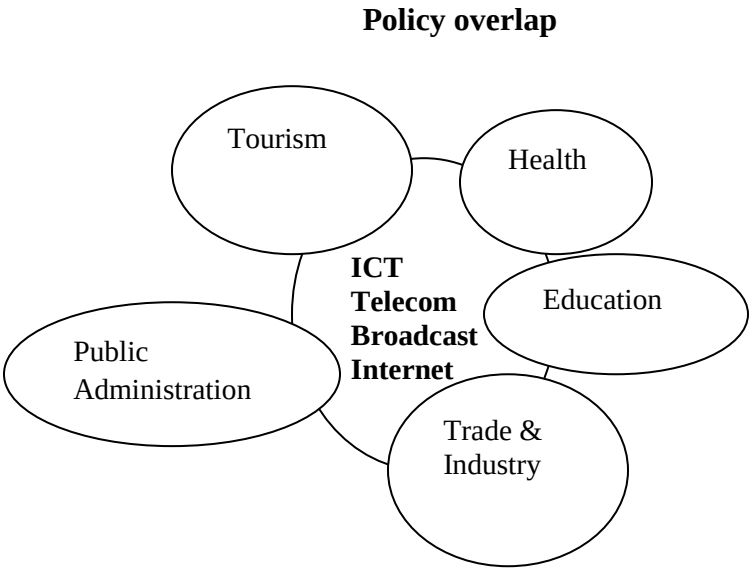
Policy varies from country to country, especially from rich to poor, and the priorities are different (The Association for Progressive Communications 2003:15). In poorer countries, where ICTs are less developed, the key issues are access to ICTs for the majority of the population and outright restrictions such as internet filters and lack of freedom of expression. In the developed countries, many of these issues have already been decided such as telephone access, or have a long tradition such as the lack of censorship. The success of policy depends on how people use the new tools that become available to them – computers, fixed line phones, mobiles or the internet – once the policy is implemented (ibid.57). The Association for Progressive Communications (2003:55) further contends that the scope of an ICT policy should;

- "Address the extension of the communications infrastructure through telecommunications reform to stimulate private sector growth and create job opportunities,
- ICT policy must also incorporate social goals by building human capacity and creating the conditions for the development of relevant applications and content
- ICT policies have to do with education, health, agriculture, culture and all other areas of activity that impact on quality of life".

ICT policies can be integrated into sectorial as well as broad national policies; for example countries may commit to introducing ICTs into schools in order to expand educational opportunities and increase the supply of ICT-literate graduates; they may extend internet access to rural clinics to improve the delivery of health services. As the use of the internet expands within countries, a host of specific issues emerge: privacy and security, intellectual property rights, access to government information are examples (ibid).

ICT policy cuts across all human endeavours and is closely linked to other areas of policy including education, health, trade, tourism and public administration (Kate Wild and Association for Progressive Communications 2003:5). This is illustrated in figure 3.4

Figure 3.4 Policy Overlap



Source: Kate Wild and Association for Progressive Communications (2003:5)

In the face of intense competition, countries can no longer rely on the accumulation of capital and labour to sustain economic growth (The World Bank 2005:3). The capacity of the workforce to generate new knowledge has to be continuously encouraged. The ICT in Education Policy should be planned to complement other development strategies. ICT education policy should not be formulated in isolation. It should be considered and implemented to complement and support other development strategies (ibid.). Governance in this case determines the level of ICT literacy acquisition and development. Policy note (2005:10-13) further identifies the following components of Policy and Regulatory environment that help in integrating ICT into education

- Defining clearly the roles and responsibility of all departments,
- Transforming Education Policy into action
- Filtering of undesirable websites from the internet
- Educating students regarding the usage of the internet
- Internet Education
- Improving Access and Equity to narrow the digital divide
- Putting together an ICT Integration Plan.

From the above components, it's worth noting that ICT policy should not only be explicit and consistent but also practical in addressing the integration process if it has to be successful in the secondary school administration plan. "ICT policies must be dynamic, cost-effective, adaptable, and differentiated between sectors and between the various segments of educational management in order to contribute effectively to education management" (Kipsoi Chang'ach & Sang 2012:19).

Ming, Hall, Azman and Joyes (2010:6) postulate that if policy-driven educational reform programmes are to be successful and sustainable, more is required to bring teachers on board to spearhead such change. They further add that there is a need for teachers to be actively and strategically involved in ICT policy and practice from the outset in order for them to both 'own' and be able to impart the necessary skills to their students (ibid.12).

In order to make ICT an integral part of the education system and to ensure support for ICT programmes, ICT in education policy should share the same vision as other educational policies and initiatives (The World Bank 2005:6). With a clear goal, ICT becomes part and parcel of education plans, ensuring its implementation. It also enables education stakeholders to examine opportunities for ICT in education (ibid).

While national policies need to take the global agenda into account, they must also reflect the knowledge and understanding of local constituents, the needs of the people who will be most affected by the policies and the particular circumstances of their lives (The Association for Progressive Communications 2003:52).

The World Bank (2005:8) recommends the need to identify and document successful worldwide usage of ICT in Education to create awareness. Policy makers and stakeholders are more likely to support ICT in education policy when real life examples are identified, documented and presented. By making policymakers and stakeholders aware of and updated on the benefits of ICT to education, advocacy for the acceptance of ICT use in education is strengthened (ibid.). Due to fear of the unknown, many a person would want to try a business venture that has been experimented and worked relatively well elsewhere rather than taking a lead in initiating change.

This may, however, deter creativity in ICT policy formulation thus prompting the need for more research on how to effectively customise education policies to suit the end users in secondary schools and other institutions of learning.

3.4.2 Capital

Vital wave consulting (2009:13) views that budgets should be created for the expected life of the deployment, typically five years, and cover all of the costs identified in the Total Cost of Ownership (TCO) calculations. If the budget does not match the TCO requirements, it is better to revisit the programme goals than to move forward without adequate budget as it is extremely likely that the educational goals can be met if sufficient funds exist (ibid.).

Available technology needs to be affordable by schools if it is to be adopted, according to Hennessy, Onguko, Harrison, Ang'ondi, Namalefe, Naseem and Wamakote (2010:53). They further note that at the national level, affordability could be limited by the high cost of putting infrastructure in place, and is linked with the issue of poverty. At the individual or organisational level, expensive hardware and software as well as high costs of communication and services restrict access to ICT (ibid). This will have a trickle-down effect in the use of ICT in secondary school administration especially where there is no tax waiver on ICT equipment by the government of the day.

The governments need to both identify and tap into all ecosystems and development community partners for financial as well as technical (e.g., ICT, training, pedagogical) support for technology programmes from the start (Vital wave consulting 2009:15). There is also the need to select a financing model that minimises total costs and suits their particular initiative. Completing a thorough assessment of the best financial alternatives and moving to secure funding avoids interruptions to ICT in education programmes (ibid.). As a way of encouraging the ICT integration process in secondary schools, the government should consider a tax waiver on the purchases of the key ICT equipment like computers, their accessories, soft-wares and internet connectivity charges.

Kokay (2004:17) recommends that due to the additional funding required to meet IT development, an integrated plan that provides technical support for teaching and learning needs is important. Budget decisions should follow strategic planning not the other way around (ibid.). Comparative cost and cost benefit analysis are important and necessary (UNESCO 2009:30). A total cost of ownership calculation, including the cost of servers, programming and IT support staff time, needs done when comparing the suitability of software (ibid.5). Government and key stakeholders in the education sector and other development partners need to put their energies in drawing up an ICT integration budget for schools and provide them with monetary support as a way of subsidy. On the other hand, school managements through their respective Board of Governors and Parents Teachers Association require drawing their ICT integration plan that prioritizes on capital sourcing as part of their mainstream agenda besides infrastructure, technical and other physical resources.

3.4.3 Infrastructure

Hidden from the application-based world of end-users, technology infrastructure encompasses the unseen realm of protocols, networks, and middleware that bind the computing enterprise together and facilitate efficient data flows (Ermelinda, Gorica & Ahmetaj 2011:125). ICT infrastructure involves more than just the mechanics of data systems; it also includes people providing support and services. The technology components are converted into useful shared services by a human information technology infrastructure composed of knowledge, skills, standards, and experience (ibid.).

A suitable physical infrastructure is critical to the success of a technology deployment (Vital Wave consulting 2009:17). In order to avoid theft and weather adversities like heat or cold related damages to devices, ICT facilities must be physically secure enough. Wiring should take into account the energy requirements of the devices chosen, and the usage model - current and future - selected for the deployment (e.g., 1:1 learning, computers on wheels, computer lab) should influence the cabling and connectivity infrastructure installed (ibid.). The problems of ICT facilities require strong institutional policy as well as regional approach for joint negotiations on the cost of bandwidth (UNESCO 2009:11).

Venezky (2001:17) observes that in the initial stages of implementing ICT in a school, a reliable and user-friendly infrastructure is critical. As teachers become more technically competent, their general pedagogical abilities and their ability to implement ICT into the curriculum become more important. Nor and Hazita (2005) in Ming *et al.* (2005) in their study on the teaching and learning of English in Smart Schools found that although teachers and students expressed the desire to learn the smart way, their attempts were hindered by the limitation in infrastructure. ICT integration in secondary schools cannot be well implemented with inadequate network connectivity.

For the purpose of building an information society (a society in which the creation, dissemination and manipulation of information has become the most significant economic and cultural activity), ICT infrastructure is one of the important factors to be considered (Ermelinda Klodiana & Lavdosh 2011:123). In a related view, UNESCO (2009:12) notes that ICT infrastructure plays a very pivotal role in determining ICT literacy acquisition and integration in secondary school administration. ICT infrastructure is one of the parameters on the basis of which the engineering colleges are approved (ibid.).

Gronow (2007:5) argue that "the school with an ICT infrastructure allows for networked communities, promoting fast pace communication and information sharing. He further notes that this allows for a less hierarchical and more flexible organisation, creating a new pattern of learning in schools. In support of this, Venezky (2002:13) argues that access to the internet is of particular importance to schools. By providing access to the resources of the web, internet access can facilitate learning activities centred on student research. Internet access enables a whole range of communication activities, including links with other schools, parent access, and distance learning (ibid.). However, there is need for proper guidance on the use of internet for learning purpose as some information needs be filtered for learners' or users' consumption. To some extent the learner or user may stray away and get "drawn" in the super abundance of information content and fail to attain their objectives as they end up trapped in other interesting information unrelated to ICT integration in school administration. More research on the effects of internet on ICT integration in secondary schools needs to be carried out.

Where the ICT infrastructure exists nationally, many institutions working together could tap into an ICT network to facilitate collaboration and sharing to cut down on costs and optimise the returns gained in the use of ICTs (UNESCO 2009:23). ICT networks are critical for the successful implementation of ICTs in education. Well-articulated policies will ensure that such access is possible (ibid.).

The ICT options paper in Kenya indicates that one of the main challenges facing ICT literacy development is limited access and the degree of disparity in infrastructure, especially electricity and telecommunications that exists between rural and urban areas (MoE 2005 in Makhanu 2010:85). The report continues that getting computers into schools is relatively easy; keeping them working is a greater challenge. A myriad of problems ranging from electrical spikes, to viruses, dust, heat, and normal wear and tear can bring activity in a developing country's computer lab to a screeching halt (ibid.). Routine maintenance is equally important as machines are subject to malfunction either by default, negligence or operations by malicious handlers.

The introduction of ICTs has to be accompanied by far reaching reorganisation of the learning structures (The World Bank 2005:3). In addition, it is important that technological innovation is developed to serve education in diverse learning context, while respecting linguistic, cultural and social differences (ibid.). However, ICT infrastructure requires major financial investment, which is best done on the basis of well-conceived national and institutional policies (UNESCO 2009:7). Besides capital and training support, infrastructure forms the backbone of ICT integration in secondary school administration since it is the gateway for knowledge acquisition, development and application for an effective and efficient service delivery.

3.4.4 Education level

Since ICT skills are associated with the process of continuous learning, learners often incorporate several methods to learn necessary computer skills, either formally or informally and seldom rely on only one method of learning (Borghans & Ter Weel 2004 in Makhanu 2010:81). Formal methods include courses sponsored by one employer, while less formal methods may

include help from colleagues or family, the use of manuals and books, observing others, or self-teaching through trial and error (ibid. 89).

Nakhaie (1998) in Lowe and McAuley (2000:7) argues that "just as with prose and document literacy, ICT literacy is highly correlated with education and income, both key measure of socio-economic status". Individuals with low educational cognitive ability level may lack the opportunity to develop computer skills, or consciously opt not to become familiar with computers due to the perceived difficulty in learning about and using computer technology (Authur & Hart 1990 in Lowe & McAuley 2000:7). Perceptual barriers hinder not only effective communication but also shun away a room for interrogative skills and creativity in ICT integration in secondary school administration due to mindsets. Further studies on perceptual barriers in ICT integration in secondary schools need to be carried out.

In their study in Canada, Ladds and Underhills (2007:14) noted that education made a difference in distinguishing Government On - Line users (GOL) and non-GOL users. Individuals with higher levels of education were much more likely to use the internet to access government information online than those with lower levels of education. For example, education was an important predictor; with post-secondary education, the odds of GOL use increased by 1.6, compared to having a minimum of a high school education alone. Similarly, for an individual with a university degree, the odds of GOL use more than doubled compared with having only a high school diploma or less (ibid.13).

According to the National Centre on Adult Literacy Technical Report (2005) in Makhanu (2010:8) one study in Britain found that people with further education have higher ICT skills, but suggests that more educated people tend to work with computers, making it difficult to differentiate whether education or employment has the biggest impact on ICT skill levels. Frequent multi-tasking use of computers and the internet play a major role in ICT literacy acquisition and integration in secondary schools besides individual's education level. One is more exposed to exploratory learning which is experiential and rewarding.

3.4.5 Training and Technical support

Training generally includes basic computer literacy, exposure to the basics of email, search engines, website design and the integration of technology in the classroom in a concentrated period with groups at various levels of competence (Kipsoi, Chang'ach & Sang 2012:25) Pernia (2008:18) further posits that ICT literacy training could include critical assessment skills alongside sharpening technical skills in order to build social and ethical competencies alongside technical proficiencies. This means that curricula would integrate topics such as: using ICTs to work individually or in teams; complying with agreements and helping each other in case problems occur; using the internet safely and responsibly; and developing awareness on the motives of technology companies and ability to judge the truthfulness of advertisements regarding technologies (ibid.).

Kate Wild and Association for Progressive Communications (2003:4) argue that "if ICT programmes are to be sustainable, a critical mass of people has to know not only how to use technologies and applications but also how to maintain them and generate from them innovative solutions to local problems". Countries need to focus on training a core of professionals who can provide access to and maintain the ICT infrastructure (computers, computer software, communications networks) and adapt them to local needs. Countries also need to think about how to retain skilled technical staff in the country once they have been trained. ICT policies can "start small" to take advantage of existing skills and become more ambitious as human capacity expands (ibid.).

Training goals vary but most are based on training schedules using workshops to cover the various skills (Kipsoi Chang'ach & Sang 2012:25). He further contends that in general, training is seen more in terms of time spent on training than in terms of outcomes such as proficiency in the skills, comfort with the technology or experience in integrating use of the internet into curricula.

"Introducing ICT into the schools, without a proper staff development plan and without a pedagogical perspective, is a low-return investment" (Hepp, Leukel & Schmitz 2004 in Unwin

2005:50). According to The Association for Progressive Communications (2003:78) education, training and skill development are critical to ICT interventions. UNESCO (2009:25) supports the view that "training should be introduced to ensure that the implications of technology adoption and use are clearly understood and accounted for in short and long-term planning". Due to the uniqueness of institutions, it is imperative for each school to carry out its own ICT needs assessment for training its staff members based on the needs identified to avoid wastage of resources in duplication of training skills previously learnt. This will foster effective ICT integration in the school plan.

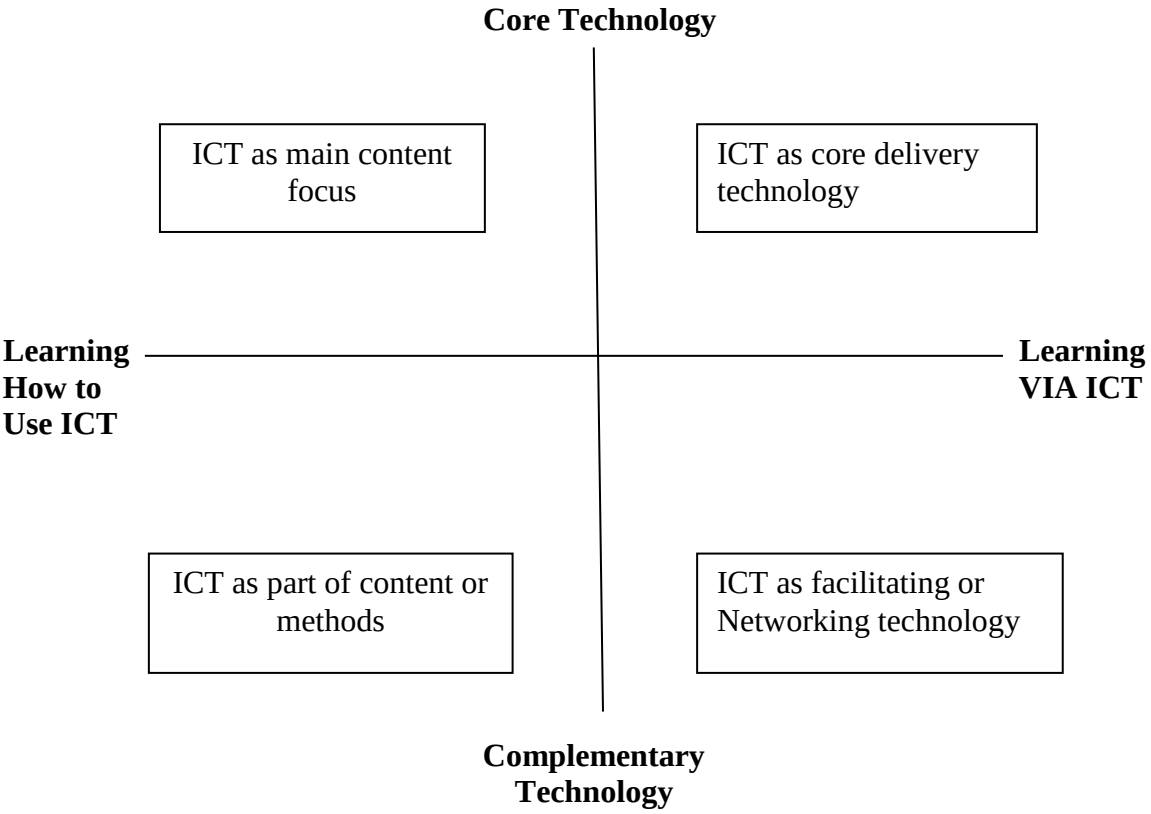
The World Bank (2005:22) contends that training education staff at all levels ensures that ICT use in schools is implemented in an efficient and complementary way. Most professional development programmes target only teachers and heads of schools. However, this should not be the case. The Ministry Of Education's (MOE) non-education staff can help and support teachers in integrating ICT in schools. Continuing training for policy makers and school administrators in technology planning and management is essential. The MOE can make certain that all education staff use ICT in their work and that all mid-level school staff acquire basic skills in using general software applications and the internet (ibid.). Since technology is dynamic, continued ICT training of school administrators, teachers and clerical staff is necessary so as to be in tandem with the ICT global trend on educational matters.

Although teachers must be trained before a deployment is launched, regular on-going training is also critical (Vital wave consulting 2009:44). Continuous training reinforces the skills teachers have already learnt while teaching them new skills as technology is more fully integrated into student learning. A strong, reliable teacher training programme, whether provided internally or by outside organisations, is also necessary as new teachers consistently need to be trained due to the high turnover rates in primary schools (ibid.). In support of this, Hennessy *et. al*. (2010:99) argue that having ICT-literate and confident teachers is clearly a prerequisite for integrating any form of ICT into schooling.

According to Collis and Jung, 2003 in Hennessy *et al* (2010:85) the ICT teacher training can take many forms. They add that teachers can be trained to learn how to use ICT or teachers can be

trained via ICT where ICT can even be used as a core or a complementary means to the teacher training process. Building on this, Jung (2003) organises various ICT teacher training efforts found in different countries into four categories using a framework as illustrated in figure 3.5 below.

Figure 3.5: Categories for ICT in teacher training



Source: Collis & Jung (2003) in Hennessy et al... (2010:85)

Teachers need support, examples of good practice and leadership from their school leaders and necessary time for professional development in order to truly transform teaching and learning in the classroom (Hennessy *et al*. 2010:83). Eventually, teachers need to be transformed from information consumers, using the internet to access resources and information, into information producers who adapt the information for their particular cultural and educational reality (ibid). This will impact positively on the teacher's ICT integration process in carrying out various

administrative tasks such as exam analysis, students' school duties allocation and percentages of class attendance per student, among others.

Orientation and training are essential components of ICT in education programmes where the technology is often being deployed for the first time (Vital Wave consulting 2007:18). All stakeholders whose efforts will coalesce to make the technology in education programme a success will benefit from being involved in orientation or training sessions (ibid.). Gronow (2007:5) further attests that "the promotion of staff professional development in a learning organisation can be highlighted in an ICT rich environment where people learn from their work as a regular part of their day to day responsibilities. Teachers and administrators will be better placed in ICT integration in their pedagogical and administrative duties respectively when they have proper and adequate training.

3.4.6 Technology characteristics

Peansupap and Walker (2005:198-199) argue that the characteristics of technological innovation such as relative advantage, ease of use, compatibility are the primary criteria that influence the individual's adoption decision. Technology characteristics influence IT or ICT diffusion processes and are an important element influencing IT or ICT adoption (ibid.).

Whereas the potential benefits of ICTs for administration are substantial, there are associated challenges that decision makers should be aware of before introducing technology changes (UNESCO 2009:25). As the goal is for seamless transfer of data from the point of student registration to registry, finance, student services, human resources and so forth, the respective systems or databases involved in the process must be able to communicate with each other intelligently. Reliability and security are of the essence (ibid.).

Ramamurthy (1994), Peansupap and Walker (2005:198-199) found that compatibility has a positive influence on organisational IT or ICT adoption and implementation. For example, IT or ICT that was designed to replicate manual or paperwork is easy for users to accept because they feel familiar with the work patterns. Therefore, the higher the compatibility with users' existing

work, the more likely it is that the users become familiar with a system. However, ICT use is not limited to duplicating manual and paper work systems but involves work process re-designing or re-engineering (ibid.). However, the ICT integration end users in the school environment should be ready to move from known to unknown by adopting exploratory strategies in effecting their pedagogical and administrative skills respectively. They can do this by searching into related fields of knowledge rather than the only known ones.

Taddeo (2006:1) observes that the educational community is also beginning to appreciate the far-reaching implications of ICT integration. Not only will traditional teaching practices be challenged but also the parameters within which learning occurs. He adds that current and future ICT innovations will have major ramifications for all educational stakeholders, in particular for educational leaders (Science & Training 2002 in Taddeo 2006:1).

In order to improve organisational productivity, most current IT or ICT systems require complex change management projects in consideration of other technological attributes such as speed, reliability and accessibility (Peansupap & Walker 2005:198-199). Speed makes users feel that they are gaining a real benefit and improving their productivity by using IT or ICT technology compared with previously used systems. If users feel that applications lack speed and reliability or if users are not provided with necessary access to use an ICT application, then they may not be willing to use them (ibid.). Reliability in the use of ICT, accompanied by good accessibility boosts consumer confidence of the end users in the application of their acquired skills in education administration. This is further enhanced by a relatively high speed that helps in time management.

3.4.7 Attitude towards ICT literacy

The attitude dimension of ICT represents the product and process of a person's critical assessment of her or his use of ICT for information and knowledge (Pernia 2008:15). In recursive fashion, the continued use of ICTs increases and deepens the user's critical reading of the information and knowledge that is accessed, managed, integrated, created and communicated through ICT (ibid.).

An individual's propensity to adopt or use any innovation depends on the way that the individual perceives it in terms of its relative advantage, compatibility, user friendliness and observability (Rogers's theory 2003 in Bakabbulindi 2012:77). If the individual perceives the innovation to have relative advantage over similar products or services say in terms of speed of performance, then that individual will have high propensity to use the innovation. If the individual perceives the innovation to be compatible with the individual's work and interests, then that individual will have high propensity to use the innovation (ibid.).

Murphy *et al*. (1989) in Peansupap and Walker (2005:200) are of the view that one motivation behind an individual's IT or ICT application use is their characteristics such as self-confidence, enjoyment of learning and their previous foundation IT skills. Users with high self-confidence levels are more likely to use and adopt IT or ICT applications than users with low self-confidence (ibid.). ICT literacy acquisition in this case is dictated upon by the state of mind in relation to past experiences rather than the prevailing learning and ICT application environment. Teachers with positive attitudes for using computers were more likely to use computers frequently and intensively in their teaching subjects (Pelgrum 1993 in Chen 2000). In view of this, Venezky (2001:30) notes that those enthusiastic about ICT succeeded in using it despite inadequate infrastructure and institutional support. Utase in Venezky (2001:15) contends that the use of ICT is influenced by the teacher belief about the appropriate role of technology in education. A Japanese school reported that a number of teachers were sceptical of the value of ICT for their subject areas and therefore made no attempt to integrate it in their teaching (ibid).

Pernia (2008:15) notes that critical assessment skills pertain to reflection, critical assessment and understanding that ICT acquisition and use impacts on personal and social development, including values, responsibilities, communication and other behaviours. It is through this critical reflection that a person understands the social and ethical implications of ICT-related behaviours and, hence, develops social and ethical competencies. The key competencies that can be expected of individuals who have completed a critical assessment skills course or module on ICT are stipulated as follows;

Table 3.2 Key Competencies for Critical Assessment Skills

Dimensions	Conceptual Label	Key Competencies
Attitude	Critical Assessment Skills	➢ Ability to use ICTs to work individually or in teams, complying with agreements and helping each other in case problems occur. ➢ Judicious or responsible use of technology: Sensitivity to safe and responsible use of the internet ➢ Critical and reflective attitude when assessing information: Awareness of the motives of technology companies and ability to judge the truthfulness of advertisements regarding technologies. ➢ Interest in using ICT to broaden horizons by taking part in communities and networks for various causes. ➢ Understanding the consequences of acquiring and using technology: Ability to understand that use of ICTs affects formation of values and responsibilities, communication practices and other behaviours. ➢ Ability to critically assess the effects of the technology on values.

Source: Pernia (2008:15)

Venezky (2001: 15) acknowledges the importance of teacher skills and attitudes. He observes that in most of the case study schools, there remained some teachers who did not use ICT. In a Greek secondary school, despite the stimulus of an external project and a school-wide policy of ICT usage, there were some who did not take it up at all. In Oulu school in Finland the teachers using ICT were very happy with the progress, and saw learning advances in deeper understanding, but they found it difficult to convince their colleagues of the benefits. This reluctance was often attributed to lack of technical skills. In Ireland, for example, it was noted that the teachers who did not develop sufficient confidence avoided using ICT (ibid).

Lack of acceptance of ICT as an urgent national need and as a reason for slow penetration of ICTs in Africa has been cited by Chege 2003 in Hennessy *et al*… (2010:55). Technology is still considered a luxury by many within the region and extreme poverty necessitates countries to choose between feeding the hungry and sheltering the homeless over investing in enhancing technological infrastructure and thereby improving ICT access. Schools are under-funded and have little resources to spend on technology (ibid).

The wide adoption of ICTs calls for mindsets and skill sets that are adaptive to change (UNESCO 2009:28). It further postulates that an attitude of resistance to change is often caused by the lack of appreciation of the benefits brought by ICTs and by the fear that technology will replace jobs, which it should if it is to be cost-effective (ibid.). Akker and Pelgrum (1993) in Chen (2000) observe that school principals with positive attitudes for computers report a higher frequency of computer use stimulation by school authorities than those who have less positive attitude.

The World Bank (2005:3) observes that as technology advances, unless it brings with it an attitude shift towards learning, computers cannot be properly used to enhance the education quality. To get maximum value from new technologies, there has to be a shift in the attitudes governing education. Educators and teachers have to figure out new ways to take advantage of the fast evolving technology. Barlow (1998) in Adeya (2002:2) believes that common perceptions of the potential of the digital age are limited by the habits of the mind one develops in an industrial society. The mind set of school staff members requires frequent de-schooling through psyching process and where possible be coerced to internalise the benefits of ICT through training, reward and motivation so as to integrate ICT in education administration.

3.4.8 Age Factor

Schaie (1994) as cited in Crawford (2004) using a longitudinal study over a period of several decades noted that “scores on primary mental abilities improved gradually until about age forty at which the abilities tend to stabilise until approximately age sixty. The decreases are small until the mid-seventies at which time scores are usually measurably lower than they were in the mid-

twenties. Therefore, when a composite measure of mental abilities is used, learning ability does not decrease until the sixth or even seventh decade for most individuals (ibid.).

Crawford (2004) further notes that adult learners are more problem-centred and want to make learning apply to their lives. They view learning as most desirable when it is relevant and can be used currently rather than as something to be accessed in the distant future. While older adults are not as quick to learn as younger people, they can often make up for this through a wealth of experience that tends to support superior reasoning and judgment abilities (ibid.).

Lowe and McAuley (2000:7) in their study found out that there are notable age differences regarding ICT use and skills. For instance, young people are more likely to be ICT users and to be more ICT literate than older age groups. This is likely the result of more ICT-intensive educational programmes in schools. Learner's age in the learning process determines the knowledge and content level to be taught. The learners' age was a significant factor in predicting learning gains, older learners made least progress than younger ones in terms of English for Speakers of Other Languages (ESOL) skills. Older men (but not women) acquired more ICT skills and confidence **(**National Research and Development Centre for Adult Literacy and Numeracy – NRDC 2002)**.** Although not a major determinant in ICT integration in secondary school administration, learner's or user's age is correlated to the type of learning skills, knowledge retention and attitude biases.

Older individuals are slower to respond to rapid change in technology and increased reliance on computers than younger individuals (Lowe & McAuley 2000:8). However, with adequate training, older individuals can adapt to new information technologies (Linden & Adams 1992; Kelley *et. al*., 1999 in Lowe & McAuley 2000:8). Canadian data suggest that families with children, particularly young children in school, are more likely to own computers (Dickinson & Ellison 1999 in Lowe & McAuley 2000:8).

In a study conducted in Canada by Veenhof Clermont and Sciadas (2005) in Makhanu (2010:80) it was shown that older workers have fewer ICT skills and that this may result in a deterioration of their positions in the labour force. They add that a 'generation gap' with respect to exposure to

computers and other ICTs may explain a reduced opportunity to learning ICT skills. Young workers aged 25 and under are significantly more likely to grow up with a computer in the home than those aged 25 and above. Therefore a significant decline in ICT use is found to occur after age 45 in several areas of the workforce (ibid.). Kirsch and Lennon (2005) in Makhanu (2010:80) add that as a result, there are fears of a growing mismatch between the ICT skills of older workers and those skills that are in demand.

In a similar view, Crawford (2004) contends that preconceived ways of thinking and doing something is not always easily changed, especially when it has been previously backed up by some perceived expert advice. He further observes that adults are more sceptical about accepting new information, especially if it appears to contradict what they already believe. Teaching "older generation" (45 years and above) new technological skills for personal or administrative purposes can be a daunting task since its likely to alter the status quo in working with ICT in school administration. They may be ignorantly rejecting change as denial takes the centre stage in embracing new technology. There is a need for more studies on the effects of age in ICT integration in secondary school administration.

3.4.9 Gender factor

Gender differences in attitudes and behaviour related to information and communication technology is a major research theme (Lowe & McAuley (2000:7). Men's and women's attitudes, needs and perspectives on ICTs are likely to differ and it is important to address the specific needs of women (Rathgeber 2000 in Adeya 2002:37). She adds that the telecommunications policies adopted by many African governments do not make distinctions between the attitudes and needs of male and female users.

"All women and men, communities, nations, and the international community have the right to access and effectively use the information and knowledge they need to address their development concerns" (Association for Progressive Communications (2003:83). It further notes that this is the strategic starting point for all concerned with gender equality and social transformation.

Gender stereotyping continues to exist in the fields of education and training (Association for Progressive Communications 2003:3). Courses that have anything to do with mathematics, the sciences and technologies are inevitably associated with male students. Whereas those that related to the specifics of home economics and service trades are associated with female students (ibid.). Volman and Eck (2001) in Makhanu (2010:8) argue that old stereotypic gender differences in attitudes and achievements that previously existed in mathematics and technological disciplines were extrapolated to the area of ICT. There is a dire need to demystify such stereotypes as they inhibit the ICT integration and equity of access to women thus disadvantaging them in harnessing the benefits of a knowledge economy.

Becker (1994), Chiero (1997), Hadley and Sheingold (1993) in Chen (2000) in their study found out that gender influences the performance of using computers and as a predictor, according to some studies. They further observe that male teachers used computers frequently and female teachers who used computers felt less confident than their male colleagues (ibid.). Based on data from IEA cross-national survey, Reinen and Plomp (1993a) in Chen 2000) analysed all participating countries and found that computer use in most schools was dominated by male teachers. Females considered their knowledge about computers as less than their male colleagues. It also showed that male teachers have better self-confidence in using computers than female teachers, as Pelgrum and Plomp (1991a) in Chen (2000) analysed.

The amount of time teachers spent with computers was different between male and female teachers (Becker 1994 in Chen 2000). He further observes that the male teachers used school computers for about twice as many hours per week as the female teachers did (ibid.). Female teachers tend to be more anxious, less experienced and less confident about their ICT competencies and it is less likely that they will apply computers for various teaching and learning purposes (Volman & Eck 2001 in Makhanu 2010:8).

Nancy Hafkin (2002:4) observes that at present, a huge gender gap exists in access to communications. Infrastructure is concentrated in urban areas, and the bulk of women live in rural areas. In developing communications infrastructure, many choices must be made that involve location of facilities, cost and choice of technologies. All of these affect whether the

majority of women, who in most African countries are poor and living in rural areas, can access these facilities. If choices are made that have an urban bias and high cost, fewer women will have access. Internet connectivity is frequently available only within capital and major secondary cities in many developing countries, while the majority of the population lives outside these cities. Access to communication facilities is a vital concern that affects women's lives (ibid). Matters of insecurity deter women from accessing ICT facilities in the urban centres during the evenings when they have leisure time after work as they are not guaranteed of their security on their way back home after dusk.

Gender dimension of ICTs, according to The Association for Progressive Communications (2003:78), also affects telework, flexi-time, and work from home arrangements, where women have few rights, meager pay, and no health, social or job security. A woman's wage-labour outside or inside the home as a result of the new technologies, does not necessarily entail a change in the family division of labour. Men still get out of doing the housework, and women find themselves with dual or triple burdens. Poor working conditions, long hours and monotonous work routines associated with ICTs are often injurious to women's health (ibid.).

"An equitable and inclusive 'Information Society' must be based on the principles of gender equality, non-discrimination and women's empowerment" (The Association for Progressive Communications 2003:83). It further argues that gender perspective must be incorporated by all stakeholders involved in the process of planning, implementing, monitoring and evaluating ICT initiatives. All stakeholders must, of necessity, develop quantitative and qualitative indicators, benchmarks, and 'ICT for development' targets that are gender specific (ibid). An information society that is responsive to affirmative action is crucial in not only bridging the digital divide across the board but also ensuring a fair distribution in the economic empowerment for all. This is in relation to harnessing the benefits of ICT in institutions of learning and the wider community at large.

3.4.10 Knowledge sharing environment

Teachers require formal training as well as sustained and on-going support from their colleagues to help them learn how best to integrate technology into their teaching, according to Leach, Ahmed, Makalima and Power (2005) in Hennessy *et al*. (2010:83). They further argue that ICT use can enhance teachers' professional knowledge and capability by permitting new forms of teacher-to-teacher cooperation.

Peansupap and Walker (2005:198-199) observe that learning from peers occurs when users share personal experiences. This occurs when peers have high confidence levels in using IT. Learning from peers is a useful source of IT implementation support where people have specific operational questions that require a rapid and effective response to address a specific, usually urgent, problem (ibid.). The Association for Progressive Communications (2003:4) on a similar view notes that "sharing information empowers individuals and communities, and enables whole societies to benefit from the experience of everyone within them".

According to the study by Vital wave Consulting (2009:24) teachers tend to respond best to advice, coaching and support from other teachers. This holds true for questions about class management, pedagogical advancements and technology tools. In technology programmes, other teachers can provide technical advice, perspectives on pedagogical practices and a sense of community in computer use. This same advice may not be accepted as well if provided by administrators, who may be perceived as having caused the teachers' new stress and workload by introducing technology in the classroom (ibid.). "Teachers are also more likely to integrate ICT in their courses, when professional training in the use of ICT provides them with time to practice with technology and to learn, share and collaborate with colleagues" (Policy note 2005:22). Collegial learning helps teachers share their experiences and help them overcome their weaknesses as well as their fears in ICT integration in various administrative tasks, besides carrying out their pedagogical duties.

In a related view, Venezky (2001:16) observes that many of the schools used peer-tutoring systems, where experienced ICT users were encouraged to act as mentors to teachers with less

experience. Littlejohn School (UK03) used experienced ICT teachers to act as trainers and mentors for others, and gradually reached the point where all teachers were users. Green and Cifuentes (2008) in Ming *et al*. (2010:12) provide evidence in a study in North American school librarians that online follow up, likened to coaching, improved participants' attitudes to the focus of professional development. "There was evidence of feelings of enhanced competence in the skills through online participation and that the on-going online work that addressed the area of professional practice deepened the participants' knowledge base" (ibid).

A Delphi study by Clark (2006) in Ming *et al*. (2010:12) recommends that time should be made available for teachers to work with each other to share and acquire new knowledge and skills in supporting the uptake of new technologies. The principal can foster a team learning environment in which teachers can communicate with each other on ICT experience, reinforcing each other's effective practice (Senge 2000 in Chung 2005:2). School administration can foster ICT integration by increasing time allocation mainly in the afternoons, evenings and even over the weekends when teachers and school clerical staff can share and apply their learning experiences without affecting teaching and other school programmes.

Ming *et al*. (2010) contends that there are alternative peer-support mechanisms that administrators can use in addition to or instead of a master teacher. For example, there could be an incremental rollout of the technology. In this case, the teachers from the first round of implementation would mentor those involved in subsequent rounds. Another strategy is to form groups of teachers that receive training together and work with each other throughout the year. The technology itself offers peer-support opportunities, as an online collaboration tool could be implemented to connect teachers virtually and provide an online support group (ibid.).

Innovation diffusion needs a sharing and learning organisational environment where everyone within an organisation tacit job performance knowledge (Peansupap & Walker 2005:202). When given administrative support, collegial mentoring in knowledge sharing environment would foster ICT integration with ease as teachers led initiatives would have a higher morale impact to change mind-sets.

3.5 STRATEGIES FOR DEVELOPMENT AND IMPROVING ICT LITERACY

UNESCO (2009:20) postulates that "with many developing countries envisioning a future in which they hope to become learning societies built on knowledge economies, higher education has a significant role to play in development strategies in the pursuit of such aspirations". No knowledge economy can function without ICTs. "Therefore, it is imperative that higher education institutions afford their graduates the literacy and competencies that their future work environments are likely to demand of them" (ibid.).

When considering a technology deployment, it is helpful to think of the process in terms of the plans, phases and participants encompassing all of the elements needed to make the deployment successful (Vital Wave Consulting (2009:6) It further notes that ensuring all participants (students, teachers, administrators, parents, the community and local technology firms) benefit from ICT in education programmes requires that they be guided by a comprehensive plan (ibid. 7).

Knowing the current ICT literacy level in a country or specific area enables planners to identify key proficiencies or competencies that may be expected and likewise specify the progression or contents of ICT education or training (Pernia 2008:16). It's imperative to do an ICT needs assessment of a school before the roll out of the integration process for a focused planning that will set priorities right for ease of administrative duties.

ICT reforms require consideration of issues such as budgeting, staffing, resourcing and training; these are not uncommon considerations for other reforms (Afshari 2008:645). He adds that consideration of other issues such as building and managing infrastructures, networks, intranets, boards, managing large amounts of information, developing skills and strategies to support the creation of knowledge and utilisation of ICTs, keeping up with the new technology and the related terminology are necessary. These can all be addressed in educational settings by building ICT capacities (ibid.).

UNESCO-UIS (2009:23-24) argues that before ICT integration into national education systems can be effective, an adequate mix of the following policy and operational measures is needed:

- "Clear goals and a policy environment enabled by national authorities that support the use of ICT in education;
- Support and/or incentives for both public and private educational institutions to purchase ICT facilities (for example dedicated government funding, including a budget for maintenance services; tax rebates on ICT hardware and software for educational institutions; investment in or sponsoring of research in developing low-cost ICT hardware and software);
- Adaptation of curricula to ICT integration and development or acquisition of standardised quality-assured digital educational contents and software;
- Deliberate mass teacher training programmes on teaching ICT subjects or using ICT to teach other subjects more effectively;
- Favourable and flexible school policies enabling well-planned access by teachers and learners to ICT resources in support of curricula delivery; and
- Appropriate national-level monitoring and evaluation systems that make it possible to perform regular assessments of outcomes and efficiency gains, and to detect early potential shortcomings so that policy implementation can be more effective".

Institutions investing in ICTs will need to underpin changes with a training and capacity building plan for a workforce that is heads on, hearts on and hands on with ICTs (UNESCO 2009:29).

Slowinski (2000) in Taddeo (2006:7) posit that as school leaders move beyond the issue of merely ensuring access, they must develop strategies to sustain technology in their schools while taking into account the total cost of ownership. "This clearly requires thoughtful planning based on how technology can be used effectively as part of a long-term school improvement plan directed at improving learning and achieving goals" (ibid.8).

Special attention could be given to highlighting how IT resources could alleviate some of the teachers' time management stresses, and to ensure that the changeover and training itself do not overburden the staff (Vital wave consulting 2009:26). It further notes that rural teachers, on

average, have attained lower levels of formal education and teacher training. This could be an added challenge and cost as training may have to begin at a more rudimentary level and be more structured (ibid.). There is need for ICT policy makers to focus on ways of alleviating possible problems and challenges as part of their planning process.

"ICT in education programmes can be complex and will require the support of skilled professionals from the planning through the deployment and sustained operations stages of the programme", according to Vital wave consulting (2009:26). Administrators need to decide how they want to manage the procurement and deployment process, as well as how to maintain the solution once the installation is complete. In India, for example, many primary schools rely on local technology vendors for implementation and technical support whereas in Chile, primary schools often depend on local universities for these services (ibid.).

UNESCO (2009: 24) contends that rather than introducing ICT wares across the institution all at once, it is prudent to test the efficacy of a technology at, say, departmental level before deploying it institution-wide. Such piloting, if successful, will reassure institutional policymakers of the soundness of the technology in facilitating improved teaching and, on the part of students, more and better learning outcomes (ibid.). Deciding whether to insource or outsource may be the central deployment model question, but beyond that, a whole host of other decisions must be made (Vital wave consulting 2009:26).

Due to their role in knowledge production and dissemination, educators and policy makers who embrace ICTs to further educational goals must recognise their possible negative consequences (Pernia 2008:1). Educational systems, both formal and non-formal, are powerful social institutions infused with the mission of developing and enhancing desirable values and behaviours among the public and especially among the youth. Thus, they must be most sensitised to ICT's potential dangers and be proactive in addressing them. ICT literacy education provides an appropriate venue for this (ibid.). There is need for more studies to be conducted to unravel the effects of ICTs in knowledge dissemination and means of overcoming the negativities of ICTs in the attainment of educational goals.

Vital wave consulting (2009:26) emphasises the role of leader involvement in ICT integration noting that individuals throughout an educational system will look to leaders to see whether they are embracing the change they are promoting. Administrators, union leaders and senior teachers are especially important. Leaders who embrace technology deployments, and who motivate and challenge everyone to embrace them, are more likely to succeed in bringing about change (ibid.). Pace setting among the administrators sets a good starting point in ICT integration in secondary school administration as teachers, support staff and students have role models to emulate and consult in a team building spirit.

3.6 CONCLUSION

This chapter has reviewed literature on ICT literacy in which the meaning of both Literacy and ICT Literacy have been expounded to evolve with time, thus a continuum for learning. The scope of ICT literacy has been featured along; - Knowledge, Skills, Access, Attitude and Application Dimensions. Their key proficiencies have been discussed as they apply to secondary school administration. Training and technical support, knowledge sharing environment and attitude among other factors play a crucial role in ICT integration in secondary school administration. Monitoring and evaluation strategies have been identified to allow planners to understand what is working in an ICT education plan and that which is not, hence providing a timely feedback to school administrators as they chart a way forward in their respective schools.
Above all, the mantra of ICT integration plan in a school administration lies beyond computer literacy and computer skills. An individual's propensity to adopt or use any innovation like ICT, depends on the way that individual perceives the innovation in terms of its relative advantage, compatibility, user friendliness and observability. To get maximum value from any ICT technological innovations, there has to be a shift in attitudes, mind-sets and skill-sets that are adaptive to change much as the strategies for ICT literacy are developed for educational institutions. The following chapter, four, will focus on the research design and methodology adopted.

CHAPTER 4

RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

This chapter focused on the research design and methodology adopted as well as the procedure for data collection and analysis. It provides the area of study and schools involved. The rationale behind their selection is given. The chapter also explores the research design, ethical considerations, study population, data collection methods and instruments used in justification of the validation and showing of the research instruments. Lastly, data collection, presentation and analysis procedure are addressed. The research questions and the study hypothesis are first restated in order to calibrate the study along its research design and methodology.

4.2 AREA OF STUDY

Just as the topics and populations of social research are extremely diverse, so are the settings of social research (Ruane 2005: 23). This study was carried out in public secondary schools in Kirinyaga County of central Kenya which is one of the 47 Counties in Kenya. This county is generally endowed with natural resources with mixed economy ranging from subsistence farming, cash crops and horticultural farming, dairy farming, trade and quarrying, among others. Road infrastructural networks are not well maintained especially in the interior where most schools are. This therefore posed a major challenge in their access.

The county has 107 public Secondary Schools out of which 48 have access to computers and computer studies. Most of these secondary schools are in the category of mixed day followed by girls' boarding while boys' boarding are fewer (Kirinyaga County Education Office 2014). However, most of the mixed day secondary schools are relatively young having been carved from their neighbouring primary schools. They are therefore not well equipped with ICT equipment and infrastructure besides lack of power among other key challenges.

Secondary schools in Kirinyaga County are headed by principals who are assisted by deputy principals, heads of departments (HoD) and section heads in their day to day administrative functions. The researcher purposively selected 18 secondary schools in this study because they were equipped with most ICT equipment and infrastructure besides practically offering computer studies mainly for students. Teachers, HoDs and principals used these ICT facilities for both pedagogical and administrative duties at various complementary levels. Although the other 30 secondary schools in the county had ICT equipment and infrastructure, their utility was quite minimal in most of the schools. ICT facilities in these said schools were only limited to secretarial duties or left to be handled by persons who had basic computer literacy at informal levels. Another rationale for the selection of these 18 schools is that teachers in these schools are under the government employment body which is the Teachers' Service Commission (TSC). They are all public secondary schools that are therefore subjected to the same ICT integration policies in both pedagogical and administrative executions.

4.3 RESEARCH QUESTIONS RESTATED

The following is the main research question; what are the management challenges facing the use of ICT in the administration of secondary schools in Kirinyaga County, Kenya? The main research question was further subdivided into the following sub questions:

- Is the use of ICT in secondary school administration well guided by clearly spelt out policies and guidelines in Kirinyaga County?
- How effective are teachers and principals in the use of ICT in advancing secondary school administration in Kirinyaga County?
- What is the impact of the use of ICT in secondary school administration in Kirinyaga County?

4.4 RESEARCH AIMS AND OBJECTIVES RESTATED

The main aim of the study was to establish the challenges of ICT use in the administration of secondary schools in order to identify the potential of integrating ICT in secondary school administration for effective and efficient service delivery. The study objectives were to:

- Analyse the policies governing effective use of ICT in secondary school administration
- Investigate ICT competencies of teachers and principals in advancing secondary school administration in Kirinyaga County
- Assess the impact of ICT use in secondary school administration

4.5 THE NULL HYPOTHESIS

The following was the null hypothesis for this study;

H_{o1} There is no significant relationship between ICT policies in education and effective integration of ICT in advancing secondary school administration

4.6 RESEARCH DESIGN AND METHODS

Kothari and Garg (2014: 29) contend that "a research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure". Orodho (2005: 36) in a related view further adds that research design is the conceptual structure within which research is conducted, noting that these could be exploratory (survey), case study (diagnostic), descriptive or experimental. A research design therefore gives direction and systematises the research study as the choice made affects the outcome of the study and how the findings are concluded (Menjo 2011: 69).

The choice and preparation of a research design appropriate for a particular research problem according to Orodhho (2005: 36) involves the consideration of the following;

- Means of obtaining the information
- The skills of the researcher
- Explanation of the way in which the selected means of obtaining information will be reorganised and the reassurance leading to the selection
- The time available for the research and
- The cost factor leading to the research

Descriptive survey design was the choice used in carrying out this study in unravelling the challenges of using information communication technology in advancing secondary school administration in Kirinyaga County, Kenya. This was because this study aimed at making observations and describing of phenomena. “The choice of an appropriate design increases the chances of obtaining reliable observations that lead to understanding of the phenomenon being studied “(Menjo, 2011: 69). The researcher further employed both the qualitative and quantitative methods as well as a blend between the two which is a mixed mode of complementing one another. All these are discussed in the sub-sections that follow.

4.6.1 Descriptive Survey Research Design

According to Martyn (2008) “descriptive research design is a scientific method which involves observing and describing the behaviour of a subject without influencing or manipulating the variables in any way”. He further posits that descriptive research design is used by market researchers to judge the habits of customers, or a company to judge the staff morale. Descriptive research studies are concerned with the characteristics of a particular individual or a group (Kothari & Garg, 2014: 35). The researcher should be prepared to evaluate the research site on a continuum of locations ranging from private to public (Johnston & Vanderstoep 2009: 35). Descriptive research design in this case was used by the researcher to collect primary data from the participants. This was done by capturing their perceptions, making observation of the ICT equipment and infrastructure in the various secondary schools under study in Kirinyaga County as well as the various administrative documents. The views and predicaments of school principals and computer teachers were also addressed in the semi-structured interview schedules with the purpose of assessing their ICT integration preparedness in secondary school administration.

4.6.2 Qualitative Research

“Qualitative research is primarily subjective in approach as it seeks to understand human behaviour and reasons that govern such behaviour” (Explorable.com 2009). In a qualitative approach, information gathered is non-numerical and might include responses to an open-ended

survey question, dialogue from a focus group, the answer to an essay question, a term paper, or ideas brainstormed by a group (ACET, Inc. 2013: 1, Mugenda & Mugenda 2003: 155). The researcher in this study used a qualitative method to further probe the participants to express themselves independently as to how they felt would be the best strategies to adopt in integrating ICT in the school administration. One of the advantages of qualitative research is that participants are free to answer any way they wish. They are not constrained to a pre-determined set of possible responses as is the case in a survey (ACET, Inc. 2013: 1). Qualitative approach recognises that everybody is capable of constructing knowledge irrespective of their background when given a chance (Mugenda & Mugenda 2003: 201)

Although the main focus in this study was not based on addressing the disadvantages of qualitative methods, it is worth noting that qualitative data cannot be mathematically analysed in the same comprehensive way as quantitative results, so they can only give a guide to general trends (Explorable.com). It is a lot more open to personal opinion and judgment, and so can only ever give observations rather than results (ibid). Qualitative research can be time consuming and tedious in the collection and analysis of data as one moves on a wider geographic scope. For instance, it would take 10 hours or more to have hour-long interviews with 10 people, and that would not include the time needed to schedule the interviews, transcribe recordings or notes, and analyse and summarise the data (ACET, Inc. 2013: 1). In order to address this challenge, the researcher dispatched the questionnaires in both hard and soft copies a week prior to the interviews to the respective participants (Appendix D1 – D3). He then went to the field to interview the respective participants who had a glimpse of the study idea. This was carried out on structured interview schedules as well as face to face interviews. Where applicable, the researcher used the telephone interview to some of the participants in order cut on the fatigue, time and cost of travelling. This happened where such respondents were absent during the interview after the researcher had made observations of the existing ICT facilities, infrastructure and relevant policy documents to verify their data alongside that of the present respondents. The same structured interview schedules were used over the phone calls on those participants who could not have been immediately accessed physically when the researcher was on the field collecting data. One advantage of a phone survey is that most people have phones (Johnston &

Vanderstoep 2009: 35). Data from participants and the observation schedule was analysed quantitatively and inferences made from the findings.

4.6.3 Quantitative Research

"Quantitative research design is a suitable way of finalising results and proving or disapproving a hypothesis because after statistical analysis of the results, a comprehensive answer is reached, and the results can be legitimately discussed and published" (Explorable.com 2009). All of the data collected in quantitative approach would be counted or quantified therefore making it an extremely efficient method for gathering information, especially for large groups of people (ACET, Inc. 2013: 1). It further posits that participants are limited to a set of response options and they may not feel that any of the options best describes their experience. Quantitative research is an objective approach in the sense that it only seeks precise measurements and analysis of target concepts to answer the inquiry (Explorable.com 2009). Quantitative studies usually require extensive statistical analysis, which can be difficult to most social scientists because they may not be statisticians (ibid.).

This study collected quantitative primary data. These data types collected were in the form of categorical (nominal), ordinal, interval or ratio (continuous) data types. These types of data made it possible to compute descriptive statistics in form of frequencies, that is central tendency (mean, mode, medium, sum) percentile values, dispersion (minimum, maximum, range, variance, standard deviation), dispersion (skewness and kurtosis). The collected quantitative data also allowed production of charts and tables to present study findings. Quantitative data was used to generalise the study findings in order to describe the nature of the entire population. The data was captured from a sample of representative population of the subjects. Inferential statistics using non-parametric statistics (chi –square and spearman correlation coefficient) techniques was generated and the results were inferred to form an opinion regarding generalisation of the study findings. For this study, the data collected was mainly categorical and ordinal which are suitable for non-parametric inferential statistics. Chi-square and Spearman correlation coefficient was applied to determine the relationship between independent and dependent variables such as demographic data and integration of ICT in school management.

4.6.4 Mixed Methods Research Approach

A mixed method approach incorporates both qualitative and quantitative elements in such a way that the qualitative and quantitative information complements each other (ACET, Inc. 2013: 2, Onwuegbuzie & Johnson 2004: 17, Mugenda & Mugenda 2003: 198). Mixed methods research is an attempt to make legitimate the use of multiple approaches in answering research questions, rather than restricting or constraining researchers' choices , in other words it rejects dogmatism, according to Onwuegbuzie and Johnson, (2004: 17).

Menjo (2007: 75) observes that "the strengths and weaknesses of quantitative and qualitative approaches depends on the former methodology being better at dealing with 'cause' and 'effect' aspects of the research". The latter is better suited to address the meaning of particular events or circumstances (ibid). Qualitative research is ideal for earlier phases of research projects while for the latter part of the research project, quantitative research is highly recommended (Explorable.com 2009). Therefore quantitative research provides the researcher a clearer picture of what to expect in his research compared to qualitative research (ibid).

Qualitative and quantitative approaches are similar in sequence and method according to Mugenda and Mugenda (2003: 198). "The way the researcher or evaluator puts the various components together in each approach makes for differences in both the process and the finished product as both research and evaluation seek to build a body of knowledge about phenomena" (ibid.).

Data from the structured questionnaires and semi structured interview schedules in this study was gathered qualitatively to probe HoDs, principals and ICT teachers on their opinions and challenges in advancing ICT integration in secondary school administration. Their collected responses were quantitatively analysed to find out statistical relationships of various variables in ICT integration in school administration. The challenge of a mixed method approach is to ensure that the two data collection methods complement but do not duplicate each other hence doubling the cost of information gathering (ACET, Inc. 2013: 2). The approach that best aligns with the goals of the evaluation is usually the best approach (ibid). Data collection tools in this study were

thoroughly scrutinised which is where questionnaires, semi-structured interview schedules and observation schedule were subjected to an expert's second opinion to avoid duplication.

The findings from this study can help the school administrators, policy formulators, government and various stakeholders in the Education sector to address ICT integration in school administration, where Kirinyaga County acted as a sample. Although circumstances of ICT integration may differ from one region to the other, ICT challenges with semblance of integration in school administration countrywide could borrow a leaf from this study and improve on it.

4.7 RESEARCH METHODOLOGY

4.7.1 Introduction

Kothari and Garg (2014: 6) define research methods as "all those methods that are used for conduction of research operations. Some of these include; sampling and sampling procedures, data collection and analysis, interviews and observation and document analysis" among others.

4.7.2 Sample

King'oriah (2004: 22-23) defines a sample in statistical terms as a large group of people, animals, or objects; each with individual characteristics out of which specific inferences are made after exhaustive quantification and analysis of such individual characteristics. Mugenda and Mugenda (2003: 9) describe population as an entire group of individuals, events or objects having a common observable characteristic that is aggregate of all that conforms to a given specification. Population in this study comprised of HoDs, principals and ICT teachers who play complementary roles in assisting ICT integration in secondary school administration. All these have similar observable characteristics in that they are all trained teachers employed by the Teachers Service Commission (TSC) and play complementary roles in the administration of their respective secondary schools.

4.7.3 Sampling procedures

"A sample is a sub-group of a population which can be used as a representative of the population, to derive inferences about the characteristics of that entire population", according to King'oriah (2004: 23). Sampling is a statistical method or process of obtaining a representative population to collect data or information about an entire population by examining only a part of it (Kothari and Garg 2014: 147). Sampling is important because, in almost all cases, it is not practical to study all the members of a population (Johnston & Vanderstoep, 2009: 26). A researcher must have a sampling frame in order to select a representative sample (Mugenda & Mugenda 2003: 44).

This study's sampling frame included a:- list of secondary schools in Kirinyaga County where ICT integration is operational, and list of targeted participants who included the principals, ICT teachers and HODs. Purposive sampling was used to sample 18 principals and 54 teachers inclusive of two heads of departments and one computer teacher in each school due to their expertise in their areas of teaching. Schools were categorised as boys' boarding, girls' boarding and mixed day for a wider representation of the target population. Purposive sampling allowed the researcher to use cases that have the required information with respect to the objectives of his study where cases of subjects were therefore handpicked because they were informative or possessed the required characteristics (Mugenda & Mugenda 2003: 54).

4.8 INSTRUMENTS FOR DATA COLLECTION

4.8.1 Introduction

The data collection instruments used in this study were those compatible with both the qualitative and quantitative methods adopted. These included; - three sets of questionnaires for collecting data from the HODs, principals, and ICT teachers. Also semi-structured interview schedules for collecting qualitative data through face to face and telephone interviews as well as observation were used to collect primary data. These are addressed in the subsections that follow.

4.8.2.1 *The Questionnaire*

A questionnaire is a self-contained, self-administered instrument for asking questions which is an extremely efficient data collection tool (Ruane 2005: 123). “Questionnaires are commonly used to obtain important information about the population where each item inside is used to address a specific objective, research question or hypothesis of the study” (Mugenda & Mugenda 2003: 71). Three structured questionnaires were administered in this study. Kothari and Garg (2014: 97) high light the following as some of the advantages and disadvantages of questionnaires;

4.8.2.1.1 *Advantages of questionnaires*

- Structured questionnaires are simple to administer and relatively inexpensive to analyse
- The provision of alternative replies, at times, helps to understand the meaning of the question clearly
- Respondents have adequate time to give well thought out answers
- Respondents, who are not easily approachable, can also be reached conveniently.

4.8.2.1.2 *Disadvantages of questionnaires*

- Wide range of data in respondent’s own words cannot be obtained with structured questionnaires
- They are usually considered inappropriate in investigations where the aim happens to be to probe for attitudes and reasons for certain actions or feelings
- There is also the possibility of ambiguous replies or omission of replies altogether to certain questions; interpretation of omissions is difficult
- It is difficult to know whether willing respondents are truly representative.

In this study, structured questionnaires with alternative replies were administered on the respective participants for ease of analysis. The said questionnaires were distributed a week earlier to the respective participants before they were collected on the interview day, as was the

case with some principals. Participants who were not physically present during the researcher's visit to their respective schools were given the questionnaires by their colleagues for filling at their convenient time. The researcher mainly led most of the participants through the questionnaires to address the question of clarity where needed or the issue of omission of replies in some questions.

The first questionnaire (Appendix D1) mainly embarked on investigating the influence of various policy documents in influencing the ICT integration in secondary school administration. It also focused on principals' ratings of teachers' competencies on ICT integration in school administration. The second questionnaire (Appendix D2) addressed, besides the biographical data addressed among others, the independent variables influencing ICT integration in secondary school administration. These ranged from physical facilities, teachers competencies in ICT, continuity and change forces. The third questionnaire (Appendix D3) focused on ICT teachers' competencies in ICT integration in school as they play a complementary role in the use of ICT in school administration. It also entailed teachers' ratings of their respective school principal's competences in facilitation of ICT integration in school administration.

4.8.2.2 *Semi-structured interview schedules*

An interview schedule is a set of questions that the interviewer asks when interviewing as it makes it possible to obtain data required to meet the study's specific objectives (Mugenda & Mugenda 2003: 86). Structured interviews involve the use of a set of predetermined questions and of highly standardised techniques of recording where the interviewer follows a rigid procedure laid down, asking questions in a form and order prescribed (Kothari & Garg 2014: 93).

This researcher used face-to-face interviews in administering semi-structured interview schedules to the principals of secondary schools and the ICT teachers. Face-to-face interview techniques may offer the opportunity to ask follow-up questions based on participants' responses to previous questions (Johnston & Vanderstoep 2009: 88). The researcher used a set of predetermined questions to engage the principals who were the main respondents in the face to

face interviews and did the probing on some of the responses for clarity where the need arose. **"**A probe is a follow-up technique that encourages the respondent to further elaborate or clarify a point of discussion" (Ruane 2005: 152). The telephonic interviews were conducted on appropriate dates for those principals and ICT teachers who were not physically present on the day of the interview. "Telephone interviewing is much more economical than personal interviews, costing anywhere from one-third to one-tenth the cost of an in-person interview" (Ruane 2005: 155).

Recording of the responses was done through short notes and audio recording where applicable to save time after seeking consent from the respective participants. This was after the researcher explained to the participants the study purpose and assured them of confidentiality of their information. Views on the key challenges facing ICT integration in secondary school administration on the questionnaires were captured from respondents' views during the interview schedules. The same also applied to the participants' views on how best to address the identified challenges.

4.8.2.3 *Observation and Document Analysis*

Kothari and Garg (2014: 93) contend that "under the observation method, the information is sought by way of the investigator's own direct observation without asking from the respondent". They note that the main advantage of this method is that subjective bias is eliminated, if observation is done accurately. While using this method, the researcher should keep in mind things such as: What should be observed? How the observations should be recorded? Or how the accuracy of observation could be ensured? (ibid.). Mugenda and Mugenda (2003: 92) posit that the researcher utilises an observation checklist to record what he or she observes during data collection. First the researcher must define the behaviours to be observed and then develop a detailed list of behaviours and checks off each as it occurs (ibid.).

Observation in this study was made on the various administrative documents as they related to ICT integration in secondary school administration. These included;

- School Strategic Plan

- School ICT Policy Guidelines
- Donor Policy Guidelines on ICT
- National ICT Policy of 2006
- Ministry of Education Science and Technology Strategic Plan (2006-2011)
- Sessional Paper N0.1 of 2005
- Kenya Vision 2030

Observation was also made on computers and their various accessories, computer rooms and their security details and power sources. This was done in order to confirm the information gathered on the questionnaires and justification of this study in data preparation, analysis, interpretation, inferences and recommendations on ICT integration in secondary school administration.

4.8.3 Pilot Sample

The preliminary survey in this study was carried out in four schools which were part of the target population in order to test the research data collection tools' strengths and weaknesses. Mugenda and Mugenda (2003: 79) asserts that "1% to 10% of the questionnaires are adequate for piloting". Five per cent (5%) of the instruments were used in this study. The target in this case was four principals, eight HoDs and four computer teachers. One principal, two heads of departments in each school and the ICT teachers responded to the draft questionnaires upon request on two separate days in which the draft observation and semi- structured interviews were administered. The said respondents did not form part of the main study that involved 18 schools. "It is important to pilot the questionnaire with a small representative sample identical to, but not including the group under the survey" (Orodho 2005: 182). Upon the completion of the pilot study, moderation of the questionnaires, interview and observation schedules was done to eradicate unnecessary information and inclusion of the missing crucial details to be captured in data collection. Menjo (2011: 94) postulates that "piloting has the advantage of serving the purpose of checking on phraseology and level of difficulty of the questions contained in the research instruments". He also notes that piloting helps in identification and rectification of the type of biased questions obtained in the questionnaires.

4.9 VALIDITY AND RELIABILITY OF THE RESEARCH INSTRUMENTS

4.9.1 Introduction

For validity and reliability to exist in the data, the data collection techniques must yield information that is not only relevant to the research hypothesis but also correct since the two are the measures of the same ‘‘relevance’’ and ‘‘correctness’’ (Mugenda & Mugenda 2003: 95). They further note that the quality of the research study depends to a large extent on the accuracy of the data collection procedures.

4.9.2 Validity

Johnston and Vanderstoep (2009: 59) postulate that validity is about truthfulness. They add that a measure shows validity if it actually measures what it claims to measure or is intended to measure.”Validity is the degree to which results obtained from the analysis of the data actually represent the phenomenon under investigation” (Orodho 2005: 188; Mugenda & Mugenda 2003: 95). The right order in dealing with matters affecting validity in quantitative research is to sort the issue of validity first before embarking on reliability of the instrument due to the former’s influence on the latter (Mugenda & Mugenda 2003: 100).

Content validity has been used in this study. Orodho (2005:188), Mugenda and Mugenda, (2003: 102), Johnston and Vanderstoep (2009: 59) attest that validity is a measure of the degree to which the data collected using a particular instrument represents a specific domain of indicators or content of a particular concept. The questions to be asked here are: “Is the whole content area well represented or covered well by the items?”, “Is one content area over- tested or under-tested?” (ibid.). One can determine content validity by asking an expert or group of experts to review his or her instrument (Johnston & Vanderstoep 2009: 59; Mugenda & Mugenda 2003: 102).

The researcher categorised the questionnaires in this study based on their content and participants as a way of validating the content. Appendix D1 was the questionnaire for school

principals. It had the content validation on investigation of various ICT policy documents in relation to ICT integration in school administration. Appendix D2 was the questionnaire for HoDs. It addressed key variables affecting ICT integration in secondary school administration. The third category of questionnaire, D3, validated the content on investigation of ICT teachers' competencies in ICT and their ratings of their respective principals' competencies in providing a conducive environment for ICT integration. This approach was meant to triangulate data by getting views from three sets of respondents thus ensuring the data collected was valid and captured wider views.

The researcher in this study also engaged the services of research experts and colleague scholars in the field of education management all of whom gave their opinions and contributions based on study objective and hypothesis. They all played a crucial role in the moderation of the content of the data collection instruments before they were finally administered.

4.9.3 Reliability

Reliability is the extent to which a measure yields the same scores across different times, groups of people, or versions of the instrument (Johnston &Vanderstoep 2009: 62). Reliability of an instrument is the consistency in producing a reliable result as it focuses on the degree to which empirical indicators are consistent across two or more attempts to measure the theoretical concept (Orodho 2005: 183). On a related note, Mugenda and Mugenda (2003: 95) contend that reliability in research is influenced by random error which is the deviation from a true measurement due to factors that have not been effectively addressed by the researcher. As random error increases, reliability decreases. "Random error will always exist regardless of the procedures used in the study" (ibid.). Therefore reliability is about consistency (Johnston & Vanderstoep 2009: 62).

In this study, piloting was first done in order to minimise the random error. Five per cent of the research instruments meant to collect quantitative data were administered to HoDs, principals and ICT teachers of the pilot schools. Split half strategy was used. Ruane (2005: 69) contends that the split-half strategy is a way of ensuring if all of the items that make up a composite

measure are equivalent and consistently measuring the same phenomenon.Grouping of scores from each questionnaire was put into two, that is odd and even where they were summed up per case. Reliability coefficient was arrived at using calculation of Pearson Moment correlation. The level of reliability of the instruments was arrived at by computing the "*P"* spearman-Brown coefficient formula P= (2r) ÷ (1+r). Measures of reliability for HoDs, principals and teachers questionnaires was arrived at using SPSS to compute spearman brown coefficient which had the value of 0.665, 0.682 and 0.673 respectively. This shows that the self-administered questionnaires were reliable and were used to collect quantitative primary data.

4.10 DATA ANALYSIS TECHNIQUES

In an attempt to understand the management challenges of using ICT at secondary schools at Kirinyaga County, Kenya, the study analysed collected quantitative and qualitative data that was aimed at answering the following research questions: (a) Is the use of ICT in secondary schools well guided by clearly spelt out policies and guidelines in Kirinyaga County, (b) How effective are teachers and principals in the use of ICT in Kirinyaga County secondary schools and (c) What is the impact of ICT use in secondary school administration in Kirinyaga County?.

The study involved both quantitative and qualitative data analysis. Data from the self-administered questionnaires was sorted out, cleaned and responses coded by assigning a numerical code. The coded data was entered into Statistical Package for Social Sciences (SPSS) computer software version 20. The SPSS was used to generate descriptive and inferential statistics. The descriptive statistics generated were frequencies, percentages, means, and standard deviation. Likert scale items which formed the bulk of the items in the self-administered research instruments was analysed using mean and standard deviation. Cross tabulation was done to compare various variables in the study in order to establish their relationships. Data findings for quantitative descriptive statistics were presented in the form of charts (graphically) and tables where inferences were made to offer an explanation of the study findings.

Data that was collected using self-administered questionnaires were largely categorical (nominal) and ordinal. These data could only support non-parametric inferential statistics data analysis

techniques (Julie 2003:225). The data collected was subjected to distribution test exhibited non-normal distribution. The Lickert scale data collected from the principal's questionnaire formed a large portion of data that was used to test the hypothesis for this study. Lickert scale data can be analysed using measures of central tendency (mean and standard deviation) and inferential test (t- test, Chi-Square and Anova). For this study Chi-Square was preferred since this technique does not require stringent statistical techniques like normal distribution of data and the sample size as compared to the above inferential test. It is also suitable for ranked data especially where likert scale data collection instruments were employed. This data analysis technique (Chi-Square) was used to test a number of statistical hypotheses in order to determine the overall research hypothesis:

H_o There is no significant relationship between ICT policies in education and effective integration of ICT in advancing secondary school administration.

H_1 There is a significant relationship between ICT policies in education and effective integration of ICT in advancing secondary school administration.

Chi-Square in particular was used to test the correlation between the demographic data such as age, gender, level of education and ICT Knowledge, ICT skills, ICT Access, ICT Application, Monitoring and Evaluation of ICT Literacy, among others. For this study where Chi-Square test was generated, alpha level or significance was set at the 0.05 level. The Chi-Square test was applied in this study to test the hypothesis results where the alpha value results was "$p<0.05$" which meant that the null hypothesis was rejected where $p>0.05$ the null hypothesis was accepted. Using the total score for responses on ICT policies and responses on integration of ICT Chi-Square test was used to test the overall research hypothesis.

Data from the observation schedule, interview schedule and open ended responses on the questionnaire were analysed qualitatively to generate interpretation and rationale for the study. The qualitative research data collection was captured by use of interview schedule and open ended questions. Data from open ended questions and interview schedule were analysed using thematic approach where the responses which were varied were grouped into related themes to

facilitate analysis and conclusions on the challenges facing the use of ICT in the administration of secondary schools in Kirinyaga County.

4.11 ETHICAL CONSIDERATIONS

"Ethical, legal and human relations issues enhance data collection process and protect the integrity of the researcher by ensuring honest results" (Orodho 2005: 193). In support of this, Ruane (2005: 17) observes that, "for our work to be ethically grounded, we must be prepared to evaluate our research plans and activities in light of generally accepted rules of conduct". Regardless of their specific discipline, researchers are generally charged with the responsibility of following rules of conduct that will safeguard the well-being of research subjects and treat them with dignity and respect (Johnston & Vanderstoep 2009: 29). The researcher adhered to some of these crucial issues in carrying out this study in observance of ethical considerations as discussed in the subsections that follow.

4.11.1 Research authorisation permit

The researcher sought authority to conduct this study by first getting research authorisation permit from the National Council for Science and Technology in Kenya. Down the hierarchy, he also sought permission to conduct research in the County from Kirinyaga County Commissioner and Kirinyaga County Director of Education respectively. The approval certificate and authorisation letters were granted to that effect (Appendices A1 & A2). The approval letter is not complete until the researcher is issued with a certificate bearing his or her name, photograph, and the title of the research study (Mugenda & Mugenda 2003: 183). It is important to acknowledge the administrative hierarchy in carrying out research in any organisational set up for a good communication rapport when collecting data and disseminating the research findings to the respondents. When dealing with any administrative hierarchy such as schools or districts, it is very important to follow appropriate channels (Orodho 2005: 202).

4.11.2 Confidentiality and Privacy

Confidentiality should be protected by keeping the information given confidential especially if confidentiality has been promised (Mugenda & Mugenda 2003: 191). Participants in this study who were secondary school principals, HoDs and computer teachers were assured of the confidentiality and privacy of their respective information. They did not write their names nor their school names on the questionnaires on the biographical data apart from the general information such as age and gender, among others. “The promise of confidentiality is an assurance by the researcher that the information provided by participants will never be linked to them publicly” (Ruane 2005: 25). This assurance of confidentiality and privacy of information paved way for participants’ voluntary consent to participate in this study.

4.11.3 Voluntary and Informed Consent

The principle of informed consent is about the right of individuals to determine, for themselves, whether or not they want to be part of a research project (Ruane 2005: 19). The researcher sought informed consent from the respondents to participate in the study before embarking on data collection. This was after explaining to the respondents verbally the purpose of the study, its benefits and their role in the study besides giving them introductory letters containing a brief summary of the study. They were also informed of their option to withdraw from the study at will without any penalty. In support of this, Orodho (2005: 199) contends that participation in research must be voluntary, and people have the right to refuse to divulge certain personal information. This right to privacy demands that direct consent for participation be obtained from adults, and in the case of children or students from their parents or guardians or teachers (ibid.). The researcher established a good rapport with the participants by candidly emphasising the role of ICT not only in education administration but also in general education application as a modern technological tool. This was done through open dialogue with the research participants as a way of convincing them and to get their voluntary participation for realisation of this study.

4.10 CONCLUSION

This chapter presented the various procedures that were used in the research design and methodology. It has highlighted the study area, research questions, aims and hypothesis restated to guide the study. This chapter also focused on the research methods employed and their rationale as well as instruments for data collection and data analysis techniques. Validity and reliability of the research instruments was highlighted and justified. To rationalise the credibility and ethics of this study, ethical considerations before and after the research were put into focus.

In the next chapter, there is discussion about how data analysis and inferences of this study were arrived at so as to form the basis for conclusion and recommendations of the study in chapter six.

CHAPTER 5

RESEARCH FINDINGS: ANALYSIS AND DISCUSSION

5.1 INTRODUCTION

This chapter presented the analysis and interpretations of the research findings from the data collected from three categories of questionnaires, interviews and observation schedules. These included data from school principals, Heads of departments (HoDs) and ICT teachers. This chapter has been divided into three sections.

The first section addressed the principal's questionnaire which, besides the biographical data in relation to the study, discussed the study findings of the first objective; that is, to analyse the policies governing effective ICT use in secondary schools. This objective mainly analysed the policies governing the effective use of ICT in secondary school administration. The second and third sections focused mainly on discussing the findings of the second study objective which investigated teachers' and principals' ICT competencies for effective school administration. Since the three cadres of participants have been mainly involved in school administration in one way or the other, the third study objective gathered research findings across the board from the school principal, HoDs and the ICT teacher who offered their technical expertise. This was in a bid to establish the projected impact of ICT use in secondary school administration.

The participants' biographical data was captured across the three cadres of participants as it related to the study theme which is management challenges in the use of ICT in secondary school administration in Kirinyaga County. Participants' participation in the study was highly noted (99.9) with their completion of the questionnaires for teachers and HoDs while that of school principals was at 94.4% (only one principal out of 18 did not respond to her questionnaire as she was outside the country at the time the questionnaires were filled out). This was accounted for by the timing of the issuance of questionnaires by the researcher during the first and second weeks of schools opening in the third term when principals and teachers may not have been very busy with the school tasks. Where possible, the researcher had also made prior arrangements with the

various school administrations as earlier indicated on 4.6.2 wherein the researcher used interview schedules on a face-to-face basis and phone interviews where applicable.

The hypothesis for this study stated: There is no statistically significant relationship between ICT policies in education and effective integration of ICT in advancing secondary school administration. This was tested based on the following four key areas;- School access to ICT policy documents, Schools adherence to ICT policy documents, Governments clarity on ICT policy documents and Governments' involvement of key stakeholders on ICT policy formulation. These are discussed in section 5.8 of this study.

5.1.1 Analysis and Discussion

Data collected were analysed by use of descriptive and inferential statistical techniques that employed the use of non- parametric statistics to carry out analysis. Descriptive statistics generated percentages, means and standard deviations that were used to analyse the data under study from where inferences were made. The analysed data were then presented in tables, figures and charts. "Descriptive statistics are used to address specific research questions" (Julie 2003:51).

In a related view, Boone and Boone (2012) connote that "descriptive statistics recommended for interval scale items include the mean for central tendency and standard deviations for variability". Likert scale data were analysed using mean and standard deviation where mean was used as the focal primary point for discussions of the findings. "Likert scale is composed of a series of four or more likert- type items that are combined into a single composite score or variable during the data analysis process" (Clason & Dormody 1994 Boone & Boone 2012). They further note that when the data is combined, the items are used to provide a quantitative measure of a character or personality trait.

The data were collected using the likert scale on a scale of 1- 5 in this order: (1) Strongly Disagree (SD), (2) Disagree (D), (3) Not Sure (NS), (4) Agree (A) and (5) Strongly Agree (SA). Also a likert scale in the order: (1) Very Low (VL), (2) Low (L), (3) Not Sure (NS), (4)

Moderate and (5) High (H). The items that are used in likert scale are usually declarative in form where the numerical scale helps to minimise the subjectivity and make it possible to use quantitative analysis (Mugenda & Mugenda 2003:76).

In addition, a chi-square test was generated to determine the degree of statistical relationships between variables**.** As a non-parametric test, chi-square can be used as a test of goodness of fit and as a test of independence, according to Kothari (2004: 236). As a test of goodness of fit, Chi-square test enables us to see how well the assumed theoretical distribution (such as Binomial distribution, Poisson distribution or Normal distribution) fit to the observed data whereas as a test of independence, the Chi-test enables us to explain whether or not two attributes are associated (ibid).

5.2 SOCIAL DEMOGRAPHIC INFORMATION OF THE SCHOOL PRINCIPAL

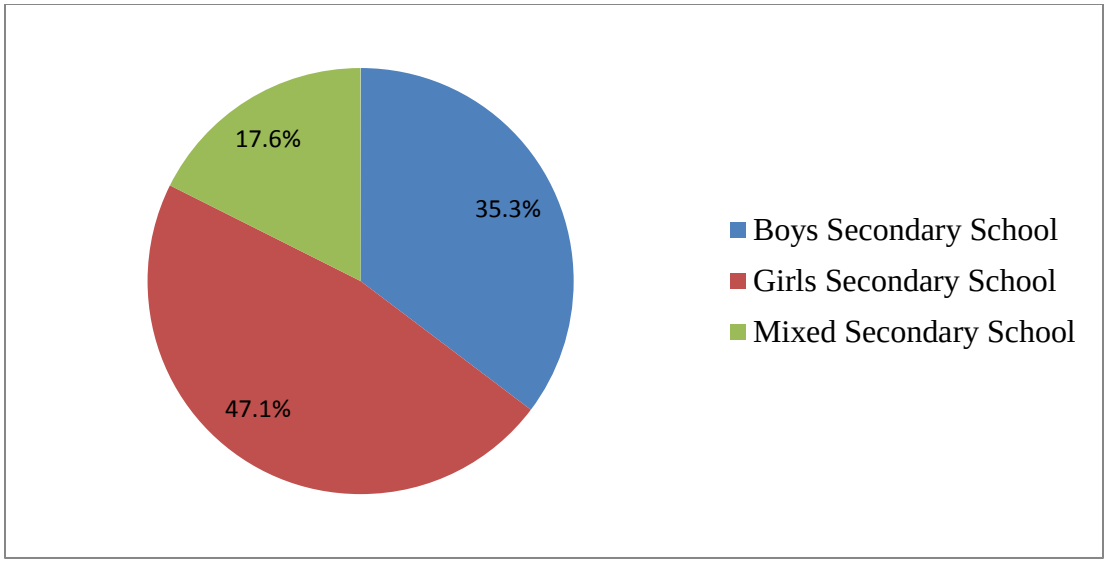
5.2.1 Introduction

The background information in this chapter was collected from the data on the category of the school as well as the biographical data of the participants. This included gender, age bracket, highest professional qualifications, period of service in the current designation, highest ICT level training, attendance of ICT integration courses and experience in the use of ICT in performing school administrative tasks. All these are analysed and inferences made based on how they impact on ICT integration in secondary school administration in Kirinyaga County.

5.2.2 Category of the school

The study intended to establish brief information on the category of secondary school where much emphasis has been laid on ICT. Chart 5.1 tabulates the results findings.

Chart 5.1: School categories



From the study findings in Chart 5.1, more girls secondary schools (47.1%) integrated ICT in their school administration followed by boys' schools with 35.3% while mixed secondary schools least integrated ICT in school administration with 17.6%. From the results above, it is clear that more principals and teachers in girls' secondary schools had more access to ICT exposure than those in boys and mixed day secondary schools. This may be attributed to more emphasis being laid on the girl child education in Kenya (UNESCO, 2012:1, Odhiambo, Simatwa & Yalo 2013: 191-192) which had seen the rise of more girls in Kirinyaga County. However, it is also worth noting that most of the secondary schools in Kirinyaga County are in the mixed category but have not been captured in this study, apart for three. This is because most of these secondary schools were relatively young after having been carved out of their neighbouring primary schools following the introduction of free primary education in Kenya as earlier explained in 4.2. This is in an instance where the government had embarked in the promotion of the development of day schools as a means of access and reducing costs to parents (Ministry of Education Science and Technology (MoEST) 2005:44).

5.2.3 Gender and age of the principal

This study deemed it necessary to establish a brief correlation between gender and age in ICT integration in secondary school administration. The intention was to create an understanding of who has a keen interest in integrating ICT in school administration between male and female principals as well as their age. A cross-tabulation on distribution of principals, according to their gender and age, is presented in Table 5.1 below.

Table 5.1: Distribution of the respondents by gender and age

Gender		Age		Total
		41 - 50 years	51 - 60 years	
Male	**Count**	6	2	8
	% within Your Gender	75.0%	25.0%	100.0%
	% within Age	42.9%	66.7%	47.1%
Female	Count	8	1	9
	% within Your Gender	88.9%	11.1%	100.0%
	% within Age	57.1%	33.3%	52.9%
Total	Count	14	3	17
	% within Your Gender	82.4%	17.6%	100.0%
	% within Age	100.0%	100.0%	100.0%

From the study findings in the table above, the majority of both male and female principals (82.4%) were between the ages of 41 to 50 years as compared to 17.6% who were between 51 to 60 years. It's worth noting that there were no principals with ages below 41 years. This implies that they have wide experience and potential necessary for providing the required leadership in education administration using ICT. This is because they have the capability of tapping and influencing the use of ICT in secondary school administration as befits their long time professional experience in school administration. However, they may not be ICT experts.

5.2.4 Professional Qualifications

This study sought to ascertain whether there was a correlation between professional qualifications of the principals and ICT integration in secondary school administration. This is because ICT, as a new phenomenon in secondary schools in Kirinyaga County, has not been fully ascertained on how it impacts the professional qualifications and gender of the principal integrating it. The findings are shown in Table 5.2 below.

Table 5.2: Distribution of the respondents by gender and highest professional qualification

Highest professional Qualification		Your Gender		Total
		Male	Female	
Diploma	Count	1	0	1
	Expected Count	.5	.5	1.0
	% of Total	5.9%	0.0%	5.9%
Degree	Count	3	7	10
	Expected Count	4.7	5.3	10.0
	% of Total	17.6%	41.2%	58.8%
Masters	Count	4	2	6
	Expected Count	2.8	3.2	6.0
	% of Total	23.5%	11.8%	35.3%
Total	Count	8	9	17
	Expected Count	8.0	9.0	17.0
	% of Total	47.1%	52.9%	100.0%

From Table 5.2 above, the findings indicate that the majority of the principals (58.8%) had first degree and some (35.3%) had attained a Master's Degree with a small proportion (5.9%) that had Diplomas. These findings imply that principals are largely well educated and can handle school administration matters effectively using ICT with the proper induction. This is because they are trained to integrate new skills along their professional jurisdiction. A chi-square test was carried out to determine the correlation between professional qualifications and gender as tabulated in 5.3

Table 5.3: Chi-square test results on professional qualifications and gender

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.219	2	.200
Likelihood Ratio	3.653	2	.161
Linear-by-Linear Association	.286	1	.593
N of Valid Cases	17		
$X^2 = 3.219$, $df = 2$, $p = .200$			

From the chi square test the (p> .05) indicating that there is no statistical significant difference between male and female in relation to highest professional qualification. These results imply that gender has no influence at all on the attainment of professional qualifications. This can be attributed by virtue of the fact that although secondary school principals are well trained with bachelors and masters degrees, ICT integration in pedagogy has not been their main area of specialization. Therefore it can be assumed that professional qualifications and gender are not substantive factors in relation to ICT integration in secondary school administration.

5.2.5 Period of service as principal

This study found it worth to establish the impact on the period of the principal's service in headship in relation to ICT integration in secondary school administration. The findings are tabulated in 5.4

Table 5.4: Distribution of the principals' period of service in relation to ICT level training

Highest ICT level training		Period of service as principal		Total
		3 years	4 years and over	
Informal training	Count	0	7	7
	Expected Count	.4	6.6	7.0
	% of Total	0.0%	41.2%	41.2%
Certificate Level	Count	1	8	9
	Expected Count	.5	8.5	9.0
	% of Total	5.9%	47.1%	52.9%
Diploma Level	Count	0	1	1
	Expected Count	.1	.9	1.0
	% of Total	0.0%	5.9%	5.9%
Total	Count	1	16	17
	Expected Count	1.0	16.0	17.0
	% of Total	5.9%	94.1%	100.0%

From the data gathered on Table 5.4 above, most high school principals (94.1%) had served for a period of four years and over in school administration. However, despite many years of service in school administration quite a sizeable number of principals (41.2%) had ICT training at informal levels which may have had a slight impact in their administrative duties. In addition, most principals reported verbatim that although they had the required professional qualifications to head schools, they lacked enough time to undergo any meaningful ICT training to effect its integration in school administration.

> *"Administration of secondary schools is very involving as the principal tries to balance between teaching, monitoring and evaluation of school programmes besides attending educational meetings outside the school. The principal has also to attend to various school stake holders like parents and community members where applicable such that he or she may not have extra time to learn ICT for effective integration in school administration" (Oral interview (OI) 05/09/2014).*

A chi-square test was carried out to show the correlation between period of principals, period of service and ICT level of training. The chi square results are tabulated in Table 5.5

Table 5.5: Chi-square test results on Principals' service in school and ICT level of training.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.944	2	.624
Likelihood Ratio	1.327	2	.515
Linear-by-Linear Association	.360	1	.549
N of Valid Cases	17		
$X^2 = 0.944$, $df = 2$, p=.624			

From the chi square test the (p> .05) indicating that there is no statistically significant difference between the period of service a school principal had served and ICT level of training. This could have been the case because the principals may not have been trained in ICT integration in school administration during their period of service as earlier attested by some of them, verbatim. This is despite undergoing ICT integration courses in school administration as attested on 5.2.6. The principals' administrative experience did not automatically translate to ease in the ICT integration process as some may have lacked crucial technical basics that are pertinent to ICT integration as a new phenomenon in the secondary school administration.

5.2.6 Attendance of ICT integration course

This study found it prudent to establish whether the principals had attended any ICT integration course in secondary school administration. This is tabulated in Table 5.6 below.

Table 5.6: Principals' attendance of ICT integration course

ICT integration Course	Participants Responses	
	Yes	No
School Principals	17(100%)	0(0%)

N = 17

From the study findings, it was noted that all the school principals (100%) had attended ICT integration courses. This connotes that secondary school principals had the potential of

integrating ICT in school administration. The high level of principals' attendance in ICT integration courses is an indication that ICT can be a success in school administrative functions in Kirinyaga County, if well guided.

However, principals' attendance to ICT integration courses in school administration seem not to commensurate their integration level. Notwithstanding this, there could be other compelling pertinent factors that could be acting as major stumbling blocks as will be revealed in further findings of this study. It would be prudent for the government, through the MoEST, to address these major blocks to ICT integration in school administration meticulously with the right course of action. Mere training of teachers in ICT integration courses without addressing the root courses to key challenges of integration would be like a lost person finding his or her way out of the jungle with his or her eyes blindfolded. Or when put in other words, treating the symptoms and not the root cause of the disease.

5.2.7: Experience in the use of ICT in educational management and highest ICT level training

It was necessary in this study to investigate principals' experience in the use of ICT in educational management in relation to their highest ICT level training as a way of ascertaining its impact in integrating the school administration. A cross tabulation in Table 5.7 shows the study findings.

Table 5.7: Principals' experience in the use of ICT in educational management and experience in the use of ICT in educational management

Experience in the use of ICT in educational management		Highest ICT level training			Total
		Informal training	Certificate Level	Diploma Level	
1 Year and below	Count	1	2	0	3
	% of Total	5.9%	11.8%	0.0%	17.6%
1 - 2 Years	Count	0	1	0	1
	% of Total	0.0%	5.9%	0.0%	5.9%
2 - 3 Years	Count	3	2	1	6
	% of Total	17.6%	11.8%	5.9%	35.3%
3 Years and over	Count	3	4	0	7
	% of Total	17.6%	23.5%	0.0%	41.2%
Total	Count	7	9	1	17
	% of Total	41.2%	52.9%	5.9%	100.0%

The data in Table 5.7 indicate that the majority of secondary school principals (41.2%) had the experience of three years and above in the use of ICT in educational management of their respective schools, 35.3% of principals had two to three years of experience, 17.6% of principals had one year and below while principals with one to two years scored 5.9% experience. The high number of principals with the experience of three years and above may be attributed to governments' initiative of training school administrators in ICT integration five years ago (MoEST 2005:72,78). This observation is supported by the sentiments by one of the principals during the interviews who confided that this was also to be considered in teachers' upward professional mobility;

> *"In 2006, the Kenyan government came up with the national ICT policy that aimed at integrating ICT in its educational institutions. I was involved from the onset of ICT integration in my secondary school six years ago. Likewise those other principals in Kirinyaga County with ICT infrastructure were also involved. Some principals who have been recently promoted or transferred may have little experience in the use of ICT for they were not involved in the beginning" (OraI Interview (OI) 28/8/2014).*

A chi-square test was generated to find if there was any correlation between experience in the use of ICT in educational management and ICT level of training for school principals. The chi-square test findings were tabulated in Table 5.8 below.

Table 5.8: Chi-square test results on Principals' experience in the use of ICT in educational management and experience in the use of ICT in educational management

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.392	6	.758
Likelihood Ratio	4.020	6	.674
Linear-by-Linear Association	.136	1	.712
N of Valid Cases	17		
$X^2 = 3.392$, $df = 6$, $p = .758$			

From the chi square test the (p> .05) indicating that there is no statistically significant difference between principals experience in the use of ICT in educational management and ICT level of training. This study finding implies that the principals' experience on the use of ICT in educational management is not related to the ICT level of training. This scenario may be explained by the fact that most of the principals had access to ICT integration since its introduction in secondary schools following government initiative regardless of the ICT level of training. However, they may not have been keen in the integration of ICT in their respective school administration. In this case, principals' experience in the use of ICT does not commensurate their literacy and implementation capacities. This concurs with the findings of Makhanu (2010:129) that "the period of experience with ICT use is not a statistically significant factor in influencing ICT literacy in the western province". There is, therefore, a need for more research to unravel why principals are not fully integrating ICT in school administration in Kirinyaga County despite the government initiative to train them.

5.3 DATA ANALYSIS ACCORDING TO POLICIES GOVERNING EFFECTIVE ICT USE IN SECONDARY SCHOOLS

5.3.1 Introduction

This section embarked on analysing data from the study findings in relation to policies governing effective ICT use is secondary schools in an attempt to explain management challenges of using ICT at secondary school administration at Kirinyaga County, Kenya.

5.3.2 School principals' ICT competencies

This study intended to establish the relationship between Principals' basic ICT competencies in relation to its integration in secondary school administration. The findings were tabulated in Table 5.9 below

Table 5.9: School principals' ICT Competencies

Basic ICT Competencies	Mean	Std. Deviation
ICT Knowledge	4.06	.243
ICT skills	4.00	.000
ICT Access	4.24	.437
ICT Application	4.06	.243
Monitoring and Evaluation of ICT Literacy	4.12	.332

From the study findings on ICT knowledge, a mean of 4.06 indicates that most principals had adequate basic knowledge of ICT. Likewise the mean scores on ICT skills, ICT access, ICT application, monitoring and evaluation of ICT literacy as well ranged between 4.00 and 4.24. This indicated that the school principals had various basic ICT competencies necessary for the integration of ICT in school administration. This implies that failure to integrate ICT in school management may not, therefore, be mainly attributed to lack of ICT competencies but could either be other confounding factors which will be discussed in research findings and recommendations in Chapter 6.

5.3.3: Availability of administrative policy documents

This study investigated the availability of various key administrative policy documents and how they may cast light in the integration of ICT in secondary school administration in Kirinyaga County. The findings are tabulated in Table 5.10

Table 5.10: Availability of Administrative Policy Documents

Administrative Policy Documents	Participants Responses	
	Yes	No
School strategic plan	17(100%)	0(0%)
School ICT policy guide lines	17(100%)	0(0%)
National ICT policy of 2006	13(76.5%)	4(23.5%)
Donor policy guidelines on ICT	3(17.6%)	14(82.4%)
MoEST strategic plan 2006 – 2011	16(94.1%)	1(5.9%)
Sessional Paper N0. 1of 2005	14(82.4%)	3(17.6%)
Kenya Vision 2030	15(88.2%)	2(11.8%)

N = 17

The study findings from Table 5.10 indicate that all the schools under study had strategic plans and ICT policy guide lines (100%). Ninety-four point one percent (94.1%) of the schools had MoEST strategic plan of 2006 to 2011 whereas 88.2% had Kenya Vision 2030 policy document. However, a number of schools (23.5%) did not have the crucial National ICT policy of 2006, Sessional paper number 1 of 2005 (17.6%) and Kenya Vision 2030 (11.8%). Most schools (82.4%) did not have the Donor Policy Guidelines on ICT. This may be explained by the fact that these schools were not funded by any donor in their ICT roll out programmes. Further research findings from this table connote that schools in Kirinyaga County had good potential in integrating ICT in their respective administrations because they had the necessary administrative policy documents to guide them. This notwithstanding, lack of National ICT policy of 2006 and Sessional paper number 1 of 2005 as well as Kenya Vision 2030 policy document among some schools may be an indicator that some principals may not have been keen in integrating ICT

using the set guidelines. This posed a challenge in the integration of ICT in secondary school administration in Kirinyaga County.

Failure to use the government set policy guidelines by some schools may lead to shoddy ICT integration exercises that may not be in conformity with the national standards for cohesion. This would turn out to be not only a waste of taxpayers' income but also a waste of both human and material resources that could have been used elsewhere in other school developments programmes. There is, therefore, the need for principals to follow the set government ICT policy guidelines as they blend with their respective school ICT policy guidelines for the fruition of the integration exercise.

5.3.4 Adherence to administrative policy documents

This study investigated the extent to which secondary schools in Kirinyaga County adhered to the various administrative policy documents in their administrative tasks. The findings were tabulated in Table 5.11 below.

Table 5.11: Adherence to Administrative Policy Documents

Administrative Policy Documents	Mean	Std. Deviation
School strategic plan	4.38	.500
School ICT policy guide	4.18	.393
National ICT policy of 2006	3.53	1.179
Donor policy guidelines on ICT	1.94	1.391
MoEST strategic plan2006 – 2011	4.13	.342
Sessional paper no. l of 2005	4.00	.707
Kenya Vision 2030	3.18	.951

As tabulated in Table 5.11, most of the schools had a high adherence of their respective strategic plans with a mean of 4.38, school ICT guide with a mean of 4.18 as well as MoEST strategic plan of 2006-2011 with a mean of 4.13. Adherence to Kenya vision 2030 and the national ICT policy though moderate ranked lower with a mean of 3.18 and 3.53 respectively. Adherence to donor ICT guidelines ranked lowest with a mean of 1.94. This is because most ICT infrastructures are not mainly funded by donors in these schools, as earlier explained.

It is regrettable though that despite having the national ICT policy of 2006 and Kenya Vision 2030 policy documents, most principals did not adhere to them compared to their school strategic plans and schools' ICT guidelines. This posed a challenge to the integration of ICT integration in school administration in Kirinyaga County. Individual school's ICT policy guidelines, therefore, should not stand in isolation from other national policies that touch on ICT such as the national ICT policy of 2006 and Kenya vision 2030 policy document, among others. For effective and efficient ICT integration in school administration, school strategic plans and schools' ICT guidelines are supposed to be calibrated along the national ICT policies cascaded and customised at each individual school level. There is a need for more studies to be conducted in investigating the effects of schools ICT policy guidelines or strategic plans in relation to national ICT policies and come up with the recommendations of how best these can assist in the effective integration of ICT in school administration

5.3.5: Government policy definition on the roles and responsibilities of key education actors

This study found it prudent to investigate whether the government policy on ICT had well-defined the role and responsibilities of the various key education actors. The purpose was to establish whether the ICT policy guidelines for effective service delivery in school administration were well addressed by the government. This is tabulated in Table 5.12 below

Table 5.12: Government policy definition on the roles and responsibilities of education actors

Key Education Actors	Mean	Std. Deviation
Policy Makers	2.65	1.222
Administrators	2.65	1.498
Teachers	2.59	1.417
Students	2.41	1.543
Funding Agencies	3.18	.951
Development Organizations	3.18	.951
Civil society	2.87	.834

From the results in the Table 5.12, the government has not adequately defined the role of various education actors. This is projected in the low ratings among the key education stakeholders starting with teachers with a mean of 2.59, policy makers and administrators 2.65, civil society 2.87 whereas funding agencies and development organisations had a mean of 3.18. This may be interpreted as posing a challenge since the school administrators may not fully know their roles and responsibilities in integrating ICT in school administration. This may explain why the integration of ICT in secondary schools in Kirinyaga County is quite a daunting task despite these schools having relatively good ICT infrastructure, equipment and manpower, among other facilitating factors. This implies that clarity of any policy document to its implementers and overseers is very critical if it has to be executed judiciously. The government should therefore elaborate on the role of the key education stakeholders in its policy formulation for a level playing ground in the whole exercise of ICT integration in schools.

An opaque policy remains foggy to its implementers and therefore cannot stand the test of time. There is the need for the government to clear the blur in its policy formulation by candidly calibrating its policies on ICT integration in school administration by vividly addressing the roles and responsibilities of the key implementers. This would ensure a national focus in the whole integration exercise where each teacher and administrator can venture into ICT integration with an informed mind and clarity of purpose.

5.3.6: Governments' policy clarity on key ICT integration priorities

This study sought to find out the clarity of the government concerning the policy on ICT integration in secondary schools with regard to key ICT integration priorities that could shed light on ICT implementation in secondary school administration. This is tabulated in Table 5.13

Table 5.13: Governments' policy clarity on key ICT integration priorities

Key ICT integration priorities	Mean	Std. Deviation
Developing the use of video technology in pedagogy and school administration	2.41	1.121
Equipping teaching and administrative areas in schools in ICT	2.88	1.269
Training of school administrators on the use of ICT in Education management	2.88	1.269
Developing further in virtual learning environment for school administrators	2.47	1.375

From the study findings in Table 5.13, the mean for all key ICT integration priorities ranked relatively low and ranged between 2.41 and 2.88. The standard deviation in equipping teaching and administrative areas in schools in ICT and training of school administrators on the use of ICT in education management are noted with a high tie of 1.269 from the mean respectively. These results portray that the government may not have made it quite clear in its elaboration of its key ICT integration priorities in secondary schools. Whereas the priorities in ICT integration are in place, ways and means of attaining them seem not well articulated from these findings. This, therefore, implies that school administrators and teachers training in ICT largely depend on the individual school ICT policies. Some of these policies may not be calibrated along the national ICT policies thus subjecting such schools to trial and error in the integration of ICT in education administration. If not well revisited to address these key ICT priorities and especially training, integration of ICT in school administration in Kirinyaga County may remain elusive.

Planning without strategising with a clear roadmap by the government and individual schools may catalyse the end of a well perceived vision. The government and individual schools would, in this case, require to come up with elaborate ICT integration priorities that have well laid out strategies on how best to address the school administrative functions besides pedagogy as the two need to complement each another. The key priorities should have strategies with a clear roadmap to their attainment not only in Kirinyaga county secondary schools but nationally.

5.3.7: Government's involvement of key stakeholders in the formulation of national ICT Policies

This study sought to establish the extent to which the government had involved the key stakeholders in the formulation of National ICT Policies in a bid to assess ICT integration in schools management. This is tabulated in Table 5.14 below.

Table 5.14: Involvement of key stakeholders in the formulation of National ICT Policies

Key Stake holders	Mean	Std. Deviation
Administrators	2.76	1.251
Teachers	2.12	.993
Students	1.94	1.144
Funding Agencies	2.82	1.237
Developing organizational partners	2.76	1.393
Civil Society	1.88	.928

As tabulated in Table 5.14, it is vivid that the various key stakeholders' involvement by the government in national ICT policy formulation was quite low registering a mean between 1.88 and 2.82. The same is also projected by the high level of standard deviation from the mean that mainly ranged from 1.237 to 1.393 for the stake holders' involvement in national ICT policy formulation. These findings were further supported by the views of one of the principals during the interviews who attested that;

> *"Although we are expected to integrate ICT in our respective schools, most of us, teachers and students were not consulted during ICT policy formulation by the government during the initial stages. The schools management were required to implement the very ICT policy that the government formulated oblivious of the key stake holders and implementers" (OraI Interview (OI) 27/8/2014).*

From the principals' sentiments, there is confirmation that some of the key stakeholders may have been denied the opportunity to own the very National ICT policy document they were supposed to implement and see it to fruition. This may have implied some levels of laxity in ICT

integration by the school principals. It is unfortunate that as much as the integration of ICT in secondary school is crucial, the government may not have emphatically factored in the involvement of the key implementers and overseers of the whole programme. These are the teachers and school administrators respectively in this case who are principals and HoDs.

The above findings further connote that, while the Kenyan government is zealous in the integration of ICT in her secondary schools, she may not have keenly involved the various key stakeholders in its ICT policy formulation. This may explain why the education actors' roles may not be well defined hence posing a major challenge in ICT integration in secondary schools. There is need for the government to involve on board key stakeholders in its ICT policy formulation from the initial stages to ensure smooth transition in ICT integration in schools. To this effect, more studies require to be carried out to unravel the impact of the involvement of school administrators and teachers in the integration of ICT in secondary school administration and come up with recommendations as to how best such potential can be tapped.

5.3.8: Resistance to ICT policy change among school staff

This study sought to find out the extent to which various schools staff resisted ICT policy change in performing various school tasks. This was necessary to establish if there was any challenge in the introduction of ICT in secondary school administration besides pedagogy. This is tabulated in Table 5.15 below.

Table 5.15: Ratings of school staff on ICT policy change resistance

School staff	Mean	Std. Deviation
Heads of Department	2.82	1.237
Teachers	3.18	1.510
Secretary	2.65	1.498
Accounts clerk/Bursar	3.24	1.300

From the findings in Table 5.15 above, resistance to change in relation to ICT policy is noted moderately among the accounts clerks or bursar with a mean of 3.24 followed by teachers at a

mean of 3.18. However, change resistance is noted lowest among the school secretaries at a mean of 2.65 and principals at 2.82 respectively. Change resistance among teachers may be attributed to the fact that ICT is a new phenomenon for them as they were not trained during their professional training. Lack of time to learn ICT integration as evidenced in the open ended responses of the teachers' ICT integration challenges may also have accounted for this. However, resistance to ICT policy change is lowest among the secretaries in schools since they may not have alternatives to use computers as the schools move from analogue to digital application of their daily tasks.

The principals' resistance to change in ICT integration is also low, a fact that could be attributed to their key role in ICT integration in school administration. It is also notable that quite a number of HoDs with a mean of 1.237 who were supposed to assist the school administrators in the integration of ICT in school administration, were resistant to the very change they were supposed to foster in its implementation. School administration should address the issue of motivating HoDs and teachers, mainly through sponsoring them for training on ICT integration in administration, besides pedagogy. This can also as well be done through promotion of teachers and HoDs who excel in the facilitation of ICT integration in their respective school administration duties.

5.3.9: Government ICT policy and ICT integration competencies

The study found it prudent to ascertain the adherence of key ICT integration competencies by schools as a way of compliance to government policy on ICT integration in schools management besides pedagogy. This is contained in Table 5.16

Table 5.16: Schools adherence to government ICT policy and ICT integration competencies

Key ICT integration competencies	Mean	Std. Deviation
Dynamism	3.88	.857
Cost-efficiency	4.18	.728
Adaptability	4.00	.791
Comprehension	3.65	.786
Training of administrators on ICT integration in education management	2.82	1.468
Trailing of teachers on ICT in pedagogy	2.88	1.409

As tabulated above in Table 5.16, most schools adhered to government ICT policy on cost efficiency at a high rating with a mean of 4.18; adaptability had an adherence mean of 4.00 and dynamism at a mean rating of 3.88. However, the training of administrators on ICT integration in education management ranked low with a mean of 2.82 whereas teacher training on ICT in pedagogy and comprehension ranked averagely with a mean of 2.88 and 2.2 respectively. This may be attributed to the opaque nature of the government policy guidelines that may have been non-committal on the training needs of ICT integration implementers in the secondary school set up. In this case, the government policy may not have addressed pertinent issues on the training of ICT integration implementers in their respective administrative and pedagogical dockets. Meaningful national ICT policies should be candidly interpreted for adherence, more so on the training of the much needed manpower for its effective integration in secondary schools. There is a need for school administrators to liaise with MoEST and KEMI to embark more on training of teachers and heads of department so that they can adequately be well equipped for integration of ICT in school administration alongside elaborate National ICT policy.

5.3.10 Extent of policy implementation on key ICT integration strategies

The study sought to establish the extent of policy implementation on key ICT integration strategies by secondary schools. This is tabulated in Table 5.17

Table 5.17: Extent of policy implementation on key ICT integration approaches

Key ICT Integration strategy	Mean	Std. Deviation
Defining clearly the role and responsibilities of all heads of department	4.00	.354
Transforming educational policy into actions	3.76	.903
Filtering of undesirable website from the internet	3.88	.332
Educating students on the use of the internet	4.00	.866
Improving ICT access and equity to narrow the digital divide	3.65	.862
Adhering to ICT integration road map	2.76	1.147

Findings from Table 5.17 indicate that most schools implemented government policy and regulatory framework in clearly defining the role and responsibilities of all heads of department and educating students on the use of the internet with a high mean of 4.00. Filtering of undesirable website from the internet ranked moderately with a mean of 3.88 alongside transforming educational policy into actions with a mean of 3.76 respectively. However, adhering to ICT integration road map ranked the lowest with a mean of 2.76. This may imply that ICT roadmap may not have been clearly spelt out by the government in its national ICT policy hence posing a challenge to ICT integration in secondary school administration in Kirinyaga County.

Embarking on a foggy ICT roadmap is like chasing fortune in an ocean of uncertainties where illusions take centre stage. There is therefore the need for the government to spell out enticing strategies on how best ICT can be integrated into the school administration by its respective implementers in schools nationally for coherence, uniformity and consistency in application.

5.3.11: Policy implementation by schools on key ICT integration approaches

The study deemed worthy to establish the extent to which schools have implemented key ICT integration approaches in school administration in relation to the national ICT policy. This is tabulated in 5.18

Table 5.18: Extent of policy implementation on key ICT integration approaches

Key **ICT integration approach**	**Mean**	**Std. Deviation**
Setting visions that can be translated to action	4.06	.899
Monitoring ICT integration in educational administration	2.88	1.269
Evaluation ICT integration in educational administration	2.82	1.334
Use of motivation to overcome ICT change resistance	2.53	1.007

Most schools set high visions which could be translated into action according to the study findings with a mean of 4.06. However, this was not replicated to the other ICT integration approaches where sharp contrast was noted. Monitoring ICT integration in educational administration ranked moderately with a mean of 2.88; Evaluating ICT integration in educational administration with a mean of 2.82 whereas the use of motivation to overcome ICT change resistance ranked the lowest with a mean of 2.53 respectively. This may be interpreted to mean that, whereas most principals may have been enthusiastic in setting visions for their schools, they may not have had enough strategies in monitoring and evaluation of ICT in their respective school administration.

Alternatively it can also be construed that the government policy on ICT may not have clearly stipulated the approaches on how best to monitor and evaluate ICT integration in schools by its implementers. Due to other confounding factors as well, school principals may not have come up with good means to use in motivating teachers to overcome ICT change resistance. All these posed a challenge in the use of ICT in secondary school administration. There is need for government to involve teachers and school administrators alongside other education stakeholders to address the issue of monitoring and evaluation of ICT integration in schools as well as motivational strategies of these personnel in overcoming change resistance.

5.4 SOCIO-DEMOGRAPHIC INFORMATION OF THE HEADS OF DEPARTMENT (HoD)

5.4.1: Introduction

Socio-demographic information of the heads of department is analysed in this subsection that addressed the ICT competencies of teachers and principals. Inferences made were based on ICT in relation to ICT use in secondary school administration in Kirinyaga County.

5.4.2: Gender and age of the Heads of Department (HoD)

This study sought to establish a brief correlation between gender and age in ICT integration in secondary school administration. This intended to ascertain who had keen interest in integrating ICT in school administration between male and female HoDs as well as their age. A cross-tabulation on distribution of heads of department according to their gender and age is presented in Table 5.19

Table 5.19: Distribution of the respondents by gender and age

Your Gender		Age			Total
		21 - 30 years	31 - 40 years	41 - 50 years	
Male	Count	2	10	17	29
	% of Total	5.6%	27.8%	47.2%	80.6%
Female	Count	3	2	2	7
	% of Total	8.3%	5.6%	5.6%	19.4%
Total	Count	5	12	19	36
	% of Total	13.9%	33.3%	52.8%	100.0%

From the study findings in the above table, the majority of both male and female heads of department (52.8%) were between the ages of 41 to 50 years as compared to 33.3% who were between ages 31and 40 and 13.9% who were between 21 and 30 years respectively. Male HoDs were more (80.6%) than the female (19.4%) with a broader margin of 61.2%. This may be attributed to gender parity in access to education in Kenya where more males have had access to

education than females (UNESCO 2012:1). This is projected in the ratio of their promotions where males dominate. The same tendency is replicated in ICT acquisition and integration in secondary school administration. From the results above, the majority of HODs (52.8%) fell in the age of 41 to 50 years. This may be attributed to the number of working years of experience based on performance that had culminated to their promotion unlike ages 21 to 40 years where the majority of the teachers may not have had enough results based on teaching experience to warrant their promotion. Most of these HoDs may have learnt ICT in the recent years (between 1to 5 years) given that ICT has been a new phenomenon in the Kenyan education system that had not been given much attention in the past.

5.4.3 Professional qualifications

This study sought to ascertain whether there was a correlation between professional qualifications of HoDs and ICT integration in secondary school administration. This is because ICT as a new phenomenon in secondary schools may not have been fully ascertained on how it impacts on the professional qualifications on the person integrating it. The findings are shown in Table 5.20 below.

Table 5.20: Distribution of the respondents by gender and highest professional qualifications in Education

Highest professional Qualification in Education		Your Gender		Total
		Male	Female	
Diploma	Count	6	4	10
	% of Total	16.7%	11.1%	27.8%
Degree	Count	21	3	24
	% of Total	58.3%	8.3%	66.7%
Masters	Count	2	0	2
	% of Total	5.6%	0.0%	5.6%
Total	Count	29	7	36
	% of Total	80.6%	19.4%	100.0%

From Table 5.20 above, findings attest that the majority of the HODs (66.7%) had first degrees and some (27.8%) had attained diplomas whereas a small proportion of 5.6% had Master's Degrees. From the above findings, the majority of HODs are trained in not only pedagogy but

also in school management functions as it is a prerequisite in teacher training colleges. This implies that they can handle school administration matters effectively if well inducted using ICT. As education managers, HoDs should be able to integrate emerging ICT skills and trends in their administrative capacities.

A chi-square test was carried out to determine the correlation between professional qualifications and gender. A chi-square test was generated to find if there was any correlation between professional qualifications and gender in integrating ICT in secondary school administration. The chi-square test findings were tabulated in 5.21 below.

Table 5.21: Chi-square test results on professional qualifications and gender

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.919	2	.141
Likelihood Ratio	3.922	2	.141
Linear-by-Linear Association	3.628	1	.057
N of Valid Cases	36		
$X^2 = 3.919$, $df = 2$, $p = .141$			

From the chi square test the (p> .05) indicating that there is no statistical significant difference between male and female in relation to highest professional qualification. These results imply that there is no correlation on gender and highest professional qualifications of HoDs in integrating ICT in secondary school administration in Kirinyaga County Secondary Schools.

5.4.4 Period of service as HoD and experience in the use of ICT

This study found it worth to establish the period of service as HoD and experience in the use of ICT in performing school administrative tasks. This is captured in a cross tabulation as presented in Table 5.22

Table 5.22: Period of service as HoD and the experience in the use of ICT in performing school tasks

Experience in the use of ICT in performing school tasks		Period of service as HOD				Total
		1 years & below	2 years	3 years	4 years and over	
1 Year and below	Count	2	1	0	3	6
	% of Total	5.6%	2.8%	0.0%	8.3%	16.7%
1 - 2 Years	Count	1	0	2	4	7
	% of Total	2.8%	0.0%	5.6%	11.1%	19.4%
2 - 3 Years	Count	1	0	1	6	8
	% of Total	2.8%	0.0%	2.8%	16.7%	22.2%
3 Years & over	Count	1	2	2	10	15
	% of Total	2.8%	5.6%	5.6%	27.8%	41.7%
Total	Count	5	3	5	23	36
	% of Total	13.9%	8.3%	13.9%	63.9%	100%

From the study findings, the majority of HoDs (63.9%) had served for a period of four years and over in the teaching profession. This connotes that with proper training, the HoDs had a high potential for ICT integration in secondary school administration with proper monitoring and evaluation of the integration process. This is because the HoDs can oversee the ICT integration processes and provide the principal with necessary feedback on how best to facilitate this roll out process. The Majority of the HoDs (41.7%) had three years and over in performing school tasks whereas the minority (16.1%) had one year and below. This implies that with proper training and change of attitude among teachers, schools can effectively integrate ICT in school administration in Kirinyaga County.

A Chi-square test was generated to determine if there was correlation between the period of service as HoD and experience in the use of ICT in performing school tasks. The findings are tabulated in Table 5.23

Table 5.23: Chi-Square test results on relationship between period of service as HoD and experience in the use of ICT in performing school tasks.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.747[a]	9	.663
Likelihood Ratio	8.069	9	.527
Linear-by-Linear Association	1.476	1	.224
N of Valid Cases	36		
$X^2 = 3.919$, $df = 9$, $p = .663$			

From the chi square test the (p> .05) indicating that there is no statistical significant difference between period of service as HoD and experience in the use of ICT in performing school tasks. These results explain that there is no correlation between the period of service as HoD and experience in the use of ICT in performing school tasks of HoDs. This may be attested by the fact that use of ICT in school management functions, being a new phenomenon, may not have been emphasised much by the HoDs during their period of service. Therefore, there could be other pertinent factors that may have influenced the integration of ICT in secondary school administration in Kirinyaga County Secondary Schools under study as will be attested by this study's further findings.

5.4.5 Highest period of ICT training and attendance of ICT integration course in education management

This study deemed it necessary to establish the relationship between highest period of ICT training and attendance of ICT integration course in education management by HoDs. This is captured in Table 5.24.

Table 5.24: Highest period of ICT training and attendance of ICT integration course in education management.

Highest ICT level training		Attendance of ICT integration Course in education management		Total
		Yes	No	
Informal training	Count	10	3	13
	% of Total	27.8%	8.3%	36.1%
Certificate Level	Count	5	6	11
	% of Total	13.9%	16.7%	30.6%
Diploma Level	Count	6	1	7
	% of Total	16.7%	2.8%	19.4%
Degree Level	Count	2	0	2
	% of Total	5.6%	0.0%	5.6%
Not trained at all	Count	2	1	3
	% of Total	5.6%	2.8%	8.3%
Total	Count	25	11	36
	% of Total	69.4%	30.6%	100.0%

From the study findings, the majority of HoDs (36.1%) had informal training in ICT, 30.6% HoDs had certificate level in ICT education and 19.4% had diploma level of education in ICT. Five point six percent (5.6%) of HoDs had degree level of education in ICT. However it's worth noting that 8.3% of the HoDs did not have any ICT level of training at all. Sixty nine point four percent (69.4%) of HoDs had attended ICT integration courses whereas 30.6% had not. It's also worth noting that despite many HoDs having many years of administrative experience in secondary school administration, it is regrettable though that the majority of them had taken ICT training at informal level. Worse still, few had not received any ICT training at all yet they are expected to oversee the very ICT integration in their respective secondary schools' administration. There is a dire need for the respective school management to come up with workable training programmes for HoDs in ICT school administration. To this effect, more research needs to be conducted in unravelling the key underlying challenges that inhibits HoDs in acquiring formal training in ICT in Kirinyaga County secondary schools and how such challenges may be overcome.

From the findings above, the majority of HoDs had attended ICT integration courses in education management. However, this does not seem to commensurate their ICT integration capacities in their respective school administration. This may imply that the ICT integration

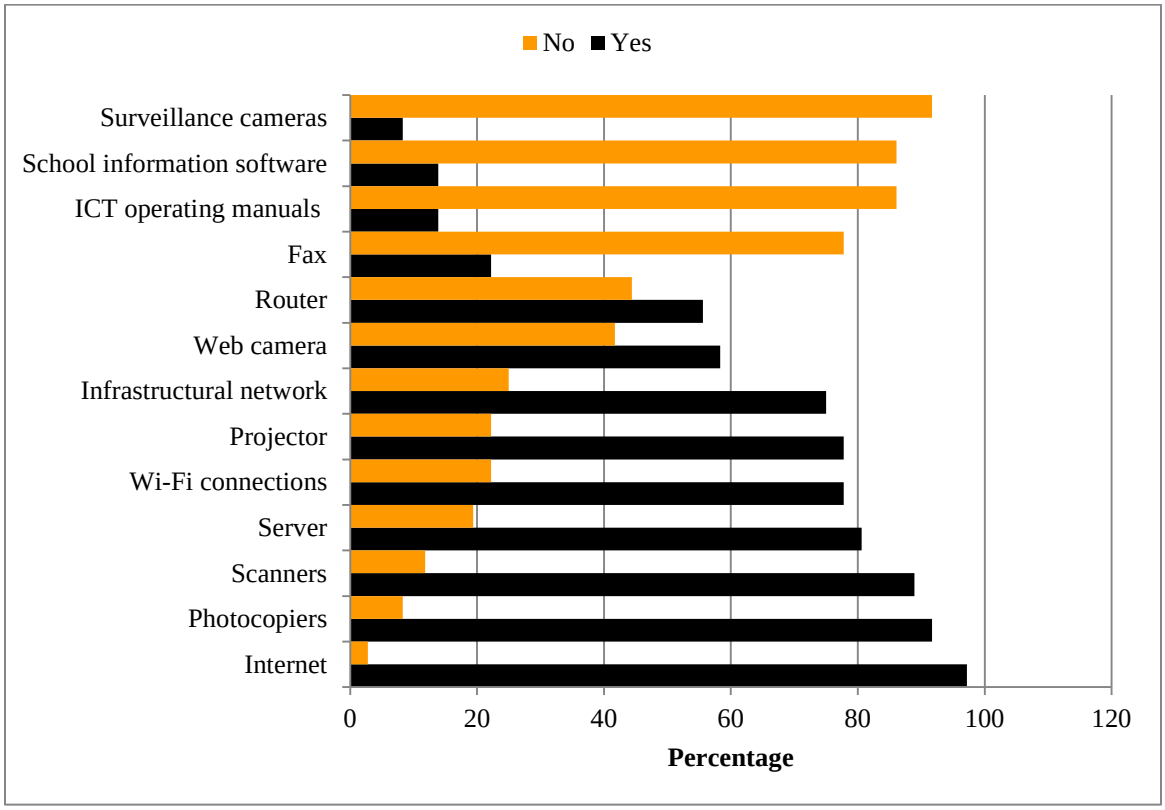
courses offered may not have adequately addressed the immediate pertinent needs of the implementers who in this regard are the HoDs. The number of those HoDs who had not attended the said ICT integration course is worrying as they play a crucial role in overseeing curriculum implementation and school administration. In this case, they may not adequately oversee the very ICT integration in school administration which they themselves have not been trained in. The government and individual schools should come up with a sound education policy in ICT that caters for the training needs of both its implementers (teachers) and overseers (HoDs) in the school administration.

5.5 DATA ANALYSIS ACCORDING TO ICT ACCESS, TEACHERS' ICT COMPETENCIES, CONTINUITY, CHANGE AND CHALLENGES IN THE USE OF ICT IN SCHOOL MANAGEMENT FUNCTIONS

5.5.1 Access to ICT Facilities

This study deemed it necessary to establish whether schools had access to various key ICT facilities for effective and efficient integration of ICT in administration in Kirinyaga County. The findings are tabulated in Chart 5.2 below.

Chart 5.2: Access of ICT Facilities in Secondary Schools



From the study's findings, it was established that all the schools under study had full access (100%) to the following key ICT facilities; computer lab or room, electricity, Word processing, Power point, databases, spread sheets and printers. However, the following key ICT facilities were not found in some of the schools under study as presented in Chart 5.2 above. For example, the presence of internet availability was in 97.2% of the schools, photocopiers and server at 91.7 % and scanners at 88.9% respectively. The presence of operating manuals for computers and other ICT peripherals, school management information software ranked low at 13.9% while surveillance cameras availability ranked the lowest with 8.3%. Access to these ICT facilities in schools was further confirmed by the outcome of observation schedules in respective schools under this study. From the research findings above, it is evident that almost all the schools under study in Kirinyaga County have the necessary key ICT facilities that would ensure smooth integration of ICT in school administration by teachers and administrators.

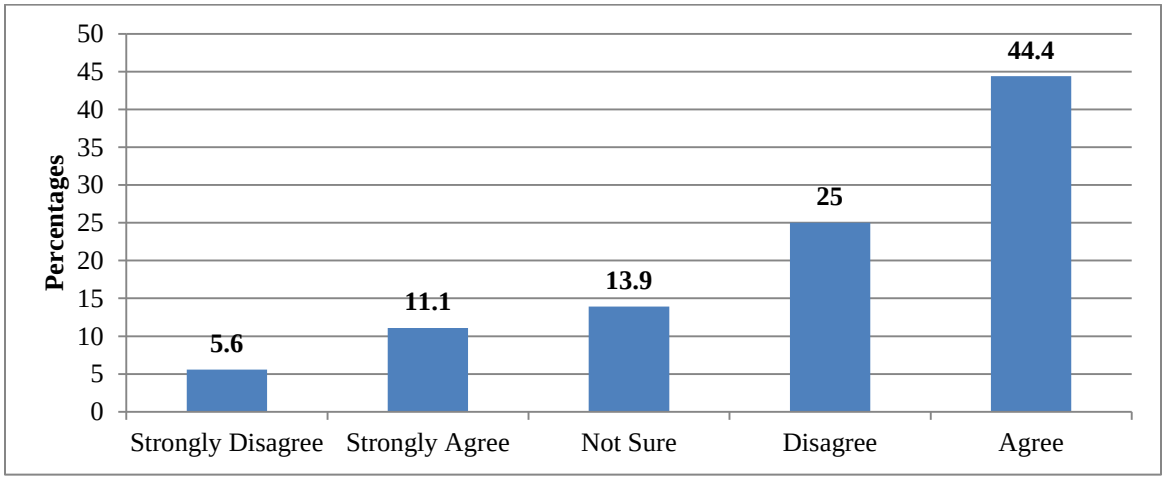
However, access to some of these ICT facilities was quite limited as in the case of operating manuals for computers and other ICT peripherals or equipment, School Management Information Software (SMIS) and surveillance cameras. This could be attributed to either ignorance on the side of teachers and administrators on the crucial role of the ICT equipment operational manuals hence failure to demand them from the said equipment suppliers or loss by negligent handling all together. This posed a draw back on ICT integration in school administration because of the lack of reference of ICT gadgets' handling in case of their servicing or sorting out minor technical failures during operation.

Of great concern is the high rating (86%) of lack of SMIS which is very crucial in assisting in the various school management functions such as financial management, stores management and students data management, among others. This could be attributed to either the high cost implications of the software or lack of commitment on the part of the respective school administration to ensure effective and efficient use of ICT in school administration. This is detrimental to any meaningful ICT integration in schools since SMIS acts as a drive engine that enables easy management of the various administrative functions of schools. Much as access to other ICT facilities above are crucial, the role of SMIS is paramount in school administration and cannot be wished away or underestimated if at all any meaningful integration exercise of ICT in school administration is to take effect. There is, therefore, a need for further research to assess the impact of SMIS on the integration of ICT in school administration for effective service delivery.

5.5.2 Servicing of ICT equipment

This study deemed it prudent to establish whether the ICT equipment is annually serviced for effective and efficient integration of ICT in administration of schools in Kirinyaga County. The findings are presented in Figure 5.3

Chart 5.3: Annual servicing of ICT equipment



The findings on figure 5.3 show that most ICT equipment (44.4%) in secondary schools undergoes annual routine servicing irrespective of whether they have broken down or not. However, smaller percentages of HoDs (5.6%) report that they strongly feel that ICT equipment in their schools do not undergo routine servicing. This connotes high potential of integrating ICT in school administration without equipment and network failure. It is challenging though, that quite a number of HoDs (13.9%) are not keen in finding out how often the ICT equipment are serviced in their schools despite being in management position. Although HoDs may not be ICT experts, it's imperative for them to acquaint themselves with basic ICT equipment operation skills. They should also take keen interest on the kind of persons in charge of servicing and maintaining ICT equipment as part of their administrative duties.

5.5.3 Persons in charge of serving and maintenance of ICT equipment

This study sought to establish who the persons in charge of service and maintenance of ICT equipment in in secondary schools under this study were. The findings are presented in Table 5.25

Table 5.25: Persons in charge of serving and maintenance of ICT equipment

	Mean	Std. Deviation
Computer teacher	4.03	.609
IT expert from a private firm	4.44	.877
Computer teacher and IT expert from private firm	4.31	1.037
IT students on internship from local colleges	2.03	1.362
No one at all	1.06	.236

From the study findings in Table 5.25, ICT equipment is serviced in all the schools. This is mainly done by ICT experts from private firms with a noted mean of 4.44 followed by a combination of computer teachers and experts from private firms with a mean of 4.31. It is also worth noting that students on internship are also engaged in the servicing and maintenance of ICT equipment in secondary schools although at a minimal level with a mean of 2.03. It is therefore quite clear from the study's findings that ICT equipment in Kirinyaga County secondary schools under study are well maintained. This is an implication that they have the potential to ensure substantive integration of ICT in both pedagogy and school administration. However, although most of these schools concentrated on the servicing and maintenance of their ICT equipment at a cost, the administrators may have been oblivious of the potential to be unleashed by proper utility of these gadgets in the schools' administrative functions. This becomes a mismanagement crisis as financial, physical, manpower and time resources are not put into meaningful use. It is worth noting therefore that positive impact of resources' utility should seem to commensurate their exploitation.

5.5.4 Financiers of ICT infrastructures

This study intended to establish who the financiers of ICT infrastructure in secondary schools in Kirinyaga County are. Its findings are presented in Table 5.26

Table 5.26: Financiers of ICT infrastructures

	Mean	Std. Deviation
Parents	4.44	.607
Government	4.11	.887
Private Firm	2.19	1.369
Parents and Government	4.39	.838
Parents and private firm	2.25	1.164
Parents, Government and private firm	2.47	1.320

The study's findings as tabulated in Table 5.26 implied that parents and the government are major financiers of ICT infrastructure in Kirinyaga County with a mean of 4.44 and 4.11 respectively. Private firms have participated less in the financing of ICT infrastructure with a mean of 2.19. It is imperative for schools administration to maximise these resources fully by training and encouraging their teachers and staff in the right use of ICT in education administration. This is because there seem to be a good will of both the government and parents who are the key financiers of the schools. ICT infrastructure is therefore not a key challenge in ICT integration in secondary schools as it connotes high potential of maximising these resources if well utilised.

5.5.5 Users of ICT in the schools

This study deemed it worthy to establish the users of ICT in the schools under study. Findings are presented in Table 5.27 below.

Table 5.27: Users of ICT in the schools

ICT user	Mean	Std. Deviation
Students	4.64	.762
Teachers	4.31	.467
Principal	4.14	.723
Administrative staffs	4.49	.507
Community members	1.32	.684

The findings on Table 5.27 indicate that students are the majority users of ICT (computers) in secondary schools with a mean of 4.64 followed by the administrative staff with a mean of 4.49. Teachers' use of ICT came third where the principals came fourth with a mean of 4.31 and 4.14 respectively. Students' rating on these findings is the highest because ICT facilities, especially the computers, are mainly used for pedagogy than administrative purposes. Community members' use of ICT ranked the least with a mean of 1.32. These results are an indicator that schools in Kirinyaga County have a high potential of integrating ICT in school administration, seeing by the high mean ratings of teachers, principals and administrative staff on the table above. However, teachers and administrative staff need to be well trained and guided on the proper use of ICT in school administration. Government and school policy makers should therefore address the immediate needs of teachers and administrative staff in integrating ICT in school administration.

5.5.6 Teachers' ICT skills and competencies

This study sought to establish the ICT key competencies among teachers in secondary schools based on the various basic key skills. The study results are presented in Table 5.28 below.

Table 5.28 Teachers competences in various basic ICT key skills

Basic ICT key skill	Mean	Std. Deviation
Ability to boot and shut down computer	4.25	.937
Ability to use Ms office	3.56	.998
Ability to sensor students on unwanted contents	3.17	1.404
Ability to use printer	3.14	1.313
Ability to manage files	3.06	1.145
Ability to use database	2.94	1.218
Ability to use scanner and photocopier	2.86	1.291
Ability to send emails	2.83	1.361
Ability to use internet	2.69	1.489
Ability to integrate ICT in administrative tasks	2.53	1.383
Ability to integrate ICT in pedagogy	2.53	1.158
Ability to use PowerPoint	2.33	1.171
Ability to use spreadsheet	2.08	1.273
Ability to use web cameras	1.39	.645

Most teachers from the study findings were conversant with basic computer operations such as the ability to boot and shut down their Personal Computer (PC) with a mean of 4.25, ability to use Microsoft Word Office with a mean of 3.56 followed by ability to censor students on unwanted contents with a mean of 3.17. Ability to integrate ICT in administration tasks among most teachers ranked low with a mean of 2.53. However, quite a number of them also had problems with the ability to use spreadsheets and integrate ICT in pedagogy with a mean of 2.53. The ability to use web cameras among teachers ranked the lowest with a mean of 1.39. These findings are an indicator that the secondary school teachers under study have a high potential of integrating ICT in education administration if well guided as they have the required basic key skills and competencies.

Teachers' ability to comprehend and apply key basic skills in ICT is a prerequisite for any meaningful integration of ICT in secondary school administration as they will be able to navigate the various school administrative functions with ease. A good example is in the monitoring of students' class attendance, analysing and monitoring their examination progress, communicating to parents on their progress and other important matters such as evaluation of general developments in the school. There is need for school administrators to encourage the teachers and the non-teaching administrative staff to integrate basic ICT key skills for administrative purposes for easy management of school functions. On a similar note, there is need for governments and the respective school management to seek the best method possible to train teachers and HoDs in these key areas as they form crucial basis for ICT integration in school administration.

5.5.7 Determinants of ICT literacy

This study intended to establish the HoDs' ratings of teachers and key support staff on the various key determinants of ICT literacy acquisition in schools**.** The study results are presented in Table 5.29

Table 5.29: HoDs ratings of teachers and key support staff on Determinants of ICT literacy acquisition

Key determinants	Mean	Std. Deviation
Knowledge sharing environment	4.25	1.025
ICT infrastructure	4.22	.760
Training and Technical Support of teachers	4.11	1.348
Gender factor	4.03	1.134
Resistant to change	4.03	1.253
Age factor	3.86	1.046
School practices	3.78	1.149
Institutional culture	3.33	1.242
Capital	2.97	1.404
ICT educational level of teachers	2.81	1.348
School ICT policy	2.67	1.394
Attitude towards ICT literacy	4.11	1.348
Government policy	3.86	1.046
Technology characteristics	2.39	1.479

The findings from Table 5.29 above indicate that knowledge sharing environment ranked the highest key determinant in ICT integration among teachers and key support staff with a mean of 4.25 followed by ICT infrastructure with 4.22. Training and technical support of teachers also ranked high together with attitude towards ICT literacy and had a mean tie of 4.11each. Gender factor and resistance to change had a mean tie of 4.03. However, ICT educational level of teachers, school ICT policy and technological characteristics ranked the lowest determinants with a mean of 2.81, 2.67 and 2.39 respectively. All these factors put together are an indication that ICT integration in secondary school administration has a good potential in Kirinyaga County if teachers are well guided in their respective administrative responsibilities.

5.5.8 Continuity forces

This study sought to establish the extent to which the continuity forces contributed to integration of ICT in secondary schools under study**.** The study results are presented in Table 5.30.

Table 5.30: Continuity forces

Continuity forces	Mean	Std. Deviation
School cultures (results oriented)	2.97	1.134
Existing infrastructure	2.89	1.214
Good Performance (without ICT Integration)	2.89	1.214
School core Competences	2.72	1.186
Technological Capabilities (prior to ICT integration)	2.58	1.339
Customer base (wide)	2.21	1.038

Findings in Table 5.30 indicate that school cultures, existing infrastructure and good performance played moderately as continuity forces in determining ICT integration with a mean of 2.97 and 2.87 respectively for the latter two. Customer base ranked the lowest with a mean of 2.21.Continuity forces may constitute a key role in ushering change in the use of ICT in education administration. This is because continuity forces can infuse the much needed integration of ICT in education administration or reject it all together depending on the way it is ushered in by the teachers who are the implementers and principals who are the overseers in this case. As earlier indicated in chapter two, change cannot be introduced sorely on its own environment but within an existing framework in a school environment. In this case, some of the existing framework includes existing school policies and ICT infrastructural set up that are very crucial in ushering change in the use of ICT in school administration.

5.5.9 Change forces

This study decided to establish the extent to which the change forces contributed to integration of ICT in secondary schools**.** The study results are presented in Table 5.31.

Table 5.31 Change forces

Change forces	Mean	Std. Deviation
Competitions	4.19	.889
Globalisation	4.15	1.077
Government Policy	4.14	1.073
New opportunities	4.08	1.052
Customer needs	4.06	1.068
New Technology	4.06	.984
e-Business	3.25	1.317
Mergers and Acquisitions	2.50	1.108

From the research findings in Table 5.31, competitions, globalisation and government policy ranked high as they played a crucial role in ICT integration in Kirinyaga secondary schools with a mean of 4.19, 4.15 and 4.14 respectively. E-business and mergers and acquisitions played the least role in ICT integration in secondary school administration although they ranked moderately with a mean of 3.25 and 2.50 respectively. This connotes that despite ranking lower on the likert scale, the latter two were still crucial determinants in ICT integration in secondary school administration in Kirinyaga County. Due to a global trend in the use of ICT, there seems to be competition in acquiring ICT knowledge for various uses in the world market and general use as people update their communication skills for them not to be rendered obsolete in the information super highway. This may have impacted heavily on the teachers in Kirinyaga County secondary schools as they prepare for new opportunities like promotions that may arise along their career progression after embracing ICT application skills. This is an indication that ICT integration in secondary school administration under study has a high potential emanating from the change forces.

5.5.10: Major ICT integration challenges encountered in the use of ICT in school management functions

This study intended to identify challenges encountered in the use of ICT in school management functions. The findings are tabulated in Table 5.32

Table 5.32: Major challenges in management functions

Major challenges	Mean	Std. Deviation
Limited Time	4.42	.874
Internet connectivity	4.33	.756
Motivation	4.22	.760
Change of attitude	4.03	1.028
Inadequate Experience	4.03	.810
Maintenance of ICT equipment	2.78	1.355

From the findings in Table 5.32, the identified major challenges of ICT integration in school management functions rated highly on the likert scale. Limited time experienced by the teachers to learn ICT ranked the highest with a mean of 4.42, internet connectivity ranked second with a mean of 4.33 followed by motivation with 4.22. Change of attitude towards ICT among teachers as well as inadequate experience ranked fourth with a mean of 4.03. Maintenance of ICT equipment ranked the lowest with an average mean of 2.78. From the above results it can be deduced that major challenges in ICT integration in secondary school administration in Kirinyaga County is mainly due to lack of adequate time by teachers to learn ICT as a new phenomenon in school administration. This could have created low motivation levels for teachers in learning ICT integration. Change of attitude towards ICT may also have accounted for the low motivation level among teachers in overseeing its implementation.

It is worth noting that whereas ICT facilities, infrastructure and policies are important, positive change of attitude towards ICT by its implementers is very crucial for any meaningful integration exercise to take place. This may not only boost the will power but also serve as motivation for the much needed ICT integration in school administration. There is need for schools management to create more time for HoDs and teachers to learn ICT integration skills. For example, this can be done in the evening after classes and over the weekend. Respective school administrations can also look for ways to motivate HoDs and teachers to learn ICT integration in school administration. This can be done by sponsoring them to attend to ICT integration courses and recommendations for promotions of those that later excel in ICT integration in school administration.

5.6 SOCIO- DEMOGRAPHIC INFORMATION OF ICT TEACHERS

5.6.1 Introduction

Socio-demographic information of the ICT teachers is analysed in this subsection that mainly focused on their ICT competencies and that of school principals. Inferences made were based in relation to ICT use in secondary school administration in Kirinyaga County. It is worth noting that although the ICT teachers do not play a key administrative role in the school, they play a very supportive role in providing technical expertise to colleague teachers, members of school support staff and the school administration in relation to ICT integration whether pedagogical or managerial. Therefore, their role could not have been underestimated in this study. ICT teachers were also subjected to a semi-structured interview schedules on a face-to-face basis and over the telephone where applicable to probe them further in order to determine their crucial role in ICT integration in school administration.

5.6.2 Gender, age and highest professional qualification cross tabulation

This study intended to unearth the relationship between teachers' gender, age and highest professional qualification in a bid to assess how these had impacted on ICT integration in Kirinyaga County Secondary School administration. A cross tabulation was generated and presented in Table 5.33

Table 5.33 Gender, age and highest professional qualification cross tabulation

Highest Professional Qualification			Age				Total
			21 - 30 years	31 - 40 years	41 - 50 years	51 - 60 years	
Diploma	Male	Count	3	2	-	0	5
		% of Total	30.0%	20.0%	-	0.0%	50.0%
	Female	Count	4	0	-	1	5
		% of Total	40.0%	0.0%	-	10.0%	50.0%
	Total	Count	7	2	-	1	10
		% of Total	70.0%	20.0%	-	10.0%	100.0%
Degree	Male	Count	2	1	2	-	5
		% of Total	25.0%	12.5%	25.0%	-	62.5%
	Female	Count	2	1	0	-	3
		% of Total	25.0%	12.5%	0.0%	-	37.5%
	Total	Count	4	2	2	-	8
		% of Total	50.0%	25.0%	25.0%	-	100.0%
Total	Male	Count	5	3	2	0	10
		% of Total	27.8%	16.7%	11.1%	0.0%	55.6%
	Female	Count	6	1	0	1	8
		% of Total	33.3%	5.6%	0.0%	5.6%	44.4%
	Total	Count	11	4	2	1	18
		% of Total	61.1%	22.2%	11.1%	5.6%	100.0%

From the findings in Table 5.33 above, there were more male ICT teachers (55.6%) than females (44.4%) in the county. This may be attributed to attitude by females towards ICT literacy where this is seen to be a male dominated world. These findings further indicate that the majority of ICT teachers (61.1%) were between the ages of 21 to 30 years followed by ages 31 to 40 years at 22.2%, ages 41 to 50 accounted for 11.1% with the smallest number of ICT teachers in the age group 51 to 60 accounting for 5.6%. The majority of ICT teachers (55.6%) had attained a diploma qualification as compared to 44.4% who had attained degree qualification. These

findings therefore imply that ICT teaching in Kirinyaga County is being handled by qualified teachers for both pedagogy and administrative purposes.

It can also be construed from these results that the low number of ICT teachers in the age group 51 to 60 years may be accounted for by the fact that the introduction of ICT is a new phenomenon in Kenyan secondary schools as it was rarely there for the last decade when these teachers were undergoing training. On the other hand, ICT being a new phenomenon in the Kenyan education system has been recently introduced in the teacher training colleges starting at diploma level. Therefore, most of those teaching ICT as a subject in Kenyan secondary schools are young teachers, who have recently graduated from diploma colleges as the ICT programme for secondary schools roll out.

5.6.3 Teachers period of service and experience in the use of ICT in pedagogy

This study intended to find out the relationship in the period of service as a teacher and experience in the use of ICT in pedagogy. A cross tabulation was generated and presented in Table 5.34

Table 5.34 Teachers period of service and experience in the use of ICT in pedagogy

Experience in the use of ICT in pedagogy		Period of service as teacher				Total
		1 years and below	2 years	3 years	4 years and over	
1 Year and below	Count	0	0	0	1	1
	% of Total	0.0%	0.0%	0.0%	5.6%	5.6%
1 - 2 Years	Count	1	3	0	2	6
	% of Total	5.6%	16.7%	0.0%	11.1%	33.3%
2 - 3 Years	Count	1	0	2	1	4
	% of Total	5.6%	0.0%	11.1%	5.6%	22.2%
3 Years and over	Count	0	2	2	3	7
	% of Total	0.0%	11.1%	11.1%	16.7%	38.9%
Total	Count	2	5	4	7	18
	% of Total	11.1%	27.8%	22.2%	38.9%	100.0%

From the findings in Table 5.34, the majority of ICT teachers (38.9%) in the above table had over three years in the use of ICT and therefore quite capable of using ICT in both pedagogy and administrative purposes. Only 5.6% had less than one year experience in the use of ICT. The majority of the teachers (38.9%) had served in the teaching profession for more than four years. This, therefore, indicates that besides pedagogy, ICT teachers had enough experience in assisting the school administration in the integration of ICT in education administration when sought for assistance. Training other teachers on the proper use of ICT for both pedagogical and administrative purposes is a good example in this case. It can, therefore, be concluded from the findings above that most schools under study in Kirinyaga county had adequate potential of integrating ICT in education management while using ICT teachers' manpower when well utilised.

A Chi-Square test was generated to determine the relationship between the teacher's period of service and the experience on the use of ICT in pedagogy. The Chi-Square test result is tabulated in Table 5.35

Table 5.35: Chi-Square test result on the relationship between teacher's period of service and the experience on the use of ICT in pedagogy.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.513[a]	9	.483
Likelihood Ratio	11.293	9	.256
Linear-by-Linear Association	.181	1	.671
N of Valid Cases	18		
$X^2 = 8.513$, $df = 9$, $p = .483$			

From the chi square tests the (p> .05) indicating that there is no statistical significant difference on the relationship between teacher's period of service and the experience on the use of ICT in pedagogy. This result explains that there is no correlation between teachers' period of service and the experience on the use of ICT in pedagogy. This could be attributed to the fact that many teachers in the past may not have been using ICT in teaching and other administrative functions.

5.6.4 Teacher's highest ICT level training and attendance of ICT integration course on pedagogy

This study intended to find out the relationship between the teacher's highest ICT level training and attendance of ICT integration course on pedagogy. A cross tabulation was generated and presented in Table 5.36.

Table 5.36: Highest ICT level training and attendance of ICT integration course on pedagogy

Highest ICT level		Attendance of ICT integration Course in Pedagogy		Total
		Yes	No	
Certificate Level	Count	2	0	2
	% of Total	11.1%	0.0%	11.1%
Diploma Level	Count	11	1	12
	% of Total	61.1%	5.6%	66.7%
Degree Level	Count	4	0	4
	% of Total	22.2%	0.0%	22.2%
Total	Count	17	1	18
	% of Total	94.4%	5.6%	100.0%

As shown by Table 5.36, most of the ICT teachers (66.7%) were trained to diploma level of education in Kirinyaga County followed by degree level (22.2%). However it is a challenge that 11.1% of the teachers had certificate level of ICT qualification. This notwithstanding though, most of the secondary schools had high potential of integrating ICT as they were well trained. As shown in Table 5.41 above, the majority of ICT teachers (94%) had attended a course on ICT integration in pedagogy therefore they had the potential of using ICT in both pedagogy and assist in education administration when called upon. For example, training other teachers on how to capture and analyse students' crucial information such as analysis of marks, gender, age and special needs among other administrative functions of the school.

5.7 DATA ANALYSIS ACCORDING TO ICT TEACHERS AND SCHOOL LEADERSHIP COMPETENCIES, MOTIVATION AND PROJECTED ICT INTEGRATION IMPACT

5.7.1 ICT key competencies

This study intended to find out key ICT competences among the ICT teachers. The results are presented in Table 5.37

Table 5.37: ICT key competencies

ICT key competency	Mean	Std. Deviation
ICT Knowledge	4.67	.485
ICT Skills	4.72	.461
ICT Access	4.50	.514
ICT Application	4.56	.984

From the findings in Table 5.37 above, all the ICT teachers in the schools under study in Kirinyaga County had good competencies in ICT ranging from knowledge, skills, access to ICT application with a mean of 4.5 and above. This shows that ICT teachers had the instrumental potency in assisting school administration in the integration of ICT in secondary school administration in Kirinyaga County. This is because these teachers were equipped with the relevant key ICT competencies that could be tapped by the school administrators in their respective management functions such as audit of both human and material resources.

5.7.2 Rating of teachers on ICT integration

This study intended to find out the rating of teachers on various ICT integration factors in school functions. The results are presented in Table 5.30 below.

Table 5.38: Rating of teachers on ICT integration

Integration Factor	**Mean**	**Standard Deviation**
Resistant to change in ICT integration	1.50	.985
Change preparedness	4.56	.616
Your attitude toward ICT integration	4.83	.383
Approach toward ICT integration	4.67	.594
Frequency in undergoing ICT integration course per year	2.28	1.72
Motivation level in ICT integration	2.67	1.414
Commitment level toward ICT integration	4.67	.485

From the findings in table 5.38 above, it is evident that most ICT teachers with a mean of 4.67 were committed to ICT integration with an equally high level of approach towards ICT integration in their respective schools. This implies that they had therefore very high potential to use ICT in assisting their school management in the use of ICT in school administrative functions. However, ICT teachers' frequency in undergoing ICT integration courses per year was low with a mean of 2.8 compared to their change preparedness that had a mean of 4.56. This may have affected their motivational level in the use of ICT which was moderate with a mean of 2.67. This is despite having training and acquisition of key competencies in ICT as earlier revealed by this study. This is further supported by the fact that teachers' ratings in resistance to change in this study are rather minimal with a mean of 1.50. It is therefore important for school administration to facilitate teachers to often attend ICT integration courses per year so that they can update their skills with emerging issues. This could help facilitate the integration of ICT in not only pedagogy but the much needed school administrative functions in relation to this study.

5.7.3: School leadership and ICT integration

This study intended to find out the rating of school leadership and ICT integration based on several administrative functions. The results are presented in Table 5.39.

Table 5.39: Ratings of School leadership in ICT integration

Administrative function	Mean	Std. Deviation
Building school vision	4.11	.676
Establishing school goals	4.11	.900
Providing intellectual simulation	2.78	1.555
Offering individual support	2.83	1.249
Modelling best practices and important organisational values	2.67	1.414
Creating a productive school culture	2.83	1.383
Developing structure to foster participation in decision making	2.89	1.183

Most of the ICT teachers from the findings of this study in Table 5.41 rated their school leadership highly with a mean of 4.11 in both building their respective school's vision and establishing their school goals. However, the same is not projected in offering individual support with a mean of 2.83, providing intellectual stimulation with a mean of 2.78 and modeling best practices and organisational values which had a mean of 2.67 respectively.

The findings from Table 5.42 are an indication that most of the principals were zealous in building their respective school's vision and establishing their school goals. However, they may not have built good enough strategies in realising their ICT visions and goals that could be interpreted into action. In order to realise effective and efficient ICT integration in secondary school administration, there is need for school leadership to create an all-inclusive productive school culture. This is a culture that would not only foster participation in decision making by the key stakeholders but also win their support and ownership.

5.7.4: Rating of school leadership on key administrative structures in ICT integration

This study intended to find out the rating of school leadership and ICT integration. The results are presented in Table 5.40.

Table 5.40: Rating of school leadership on key administrative structures

key administrative structure	Mean	Std. Deviation
Financial management	4.00	1.328
Setting directions	2.72	1.364
Developing staff	2.83	1.249
Principals agency	2.83	1.383
Building collaboration	2.72	1.227

Leadership, in most schools under study from Table 5.40 above, was rated highly with a mean of 4.0 in financial management. However the same is not projected in team building where collaborating with other key implementing agents (teachers) in ICT integration in school

administration seems to pose a challenge. This is well projected in the low rating of leadership in setting staff directions and building collaboration among staff that ranked the lowest with a mean tie of 2.72 followed by staff development and principal agency that tied with a mean of 2.83. These results may be an indicator that ICT integration in secondary school administration in Kirinyaga County has the potential but the school leadership may not have been effective in addressing the pertinent approaches in addressing its realisation. There is dire need for staff development and focused settings of directions in ICT integration in school administration by school principals as far as the key implementers, who in this case are teachers, are concerned. School leadership led by principals should lead by example and bring all concerned on board so as to realise the integration of ICT in secondary school administration.

5.7.5: Motivational strategies required in integrating ICT in secondary school administration

This study intended to establish from among the ICT teachers, the best motivational strategies that the school leadership could address in ICT integration. This was in order to get diversified views on how best ICT could be effectively and efficiently integrated in order to make it applicable in school administration. Most of the teachers from the study's findings reported maximum support by their respective schools in order to integrate ICT in education administration. They were in agreement that some of the key motivational strategies required included; training of teachers on ICT, facilitating teachers to attend to ICT integration courses and issuance of ICT trained teachers with certificates. For example one ICT teacher in one of the schools under this study reported that;

> *"I would expect our school administration to facilitate all teachers to attend ICT integration training where each will be issued with a certificate recognizable by the employer (TSC) for future promotion opportunities upon completion. This is after they excelled well in the integration of ICT in both pedagogy and other school administrative functions. I would also expect the school administration to facilitate teachers at departmental levels to attend ICT integration workshops or courses annually so as to equip them with updated skills to execute in school administrative tasks" (Oral interview (OI) 03/09/2014).*

There was also a common feeling among the ICT teachers that their respective school administration should require allocating more access of ICT facilities and extra time for ICT besides improving on internet connectivity as attested by one respondent.

> *"We would expect our school administration to allocate teachers more ICT facilities like networked computers and extra time for learning ICT integration besides improving on internet connectivity to facilitate further learning for effective service delivery in ICT integration" (Oral interview (OI) 03/09/2014).*

It was further noted that most ICT teachers would want their school administration to involve them from the onset in the facilitation of ICT integration in schools rather than involve them when there was crises like computer network programmes' failure, among others. One ICT teacher retorted that;

> *"I would expect the school administration to involve me in some key decision making and other related issues on time. This is because I can provide the much needed technical expertise and advice on time rather than involving me when there are crises like when the computers have broken down or inspecting faulty procured computer programmes whose procurement I was not involved" (Oral interview (OI) 09/09/2014).*

When all these motivational requirements are put in place by school management, it is the feeling of most ICT teachers that ICT integration in Kirinyaga County secondary schools will yield good fruit.

5.7.6: Impact of ICT use in secondary school administration

This study sought to assess the projected impact of ICT use in secondary school administration. The responses to this question cut across the principals, HoDs and teachers as earlier indicated in 5.1. This is captured in Table 5. 41

Table 5.41: Impact of ICT use in secondary school administration

Key Impact of ICT	Mean	Std. Deviation
Saves time in performing administrative tasks	4.88	0.12
Easy monitoring of school programmes	4.57	0.43
Effective audit of human and material resources	4.02	0.98
Easy communication with various school stake holders	3.82	1.18
Fast feedback to school administrators from stake holders	3.82	1.82
Easy and fast access of information over internet	3.53	1.47

From the findings in Table 5.41 above, it was noted that ICT highly saves time in performing administrative tasks with a mean of 4.88 and easy monitoring of school programmes with a mean of 4.57 among the various participants. Effective audit of human and material resources by ICT was also high rated with a mean of 4.02. Easy communication with various school stakeholders and fast feedback to school administrators from stakeholders were rated relatively high with a tie in a mean of 3.82 as projected impact of ICT. Although easy and fast access of information over internet was ranked last on the findings in the table above, it was moderately rated with a mean of 3.53 which implied it had a considerable impact in ICT integration in school administration.

The administrators and ICT teachers were all in agreement that integration of ICT in various administrative functions of the school saves time for easy monitoring and evaluation of the school programmes. This is because of the fast ease of communication feedback from the various key education players. On a similar note, there is a general consensus that ICT integration in school administration enhances accountability for both human and material resources as it promotes efficiency in the audit of the said resources. It is from here that the school administrators can be able to get timely feedback for evaluation of their progress in incorporating the best remedial action in resource management for possible best administrative practices. Besides, the internet comes in handy from where the school administrators and teachers are able to access the internet for more information on school management and pedagogy among other pertinent issues.

It can be deduced from these findings that most of the participants perceived ICT impact with high optimism. These findings concur with the views of Sessional paper No.1 of 2005:78, that "ICT has a direct role to play in education and if appropriately used, it can bring many benefits to the classroom as well as education and training process in general". In this case therefore, the challenges of integrating ICT in school administration require to be addressed objectively with the best possible policies and strategies to see it to its fruition.

5.8: TESTING HYPOTHESIS

The hypothesis for this study stated: There is no statistically significant relationship between ICT policies in education and effective integration of ICT in advancing secondary school administration. This was tested based on the following four key areas;-

- School access to ICT policy documents,
- Schools adherence to ICT policy documents
- Governments' clarity on ICT policy documents and
- Governments' involvement of key stakeholders in ICT policy formulation

5.8.1: Testing hypothesis on Schools' access to ICT policy documents

This was tested using the following hypothesis; H_o There is no school access to ICT policy documents for effective ICT integration in advancing secondary school administration. A Chi-Square test was generated where $p=0.747$ ($p>0.05$) indicating that there was statistically significant difference between schools access to ICT policy documents for effective integration of ICT in advancing secondary school administration. The null hypothesis was therefore rejected. This implied that secondary schools under study had access to ICT policy documents to guide them integrate ICT in their administration. This may connote that although the schools under study had access to various ICT policy documents, their guidelines on ICT integration may not have been very explicit on the roadmap to well calculated integration plan and strategies. This could have tampered with the integration of ICT in secondary schools in Kirinyaga County.

5.8.2: Testing hypothesis on Schools' adherence to ICT policy documents

This was tested using the following hypothesis; H_o There is no Schools adherence to ICT policy documents for effective integration of ICT in advancing secondary school administration. A Chi-Square test was generated where $p=0.208$ ($p>0.05$) indicating that there was statistically significant difference between schools adherence to ICT policy documents and effective integration of ICT in advancing secondary school administration. The null hypothesis was therefore rejected. This implied that secondary schools under study adhered to ICT policy documents in relation to their integration in secondary school administration. This is an indication that the existing ICT policy may have been defective for their integration in the school administration. No matter their level of adherence by schools, deficient and defective ICT policies cannot lead to any meaningful efficient and effective integration process. In this case, the whole exercise may be characterised by trial and error thus failing to meet the intended integration exercise.

5.8.3: Testing hypothesis on government's clarity on ICT policy documents

This was tested using the following hypothesis; H_o There is no governments' clarity on ICT policy documents and effective integration of ICT in advancing secondary school administration. A Chi-Square test was generated where $p=0.013$ ($p<0.05$) indicating that there was statistically significant difference between the respondents who agreed and those who disagreed that government policy is clear on ICT policy document. The null hypothesis was therefore accepted. This implied that government's clarity on ICT policy documents in relation to ICT integration in secondary school administration may not have been clear. This can be equated to a bullet that misses its target right from its trigger. It remains just but a stray bullet that will never strike its intended target no matter its terminal velocity.

5.8.4: Testing hypothesis on government's involvement of key stake holders on ICT policy formulation

This was tested using the following hypothesis; H_o There is no governments' involvement of key stakeholders on ICT policy formulation on effective integration of ICT in advancing secondary school administration. A Chi-Square test was generated where $p=0.281$ ($p>0.05$) indicating that there was a statistically significant difference between governments' involvement of key stakeholders on ICT policy formulation and effective integration of ICT in advancing secondary school administration. The null hypothesis was therefore rejected. This implied that the government involved the key stakeholders in ICT policy formulation. However, most of the participants were of the opinion that governments' involvement of these key stakeholders in ICT policy formulation was quite low as earlier noted in Table 5.15. This may have accounted for low impact on ICT integration in secondary school administration where pertinent integral strategies may not have been incorporated by the key stakeholders at the policy formulation stage.

From the hypotheses tests above, it can be inferred that most schools had access to ICT policy documents and adhered to them. However, governments' clarity on ICT documents was lacking. It is also worth noting that, although government may have involved some of the key stakeholders in ICT policy formulation, the level of involvement was rated relatively low. Therefore, the null hypothesis was rejected because there was a statistically significant relationship between ICT policies in education and effective integration of ICT in advancing secondary school administration.

5.9 CONCLUSION

This study analysed its findings through discussions and inferences made from the data collected from questionnaires, interviews and observation schedules. From the study findings it was established that, there was a positive correlation between ICT policies in education and effective integration of ICT in advancing secondary school administration in Kirinyaga County. Most schools had access to power, secured ICT rooms and well serviced ICT infrastructure

prerequisite of any meaningful ICT integration. Teachers, HoDs and principals were professionally trained; however, their role in ICT integration in school administration was hampered by several confounding factors some of which included; time limit, failure to attend to ICT integration courses and change of attitude. Of most concern were the government ICT policy documents that did not have enough clear cut guidelines on ICT integration roadmap and failure to adequately involve the key stake holders in ICT policy formulation. Whereas these factors may have conspicuously posed a challenge, no single factor can remain outstanding on its own as posing a challenge in the integration of ICT in school administration in Kirinyaga County's secondary schools.

Chapter six provides findings, conclusions and recommendations based on this research.

CHAPTER 6

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMMENDATIONS

6.1 REVIEW OF THE RESEARCH

6.1.1 Introduction

The overall objective of this study was to evaluate the management challenges in the use of ICT in advancing the administration of secondary schools in Kirinyaga County, Kenya. The expected outcome of the study was that possible solutions and recommendations would be addressed in order to successfully enhance the integration of ICT in both secondary school administrative and managerial practices. This was explored along the aims and objectives of the study as captured in section 1.4.1 and restated in section 4.4 from where the study findings were discussed and conclusions arrived at. This summary has been based on both the literature and the empirical study findings. Chapter one gave an overview of the study whereas chapters two and three provided the study literature. Chapter four focused on the research design and methodology adopted while chapter five provided the research findings.

6.1.2 Focus of the study

This study focused on the role of secondary school administration in the management of ICT and the means of coping up well with the current and emerging technological challenges in Kirinyaga County. It focussed, among other pertinent challenges, on continuity and change management in the use of ICT in school administration, leadership, administrative and managerial functions of the principal as well as ICT literacy for effective integration in secondary school administration. Determinants of ICT literacy acquisition and development in relation to this study were focused on strategies for developing and improving ICT literacy for effective school administration and management practices.

6.1.3 Methodology of the Study

Research methodology in this study was based on the descriptive survey design. Data from the structured questionnaires and semi structured interview schedules was gathered qualitatively to probe HoDs, principals and ICT teachers on their opinions and challenges in advancing ICT integration in secondary school administration. The Statistical Package for Social Sciences (SPSS) was used to generate descriptive and inferential statistics. Data findings were presented in the form of charts, figures and tables from where inferences were made to offer explanations, conclusions and the findings' recommendations (see chapter 5).

6.1.4 Sample Size

Purposive sampling was conducted in this study from 18 principals and 54 teachers inclusive of two heads of departments and one computer teacher in each school. The latter were sampled due to their expertise in their areas of teaching computer studies and assisting school administration in ICT related matters. Schools were categorised as boys' boarding, girls' boarding and mixed day for a wider representation of the target population.

6.2 SUMMARY OF THE FINDINGS AND CONCLUSIONS

6.2.1 Introduction

Whereas chapter one gives a general overview and justification of this study, chapter two and three provided the theoretical discussions of this study while chapter four focused on the research design and methodology adopted. The research study findings were discussed in chapter five.

6.2.2 Findings from the literature study

6.2.2.1 Application of the theoretical frame work for the study findings

The outcome of this study connotes that there has been an interplay between the foundational frameworks highlighted in 1.6 as they relate to ICT integration in secondary school administration in Kirinyaga County. These included Kast and Rosenzweig Open System theory, the Expectancy theory and Kurt Lewins Force field theory. The school as an open system comprises of various sub-systems that interacts with one another and its environs for continuous improvements. Key among these includes the Managerial, Administrative, the Academic, Finance, ICT, Clerical, Repairs and maintenance among others. In this case there was internal and external forces of change that interacted to promote the use of ICT in education administration and were accommodated by the school as an open system. Internal forces of change in the use of ICT in school administration included the principal, heads of department and the ICT teachers. Major external forces of change in this case included the Kenyan government through the MoEST that formulated the ICT policy framework for schools, KEMI that has been in charge of developing curriculum and training for Education administrators and Quality assurance personnel. The Universities and TTCs formed a very integral component of external forces of change in the integration of ICT in school administration as they are responsible for the training of teachers in ICT use in various administrative functions of the schools besides pedagogy. The TSC also came in handy as a body in charge of employing teachers as it has been able to identify and scrutinize the selection and promotion of teachers in schools who may have undergone proper ICT training for application in secondary school administration set up. All these sub-systems and their environs have been interactive where the secondary school administrators as agents of change in the use of ICT in school administration strike a balance between forces for change and resistance in relation to force field theory. This has been done by these change agents through creating positive attitude towards ICT integration in school administration as key players in its advocacy. Where the principal played an instrumental role in ICT integration in school administration as earlier indicated in (1.6.1), it was easier for the other teachers to make effective and efficient use of it and vise-versa where the former did not have the driving force in its use. Individuals are motivated to work harder to

receive reward for their efforts as earlier indicated Expectancy theory in (1.6.2). In this case, the perceived benefits of ICT in school administrative tasks encouraged the school principals, HoDs and the computer teachers to embark on the continued use of ICT in administrative functions in the schools under this study. However, other predisposing factors key among them lack of governments' clarity on ICT policy guidelines and failure to involve key stake holders in ICT policy formulation harboured effective integration process of ICT in the schools under this study as was attested by its findings.

Chapter two provided the concept of continuity in school administration, change and the role of continuity in transition for change in relation to ICT. Literature in chapter three was based on monitoring and evaluation of ICT literacy in secondary school administration, determinants of ICT literacy acquisition and development.

6.2.2.2 *Continuity in education*

Education continuity is a management and operational process that identifies education activities that are essential and critical (Saskatchewan School Board Association (SSBA) 2008:3). It notes that continuity in education identifies the potential impact that affects critical activities, provides a framework for building resilience, and creates effective responses that will safeguard the safety and interests of employees, students and the community. Whereas ICT is pertinent in educational management as a new global trend, the process, procedures and mode of its integration in secondary schools is not quite clear to ascertain its effective infusion process as part of continuity. Strategic measures require to be well addressed to usher in the much desired change alongside the continuity process.

6.2.2.3 *Concept of continuity in the integration of ICT in school administration*

Managing continuity is not only about recognising forces of resistance or stability in organisations, but also about connecting the past to the present (Kolb 2002 in Taylor 2011:4-5). He further notes that "this is done by consciously nurturing elements of stability within a changing environment". Infusion of ICT in the secondary school set up should not be perceived

as a deviation from the norm but rather as an integral part of the whole that not only complements but enhances other development strategies in secondary school administration.

Every successful venture must have its past in the continuity process for a meaningful quantification of progress. Connectivity to the past forms the basis of rationalising the current strategies in the change process of integrating ICT in secondary school administration. Proponents of change are enthusiastic about its introduction but evasive in addressing exhaustively the existing school major structures or practices that are compatible with the said change. There is need to infuse continuity and change management practices in ICT integration in the school administration to avoid high turbulence in its implementation, which may derail the whole process if not well calculated.

6.2.2.4 *Role of Continuity in the transition for change*

ICT, when integrated in the schools, needs to factor in the key administrative structural elements that are responsive to these new innovations. Continuity and change will require to be well blended if the latter is to gradually navigate the turbulent wave of resistance to new technological advances in the school administration. In a related view, Bush (1998) in Bush (2008:9) posits that while a clear vision may be essential to establish the nature and direction of change, it is equally important to ensure that innovations are implemented efficiently. He adds that the school's residual functions should be carried out effectively while certain elements are undergoing change.

6.2.2.5 *Change Management in the integration of ICT in secondary school Administration*

The existing school administrative structure forms not only the basis but also the rationale for change and its management. Individuals implementing change must be able to relate to the past and present to identify strength and weaknesses of the intended change in the use of ICT and offer solutions for possible challenges. Commitment to change in the use of ICT in school

administration by its implementers is of paramount significance if it is to impact positively in a school environment in enhancing education administration.

6.2.2.6 *The Role of Motivation in change and ICT use*

Having a recognition system for innovative and effective use of ICT integration in schools will motivate teachers to use ICT in teaching (Policy Note 2005:2-24). It is therefore the duty of educational managers to ensure that key change agents are motivated accordingly to ensure successful integration of ICT in secondary school administration.

6.2.2.7 *Agents of change in the use of ICT in school admi*nistration

"A change agent is someone who knows and understands the dynamics that facilitate or hinder change as she or he defines, researches, plans, builds support, and partners with others to create change" (IMPACT Greensboro 2011). They have the courage and the willingness to do what is best for the community.

The effective integration of ICT in schools also requires a focused principal who is knowledgeable in adopting meaningful approaches aimed at attaining the desired objectives. However, a positive attitude towards ICT by change agents is of paramount significance as it will facilitate the willingness to change. Without the will power, no meaningful change can be able to take sound effect despite the presence of ICT facilities, internet speed and man power on the ground. For school improvement to occur, teachers need to be committed to the process of change which will involve them in examining and changing their own practice (Harris 2002 in Ming *et al*. 2010:13).

6.2.2.8 *Factors and dilemmas affecting change in the use of ICT in educational administration*

Unlike other decisions made within a school that can be reviewed and changed if required, changes in technology occurring outside education dictate the speed and currency of the

decision-making process within the school (Kokay 2004:17). The dictates of time lapse pose a big challenge in the integration of ICTs in schools as some programmes and approaches may become obsolete in the transition period which may take two to three years. A year in the ICT arena is a very short period as new innovations take centre stage in the world of competition by various software companies.

Whereas actions can be seen in the integration process, quantifying attitudes and vision is quite daunting in the evaluation of ICT integration process as they are only deep-rooted in the minds and thoughts of individual change agents. Internalising the complexity of technology becomes the driving force for effective leadership in educational change.

6.2.2.9 *Leadership in educational change*

The actions, attitudes and visions of leaders and administrators have the potential to greatly impact and influence the integration of innovations (Taddeo 2006:7). Leaders need to have access to training programmes, frequent practical experience and support structures. These will enable them to develop the understanding, skills and resources that will lead to appropriate positive reform in their school setting (ibid).

Informed and focused leadership plays a major role in the ICT integration process by enacting the best contingent measures as they take into account the desire for organisational change and continuity value of the various key implementers. ICT integration in secondary school administrative set up will require to be effected alongside other educational reforms considering other pertinent elements of continuity that will match the required changes during the transition process.

6.2.2.10 *ICT literacy*

"ICT literacy involves the aspect of using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society" (The International ICT literacy panel 2002:2). The panel's definition reflects

the notion of ICT literacy as a continuum, which allows the measurement of various aspects of literacy, from daily life skills to the transformative benefits of ICT proficiency.

An ICT knowledgeable person is able to identify various basic ICT equipment or gadgets and service utilities, their respective use and how they relate to his or her area of application as per his or her acquired skills. It is imperative that school administrators and teachers seek first-hand information by acquiring ICT literacy so as to effectively search, interpret, interrogate or criticise the opinions of others from an informed point of view. Where possible apply the relevant part of that knowledge in school administration.

6.2.2.11 *Monitoring and evaluation of ICT literacy in secondary school administration*

Monitoring of the ICT integration in secondary schools acts as a check control for it provides timely feedback to the school administrators in the roll-out process as they chart a way forward for their respective institutions. It also paves way for a well-informed evaluation exercise for it provides a reliable on site feedback. There is need for the training of human capacity for the monitoring and evaluation of ICT integration for the various school administration functions. This will help set and maintain standards in the ICT infusion process in both pedagogy and overall school administration processes. Just like any other major school inspection project, monitoring and evaluation should be planned along both short and long term goals.

6.2.2.12 *Government policy on ICT*

Government policy is a tool to promote the national vision and the basis for the legislation and regulation through which it is implemented (Kate Wild and Association for Progressive Communications 2003:1). A policy that caters for both the technical training and strategies for implementers should be put in place to enhance ICT integration in secondary schools as a matter of major concern by the government. This will require involving both pedagogical and administrative aspects of ICT integration for its effective realisation as one of the key educational goals.

ICT policy should not only be explicit and consistent but also practical in addressing the integration process if it has to be successful in the secondary school administration plan. ICT policies must be dynamic, cost-effective, adaptable, and differentiated between sectors and between the various segments of educational management in order to contribute effectively to education management (Kipsoi 2012:19). Besides the national ICT policy, there is a need for each individual school to have its own ICT policy that addresses the immediate needs of the school subject to its unique environmental set up.

6.2.2.13 *Training and Technical support*

Training should be introduced to ensure that the implications of technology adoption and use are clearly understood and accounted for in short and long-term planning (UNESCO 2009:25). Due to the uniqueness of learning institutions, it is imperative for each school to carry out its own ICT needs assessment for training its staff members based on the needs identified to avoid wastage of resources in duplication of training skills previously learnt. This will foster effective ICT integration in the school plan.

Since technology is dynamic, continued ICT training of school administrators, teachers and clerical staff is necessary so as to be in tandem with the ICT global trend on educational matters. Teachers and administrators will be better placed in ICT integration in their pedagogical and administrative duties respectively when they have proper and adequate training.

6.3 FINDINGS FROM THE EMPIRICAL STUDY

The key objective of this study's empirical investigation was to establish the role of secondary school leadership in the management of ICT use. The intention was to come up with the means of coping with the current and emerging technological challenges in Kirinyaga County, Kenya. The study sought to address, among others, the role of continuity and change management in the use of ICT, leadership, administrative and managerial functions of the principal and ICT literacy. These are meant for effective and efficient quality leadership in influencing school compliance in ICT technological advancement of modern time.

Quality leadership in influencing school compliance in ICT technological advancement implies principals' ability to embrace change and set direction in the use of ICT in school administration among the HoDs and teachers. It also entails ICT skills acquisition, commitment to change, adherence to both the individual school and the national (government) policy guidelines on the use of ICT, monitoring and evaluation as well as building the school's vision.

The main hypothesis for the study stated ''There is no statistically significant relationship between ICT policies in education and effective integration of ICT in advancing secondary school administration'' This was subdivided into four key areas (see section 5.8) that were tested so as to establish whether there was a significant relationship between ICT policies in education and effective integration of ICT in advancing secondary school administration. This was done through statistical analysis as indicated in section 5.8. The following section discusses the hypothetical findings of this study.

6.3.1 Schools' access to ICT policy documents

The study established that although the schools under study had access to ICT policy documents, there was statistically a significant difference between their accesses to ICT policy documents for effective integration in advancing secondary school administration. This could have been attributed to a lack of clarity on ICT integration guidelines that were not explicit on the road map to a well calculated integration plan and strategies hence posing a challenge in advancing secondary school administration in Kirinyaga County.

6.3.2 Schools' adherence to ICT policy documents

It was established by this study that there was schools adherence to ICT policy documents. However, there was a statistically significant difference between schools' adherence to ICT policy documents and effective integration of ICT in advancing secondary school administration. This may have been attributed to a deficiency in addressing the policy formulation and the integration process from the initial stages. No matter their level of adherence by schools,

deficient and defective ICT policies cannot lead to any meaningful efficient and effective integration process in any administrative or organisational set up.

6.3.3 Government's clarity on ICT policy documents

These study findings established that there was no government clarity on ICT policy documents and effective integration of ICT in advancing secondary school administration. This in itself posed a challenge as there is a gap in the integration process among secondary schools with the potential of maximising the use ICT in Kirinyaga County.

6.3.4 Government's involvement of key stakeholders on ICT policy formulation

This study also established that there was involvement of key stakeholders in the ICT policy formulation for effective integration of ICT in advancing secondary school administration. However, there was a statistically significant difference between governments' involvement of key stakeholders in ICT policy formulation and effective integration of ICT in advancing secondary school administration. This may be attested by the governments' low involvement of these key stakeholders in ICT policy formulation as per the study findings where integral strategies may not have been incorporated at the policy formulation stage.

Based on the above findings, the null hypothesis for this study was thus rejected because there was a statistically significant relationship between ICT policies in education and effective integration of ICT in advancing secondary school administration.

6.4 CONCLUSIONS

Conclusions for this study were deduced after analysing the literature review and empirical study investigations from where findings were arrived at. These were based on the research questions (see 1.3.1 & 4.3) as presented in the next sub-sections.

6.4.1 Research Question 1

Is the use of ICT in secondary school administration well guided by clearly spelt out policies and guidelines in Kirinyaga County?

It is clear from the study findings that the ICT policies and guidelines are not quite explicit in guiding the ICT integration process in relation to; - developing the use of video technology in pedagogy and school administration, equipping teaching and administrative areas in schools in ICT. Training of school administrators on the use of ICT in education management and developing further in virtual learning environment are also not well guided by clearly spelt out policies in this case. The mean ratings for these integration policy priorities ranked relatively low with a standard deviation of 1.121 and 1.375 (see 5.3.5). Whereas the priorities in ICT integration are in place, ways and means of attaining them seem not to be well articulated.

The policies have also not adequately well defined the role of various education actors ranging from students, teachers, administrators and policy makers. This may be interpreted to pose a challenge since the school administrators may not fully understand their role and responsibility in integrating ICT in school administration. This may explain why the integration of ICT in secondary schools in Kirinyaga County is quite a daunting task despite these schools having relatively good ICT infrastructure, equipment and man power, among other facilitating factors. Therefore, the use of ICT in secondary schools in Kirinyaga County is not well guided by clearly spelt out policies and guidelines according to these study findings.

6.4.2 Research Question 2

How effective are teachers and principals in the use of ICT in advancing secondary school administration Kirinyaga County?

The findings from this study established that all the ICT teachers in schools under study in Kirinyaga County had good competencies in ICT ranging from knowledge, skills, access to ICT application with a mean of 4.5 and above. Most of the other teachers were conversant with the basic computer operations such as the ability to boot and shut down the Personal Computer (PC)

with a mean of 4.25, ability to use Microsoft Word Office with a mean of 3.56, among others. However, ability to integrate ICT in administration tasks ranked low with a mean of 2.53.

It's also worth noting that despite many HoDs having many years of administrative experience in secondary school administration, it is regrettable though that the majority of them had taken ICT training at informal level (36.1%). Worse still, a few (8.3%) had not received any ICT training at all yet they were expected to oversee the very ICT integration exercise in their respective secondary schools' administration. This hampered their efficiency in the monitoring and evaluation of ICT integration in school administration.

The findings from this study also established that most of the school principals had basic ICT competencies in relation to its integration in secondary school administration. These ranged from ICT Knowledge, ICT Skills, ICT Access, ICT Application, Monitoring and Evaluation of ICT literacy. It was further established that all the school principals (100%) had attended the ICT integration course. However, despite many years of service in school administration, quite a sizeable number of principals (41.2%) had ICT training at informal level which may have impacted low in their administrative duties.

6.4.3 Research Question 3

What is the impact of the use of ICT in secondary school administration in Kirinyaga County?

This study established that the integration of ICT in various administrative functions of the school saved time for easy monitoring and evaluation of the school programmes. On a related note, it was ascertained that ICT integration in school administration also enhances accountability for both human and material resources as it promotes efficiency in the audit of the said resources. It is from here that the school administrators are able to get timely feedback for evaluation of their progress in incorporating the best remedial measures in resource management for best possible administrative practices. Besides, the internet comes in handy from where the school administrators and teachers are able to access it for more information on school management and pedagogy among other pertinent issues.

6.5 RECOMMENDITIONS

Successful ICT integration in advancing secondary school administration requires the development of prudent implementation strategies some of which have been investigated by the researcher and forms the basis of recommendations for this study. These have been captured from section 5.8, the findings from empirical data analysis in section 6.3. The research conclusions for this study from section 6.4 have also been incorporated in making these recommendations. The use of ICT in advancing secondary school administration reveals that, a relatively high number of principals (41.2%) had only undergone ICT training at informal level despite their attendance of ICT integration courses in school administration. This calls for a redress in proper training needs in ICT in school administration for principals as they have had ample experience in running schools, in Kirinyaga County. On a related view, the government in its ICT policy formulation has not adequately defined the roles and responsibilities of various key actors in secondary schools' ICT integration. This calls for the need by the government to formulate an all-inclusive vivid ICT policy that candidly stipulates the role and responsibilities of various key actors in the education sector for ease in the interpretation and integration process by school administrators. The following further recommendations are made from these findings;

a) Individual Schools Should:
    1) Ensure that their strategic plans and ICT policy guidelines are calibrated along the national ICT policy guidelines for uniformity the integration process
    2) Improve access to ICT facilities, infrastructure, internet connectivity and power grid connectivity to facilitate the integration roll out
    3) Encourage a wider consultation from various ICT expatriates before procuring and installing ICT accessories to ensure quality service delivery from an informed point.

b) The Government through the Ministry of Education Science and Technology (MoEST) should:
    1) Make ICT training in secondary schools administration compulsory for all principals and HoDs as a basis of career promotion for easier management of these institutions

2) Involve key stakeholders in its ICT policy formulation from the initial stages to ensure smooth transition in ICT integration in school administration.
3) Approve a standard School Management Information Software (SMIS) for use in secondary school administration for national coherence, uniformity and consistency in application.
4) Involve professionally trained ICT quality assurance personnel in monitoring and evaluation of ICT integration progress in schools' administrative functions.
5) Impose a tax waiver on the purchases of the key ICT equipment such as computers, their accessories, software and internet connectivity charges as a way of encouraging ICT integration process in secondary schools.

c) The Kenya Education Management Institute (KEMI) should;
1) Come up with a mandatory ICT curriculum that caters for the training needs of both its implementers (HoDs) and overseers (Principals) in the school administration.
2) Training of monitoring and evaluation quality assurance personnel in ICT integration in schools to set and maintain standards in the ICT infusion process in both pedagogy and overall school administration process.
3) Organise frequent ICT integration capacity building forums for school administrators and teachers for day to day running of the school to cope with technological dynamism.
4) Create a digital platform for training education administrators in secondary school ICT integration for a wider access and cost efficiency.

d) Universities and secondary school teacher training colleges should incorporate ICT curriculum in pedagogy and school administration as a mandatory core subject for teacher trainees.

e) The Teachers Service Commission (TSC) should only register and recruit teachers who have undergone a mandatory ICT curriculum in pedagogy and school administration as a way of unleashing potential of ICT integration in school administration.

6.6 SUGGESTIONS FOR FURTHER RESEARCH

1) Any change management strategy that undermines the role of the key flexible organisational structures cannot usher in the desired change with stability. There is therefore a need for more research on the role of continuity in embedding and managing change in ICT integration in secondary school administration.
2) To avoid the risk of being redundant, change in the use of ICT in secondary school administration requires to be institutionalised to avoid the risks of being lost as respective government administrations change over time. There is therefore a dire need for further research on the challenges of institutionalising change in the use of ICT in management of secondary schools to ensure stability in innovative practices.
3) This study embarked on the challenges of using ICT in education administration, however, more studies require to be carried out to assess the involvement of school administrators and teachers in the integration of ICT in secondary school administration.
4) There is need for more studies to be conducted in investigating the role of schools ICT policy guidelines and strategic plans in relation to national ICT policies.
5) There is need for further research to assess the impact of SMIS on the integration of ICT in school administration for national digital cohesion.
6) Information literacy is an intellectual framework for understanding, finding, and evaluating. However, not all information is reliable to the end users from the informediaries as some of it may be misleading, harmful and subject to disclaimer. There is, therefore, a need for further research on the effects of social media and internet on ICT integration in secondary school management

6.7 LIMITATIONS OF THE STUDY

Whereas this study managed to address the research objectives and questions, it is also worth acknowledging some of the limitations encountered. In the first instance, not all schools in Kirinyaga County were investigated since not all of them are currently integrating ICT because it is not made mandatory by the government. The study therefore confined itself only to a sample

population of those principals, HoDs and ICT teachers of those schools that had access to computers and integrating computer studies.

Although there are other areas of ICT integration in a school set up, this study only focused on challenges facing the use of ICT in advancing secondary school administration as the main topic out of the other school areas and not ICT in pedagogy, technical challenges or general use of ICT.

Since literature on ICT integration in secondary schools administration is scarce in Kenya, the literature review was drawn from Kenya and some specific countries of the world. The integration of ICT challenges differs from country to country and region to region. However despite these limitations, the focus for this study was not derailed. The limitations have instead formed part of the basis of recommendations for further research.

6.8 CONCLUDING REMARKS

The secondary school administrators' ability to comprehend and apply basic key skills in ICT is a prerequisite for any meaningful integration of ICT in secondary school administration as they will be able to navigate the various school administrative functions with ease. There is, therefore, a need for government and the KEMI management to seek the best strategies possible to train these administrators on ICT integration in their respective key areas as they form very crucial basis for ICT integration in secondary school administration. This will greatly assist in minimising the challenges of ICT in school administration not only in Kirinyaga County secondary schools but also nationally.

The introduction of any change in an organisational set up disrupts the existing administrative functions in one way or another either progressively or retrogressively. Amid this ambiance, the integration of ICT in a school's organisational set-up is a relatively new phenomenon that requires to be infused gradually within the existing framework of learning and the administrative schedules. Change in the use of ICT will require to be ushered in the school administration by some strong forces of continuity for it to have strong orientation and a long lasting foundation.

Various approaches to change management in the use of ICT in educational management will require to be clearly spelt out and must not only be flexible but also responsive to particular school circumstances for customisation and adoption.

No matter how good and innovative a policy or an idea may sound, it requires vibrancy for effective communication in its marketing, convictions, persuasion and will power boost for end users. Otherwise it remains just but wishful thinking hibernating in the minds of potential executers. To get maximum value from any ICT technological innovations in education management matters, there has to be a shift in attitude, mind-set and skill-sets that are adaptive to change much as the strategies for ICT literacy are developed for education institutions.

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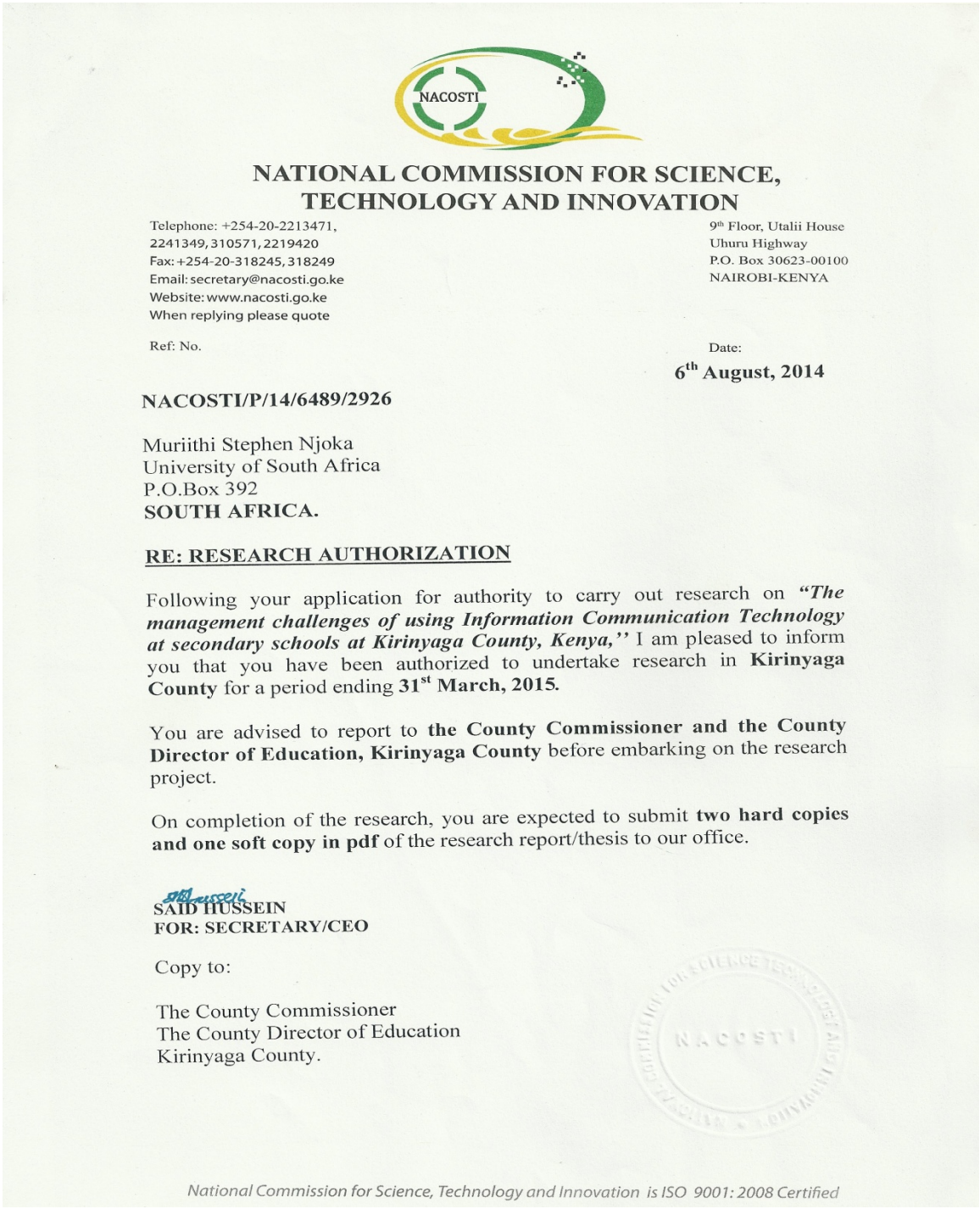
APPENDICES

APPENDIX A1: RESEARCH AUTHORIZATION LETTER FROM THE NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY



NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471, 2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No.

Date:
6th August, 2014

NACOSTI/P/14/6489/2926

Muriithi Stephen Njoka
University of South Africa
P.O.Box 392
SOUTH AFRICA.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"The management challenges of using Information Communication Technology at secondary schools at Kirinyaga County, Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Kirinyaga County** for a period ending **31st March, 2015.**

You are advised to report to **the County Commissioner and the County Director of Education, Kirinyaga County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

SAID HUSSEIN
FOR: SECRETARY/CEO

Copy to:

The County Commissioner
The County Director of Education
Kirinyaga County.

National Commission for Science, Technology and Innovation is ISO 9001: 2008 Certified

APPENDIX A2: RESEARCH AUTHORIZATION LETTER FROM KIRINYAGA COUNTY DIRECTOR OF EDUCATION

MINISTRY OF EDUCATION, SCIENCE & TECHNOLOGY
STATE DEPARTMENT OF EDUCATION

Telephone: 060-21835/0202641217
Email kirinyagacde@gmail.com
When replying please quote
Ref. No. and date

COUNTY DIRECTOR OF EDUCATION
KIRINYAGA COUNTY
P. O. BOX 96
KERUGOYA

MOE/CDE/KRG/GEN/09/85/29

7TH AUGUST 2014

To All Secondary Schools Principals
KIRINYAGA COUNTY

RE: RESEARCH AUTHORIZATION – MURIITHI STEPHEN NJOKA

The above named person who is pursuing his PHD Programme at UNISA, has been authorized to carry out research on "The Management challenges of using Information Communication Technology at Secondary Schools in Kirinyaga County, Kenya".

Please accord him the necessary assistance.

COUNTY DIRECTOR OF EDUCATION
07 AUG 2014
KIRINYAGA

S. N. MAINA
FOR: COUNTY DIRECTOR OF EDUCATION
KIRINYAGA

Vision: To have a globally competitive quality Education, Training and Research for Kenyans sustainable development.

APPENDIX B: LETTER OF REQUEST TO CONDUCT RESEARCH FOR SCHOOL PRINCIPAL

To the
Principal .....
Address .....

Dear Sir/Madam,

REF: <u>RESEARCH PERMISSION</u>

I Muriithi Stephen Njoka am a registered student with University of South Africa (UNISA) in Doctor of Education - DEd (Education Management). I am currently in the process of completing my Dissertation entitled: *The Management Challenges of using Information Communication Technology at secondary schools at Kirinyaga County, Kenya.*

Your school is one of those selected purposively to take part in this study. I do here by seek your request for permission to undertake this exercise in your school. You are requested to voluntarily fill in questionnaire1, 2 Heads of Department to fill in questionnaire 2 and 1 computer teacher to fill questionnaire 3 respectively I also request you and the computer teacher for a brief interview and permission to make some few observations of the school in relation to this study. The focus of the study will be based on the acceptable study norms. Data collected will be treated with all confidentiality protocols for academic purpose of this study only.

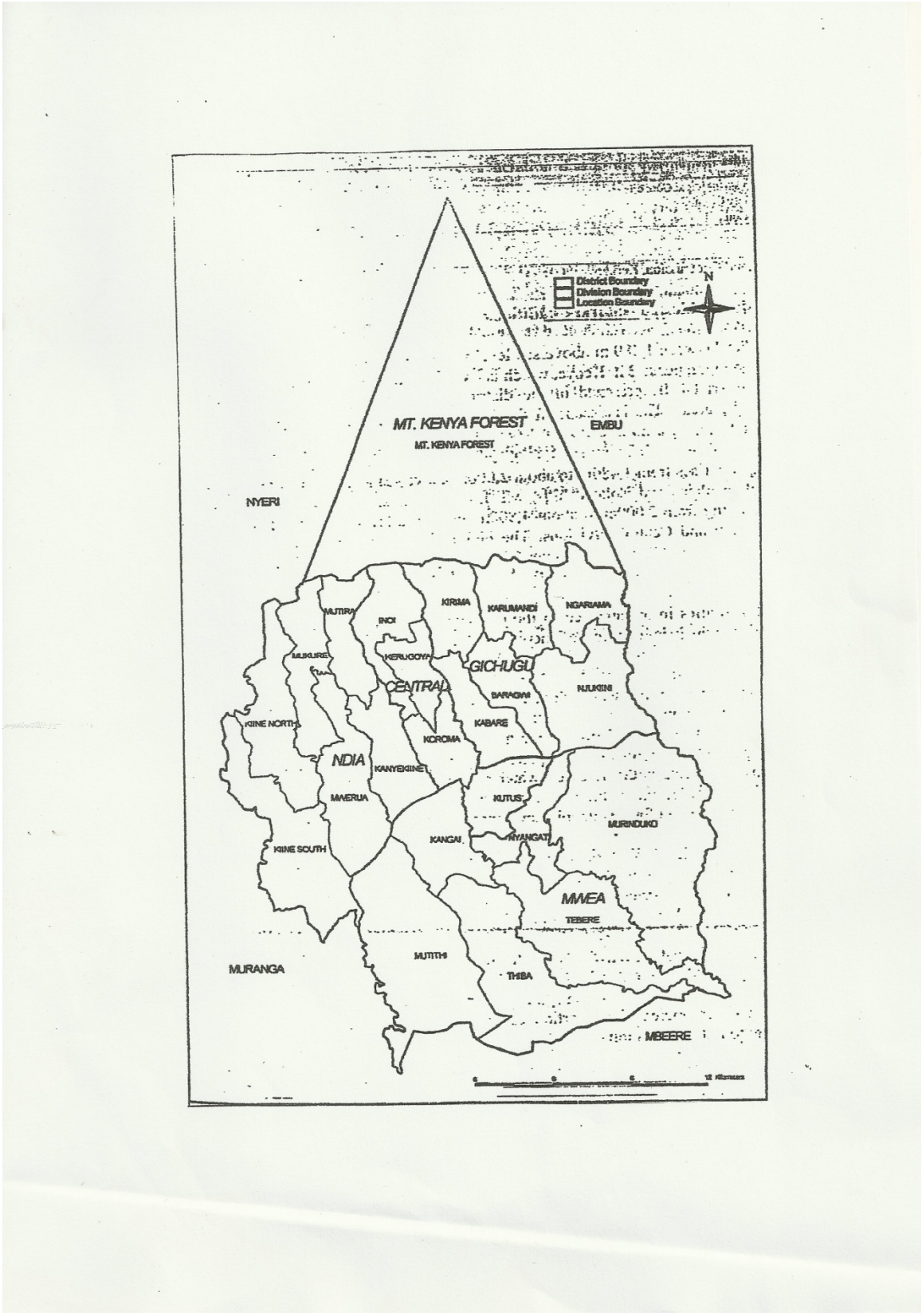
Thanking you in advance for your support,

Regards,

Muriithi Stephen Njoka
Student number: 4912-928-7
Telephone No.+254722996559
E-mail. muriithistep@yahoo.com

Date .....

APPENDIX C: MAP OF KIRINYAGA COUNTY



APPENDIX D1: QUESTIONNAIRE 1 FOR SCHOOL PRINCIPAL

This questionnaire is a part of a research study that intends to investigate the challenges of using Information and Communication Technology (ICT) in secondary schools in Kirinyaga county of Kenya. The main purpose is to investigate the challenges of using ICT in the administration of secondary schools in order to find the potential of integrating it in secondary school administration for effective and efficient service delivery. Feel free as you respond to the various items with utmost sincerity. Please note that your views and opinions in this exercise will be treated with all due confidentiality for the purpose of this study. Your cooperation is highly appreciated.

Part 1

This section intends to find some important details about you. Answer by putting a tick on the applicable number.

1. Category of your school :	Boys Secondary	1
	Girls Secondary	2
	Mixed Secondary	3
2. Your Gender:	Male	1
	Female	2
3. Age bracket	21 – 30 Years	1
	31 – 40 Years	2
	41 – 50 Years	3
	51 – 60 Years	4
4. Highest Professional Qualifications	Certificate	1
	Diploma	2
	Degree	3
	Masters	4
5. Period of service as Principal	1 Year and below	1
	2 Years	2
	3 Years	3
	4 Years and over	4
6. Highest ICT level training	Not trained at all	1
	Informal training	2
	Certificate Level	3
	Diploma level	4
	Degree level	5
7. Attendance of ICT integration Course in Education Management	Yes	1
	No	2

8. Experience in the use of ICT in Education Management	Not trained at all	1
	1 Year and below	2
	1 – 2 Years	3
	2 – 3 Years	4
	3 Years and over	5

Part 2

9. Do you have the following basic ICT Key competencies? Indicate Your level of agreement by ticking the appropriate corresponding scale.
   1 = Strongly Disagree (SD), 3 = Not sure (NS), 5 = Strongly Agree (SA)
   2 = Disagree (D) 4 = Agree (A)

Key competency	**SD**	**D**	**NS**	**A**	**SA**
ICT Knowledge	**1**	**2**	**3**	**4**	**5**
ICT Skills	**1**	**2**	**3**	**4**	**5**
ICT Access	**1**	**2**	**3**	**4**	**5**
ICT Application	**1**	**2**	**3**	**4**	**5**
Monitoring and Evaluation of ICT Literacy	**1**	**2**	**3**	**4**	**5**
Evaluation of ICT Literacy	**1**	**2**	**3**	**4**	**5**

10. Indicate whether your school has got access to the following Administrative policy documents by putting a tick on the applicable number. 1 = N0 2 = Yes

Administrative Policy Document	**No**	**Yes**
School strategic plan	**1**	**2**
School ICT Policy Guide lines	**1**	**2**
National ICT policy of 2006	**1**	**2**
Donor Policy Guidelines on ICT	**1**	**2**
MoEST Strategic Plan 2006 - 2011	**1**	**2**
Sessional Paper N0. 1of 2005	**1**	**2**
Kenya Vision 2030	**1**	**2**

11. Does your schools adhere to these administrative policy documents in relation to ICT integration in School administration? Indicate your level of agreement by ticking the appropriate corresponding scale. 1 = Strongly Disagree (SD), 2 = Disagree (D)
    3 = Not sure (NS), 4 = Agree (A) 5 = Strongly Agree (SA)

Administrative policy Documents	**SD**	**D**	**NS**	**A**	**SA**
School strategic plan	**1**	**2**	**3**	**4**	**5**
School ICT Policy Guide lines	**1**	**2**	**3**	**4**	**5**
National ICT policy of 2006	**1**	**2**	**3**	**4**	**5**
Donor Policy Guidelines on ICT	**1**	**2**	**3**	**4**	**5**
MoEST Strategic Plan 2006 - 2011	**1**	**2**	**3**	**4**	**5**
Sessional Paper N0. 1of 2005	**1**	**2**	**3**	**4**	**5**
Kenya Vision 2030					

12. Does the government policy define well the roles and responsibilities of the following education actors; Indicate your level of agreement by ticking the appropriate corresponding scale.
1 = Strongly Disagree (SD), 3 = Not sure (NS), 5 = Strongly Agree (SA)
2 = Disagree (D) 4 = Agree (A)

Education Actor	**SD**	**D**	**NS**	**A**	**SA**
Policy makers	**1**	**2**	**3**	**4**	**5**
Administrators	**1**	**2**	**3**	**4**	**5**
Teachers	**1**	**2**	**3**	**4**	**5**
Students	**1**	**2**	**3**	**4**	**5**
Funding Agencies	**1**	**2**	**3**	**4**	**5**
Development organisations	**1**	**2**	**3**	**4**	**5**
Civil Society					

13. Is the government ICT policy and guidelines elaborate on the following key ICT integration priorities? Indicate your level of agreement by ticking the appropriate corresponding scale.
1 = Strongly Disagree (SD), 3 = Not sure (NS), 5 = Strongly Agree (SA)
2 = Disagree (D) 4 = Agree (A)

Key ICT integration priority	**SD**	**D**	**NS**	**A**	**SA**
Developing the use of video technology In pedagogy and school administration	**1**	**2**	**3**	**4**	**5**
Equipping teaching and administrative areas in schools with ICT	**1**	**2**	**3**	**4**	**5**
Training of school administrators on the use of ICT in Education management	**1**	**2**	**3**	**4**	**5**
Developing further the virtual learning environment(VLE) for school administrators	**1**	**2**	**3**	**4**	**5**

14. Have the following key stake holders been involved in the national ICT policy Formulation from the onset? Indicate your level of agreement by ticking the appropriate corresponding scale.
1 = Strongly Disagree (SD), 3 = Not sure (NS), 5 = Strongly Agree (SA)
2 = Disagree (D) 4 = Agree (A)

Key Stake Holder	**SD**	**D**	**NS**	**A**	**SA**
Administrators	**1**	**2**	**3**	**4**	**5**
Teachers	**1**	**2**	**3**	**4**	**5**
Students	**1**	**2**	**3**	**4**	**5**
Funding agencies	**1**	**2**	**3**	**4**	**5**
Development Organizations/Partners	**1**	**2**	**3**	**4**	**5**
Civil society	**1**	**2**	**3**	**4**	**5**

15. How would you rate the following school staff in ICT policy change resistance;
Please tick the appropriate corresponding scale.
1 = Very low (VL), 3 = Not sure (NS), 5 = High (H)
2 = Low (L) 4 = Moderate (M)

School Staff	**VL**	**L**	**NS**	**M**	**H**
Heads of Department	**1**	**2**	**3**	**4**	**5**
Teachers	**1**	**2**	**3**	**4**	**5**
School secretary	**1**	**2**	**3**	**4**	**5**
Accounts clerk/ Bursar	**1**	**2**	**3**	**4**	**5**

16. How would rate your school adhere to the government ICT policy on the following competences? Indicate your level of agreement by ticking the appropriate corresponding scale.
1 = Very low (VL), 3 = Not sure (NS), 5 = High (H)
2 = Low (L) 4 = Moderate (M)

Key ICT integration competencies	**SD**	**D**	**NS**	**A**	**SA**
Dynamism	**1**	**2**	**3**	**4**	**5**
Cost-efficiency	**1**	**2**	**3**	**4**	**5**
Adaptability	**1**	**2**	**3**	**4**	**5**
Comprehension	**1**	**2**	**3**	**4**	**5**
Training administrators on ICT integration in education management	**1**	**2**	**3**	**4**	**5**
Training of teachers on ICT in pedagogy	**1**	**2**	**3**	**4**	**5**

17. Does your school adhere to the government ICT policy regulatory frame work in line to National ICT policies along the following strategies? Indicate your level of agreement by ticking the appropriate corresponding scale.
1 = Strongly Disagree (SD), 3 = Not sure (NS), 5 = Strongly Agree (SA)
2 = Disagree (D) 4 = Agree (A)

Key ICT Integration Strategy	**SD**	**D**	**NS**	**A**	**SA**
Defining clearly the role and responsibilities of all heads of department	**1**	**2**	**3**	**4**	**5**
Transforming education policy into actions	**1**	**2**	**3**	**4**	**5**
Filtering of undesirable website from the internet	**1**	**2**	**3**	**4**	**5**
Educating students on the use of the internet	**1**	**2**	**3**	**4**	**5**
Improving ICT access and equity to narrow the digital divide	**1**	**2**	**3**	**4**	**5**
Adhering to ICT integration plan road map	**1**	**2**	**3**	**4**	**5**

18. How would you rate your school ICT policy implementation on the following key ICT integration approaches; Please tick the appropriate corresponding scale.

1 = Very low (VL), 3 = Not sure (NS), 5 = High (H)
2 = Low (L) 4 = Moderate (M)

Key ICT Integration Approach	VL	L	NS	M	H
Setting vision that can be easily translated to action	**1**	**2**	**3**	**4**	**5**
Monitoring ICT integration in education administration	**1**	**2**	**3**	**4**	**5**
Evaluation ICT integration in education administration	**1**	**2**	**3**	**4**	**5**
Use of motivation to overcome ICT change resistance	**1**	**2**	**3**	**4**	**5**

19. What do you think would be the projected impact of ICT use in secondary school administration?

APPENDIX D2: QUESTIONNAIRE 2 FOR THE HEADS OF DEPARTMENT

This questionnaire is a part of a research study that intends to investigate the challenges of using Information and Communication Technology (ICT) in secondary schools in Kirinyaga county of Kenya. The main purpose is to investigate the challenges of using ICT in the administration of secondary schools in order to find the potential of integrating it in secondary school administration for effective and efficient service delivery. Feel free as you respond to the various items with utmost sincerity. Please note that your views and opinions in this exercise will be treated with all due confidentiality for the purpose of this study. Your cooperation is highly appreciated.

Part 1

This section intends to find some important details about you. Answer by putting a tick on the applicable number.

1. Your Gender:	Male	1
	Female	2
2. Age bracket	21 – 30 Years	1
	31 – 40 Years	2
	41 – 50 Years	3
	51 – 60 Years	4
3. Highest Professional Qualifications	Certificate	1
	Diploma	2
	Degree	3
	Masters	4
4. Period of service as HoD	1 Year and below	1
	2 Years	2
	3 Years	3
	4 Years and over	4
5. Highest ICT level training	Not trained at all	1
	Informal training	2
	Certificate Level	3
	Diploma level	4
	Degree level	4
6. Attendance of ICT integration Course in Education Management	Yes	1
	No	2

7. Experience in the use of ICT in Performing school tasks	Not at all	1
	1 Year and below	2
	1 – 2 Years	3
	2 – 3 Years	4
	3 Years and over	5

Part 2

8. Indicate whether your school has got access to the following ICT facilities by putting a tick on the applicable number. 1 = N0 2 = Yes

ICT Facility	**No**	**Yes**
Computer Lab/Room	**1**	**2**
Electricity	**1**	**2**
Server	**1**	**2**
Intranet & Extranet / Infrastructural net work	**1**	**2**
Internet	**1**	**2**
Router	**1**	**2**
Wi-Fi connections	**1**	**2**
Printers	**1**	**2**
Photocopiers	**1**	**2**
Scanners	**1**	**2**
Fax	**1**	**2**
Projector	**1**	**2**
Web camera	**1**	**2**
Surveillance cameras	**1**	**2**
Word processing	**1**	**2**
Power point	**1**	**2**
Databases	**1**	**2**
Spread sheets	**1**	**2**
School information software	**1**	**2**
Operating manuals for computers & other ICT Peripherals /Equipments	**1**	**2**

10. Do ICT Equipments and Infrastructure in your school under-go annual routine servicing apart
From when they have broken down? Please tick the appropriate corresponding scale.
1 = Strongly Disagree (SD), 3 = Not sure (NS), 5 = Strongly Agree (SA)
2 = Disagree (D) 4 = Agree (A)

11. Who is the person in charge of servicing and maintenance of ICT equipments and infrastructure in your school? Indicate your level of agreement by ticking the appropriate corresponding scale.
1 = Strongly Disagree (SD), 3 = Not sure (NS), 5 = Strongly Agree (SA)
2 = Disagree (D) 4 = Agree (A)

Person in charge of servicing and maintenance of ICT equipments	**SD**	**D**	**NS**	**A**	**SA**
Computer Teacher	**1**	**2**	**3**	**4**	**5**
IT Expert from a private firm	**1**	**2**	**3**	**4**	**5**
Computer Teacher & IT Expert from a private firm	**1**	**2**	**3**	**4**	**5**
IT Student on internship from local colleges	**1**	**2**	**3**	**4**	**5**
No one at all	**1**	**2**	**3**	**4**	**5**

12. Who are the financiers of the ICT infrastructure in your school? Please tick the appropriate corresponding scale. 1 = Strongly Disagree (SD), 2 = Disagree (D)
3 = Not sure (NS), 4 = Agree (A)
5 = Strongly Agree (SA)

Financier	**SD**	**D**	**NS**	**A**	**SA**
Parents	**1**	**2**	**3**	**4**	**5**
Government	**1**	**2**	**3**	**4**	**5**
Private firm	**1**	**2**	**3**	**4**	**5**
Parents & Government	**1**	**2**	**3**	**4**	**5**
Parents & Private firm	**1**	**2**	**3**	**4**	**5**
Parents, Government & Private firm	**1**	**2**	**3**	**4**	**5**

13. Who are the users of ICT in your school? Please tick the appropriate corresponding scale.

1 = Strongly Disagree (SD), 3 = Not sure (NS), 5 = Strongly Agree (SA)
2 = Disagree (D) 4 = Agree (A)

Major ICT Users	**SD**	**D**	**NS**	**A**	**SA**
Students	**1**	**2**	**3**	**4**	**5**
Teachers	**1**	**2**	**3**	**4**	**5**
Principal	**1**	**2**	**3**	**4**	**5**
Administrative staff	**1**	**2**	**3**	**4**	**5**
Community Members	**1**	**2**	**3**	**4**	**5**

14. How would you rate teachers' key competencies in the following ICT Skills; Please tick the appropriate corresponding scale.

1 = Very low (VL), 3 = Not sure (NS), 5 = High (H)
2 = Low (L) 4 = Moderate (M)

ICT Skill	**VL**	**L**	**NS**	**M**	**H**
Ability to Boot and shut down a computer	**1**	**2**	**3**	**4**	**5**
Ability to manage e-files	**1**	**2**	**3**	**4**	**5**
Ability to use MS Office- Word, Excel, Access	**1**	**2**	**3**	**4**	**5**
Ability to use spreadsheets	**1**	**2**	**3**	**4**	**5**
Ability to use data bases	**1**	**2**	**3**	**4**	**5**
Ability to integrate ICT in pedagogy	**1**	**2**	**3**	**4**	**5**
Ability to integrate ICT in administrative tasks	**1**	**2**	**3**	**4**	**5**
Ability to use the Internet	**1**	**2**	**3**	**4**	**5**
Ability to use power point presentation	**1**	**2**	**3**	**4**	**5**
Ability to use printer	**1**	**2**	**3**	**4**	**5**
Ability to use scanner & Photocopiers	**1**	**2**	**3**	**4**	**5**
Ability to use web camera	**1**	**2**	**3**	**4**	**5**
Ability to open and send e-mails	**1**	**2**	**3**	**4**	**5**
Ability to sensor student content on computers	**1**	**2**	**3**	**4**	**5**

15. How would you rate the following factors in determining ICT literacy acquisition in your school among teachers and key support staff members; Please tick the appropriate corresponding scale.

1 = Very low (VL), 3 = Not sure (NS), 5 = High (H)
2 = Low (L) 4 = Moderate (M)

Determinant	VL	L	NS	M	H
Government policy on ICT	**1**	**2**	**3**	**4**	**5**
School ICT policy	**1**	**2**	**3**	**4**	**5**
Capital	**1**	**2**	**3**	**4**	**5**
ICT infrastructure	**1**	**2**	**3**	**4**	**5**
School practices	**1**	**2**	**3**	**4**	**5**
ICT Education level of teachers	**1**	**2**	**3**	**4**	**5**
Training and technical support of teachers	**1**	**2**	**3**	**4**	**5**
Attitude towards ICT literacy	**1**	**2**	**3**	**4**	**5**
Technology characteristics	**1**	**2**	**3**	**4**	**5**
Age factor	**1**	**2**	**3**	**4**	**5**
Gender factor	**1**	**2**	**3**	**4**	**5**
Knowledge sharing environment	**1**	**2**	**3**	**4**	**5**
Institutional culture	**1**	**2**	**3**	**4**	**5**
Resistance to change	**1**	**2**	**3**	**4**	**5**

16. How would you rate the following forces in influencing ICT integration in the administration of your school;

a) Continuity Forces; Please tick the appropriate corresponding scale.

1 = Very low (VL), 3 = Not sure (NS), 5 = High (H)
2 = Low (L) 4 = Moderate (M)

Continuity Force	VL	L	NS	M	H
Customer base (Wide)					
Technological Capabilities(prior to ICT integration)	**1**	**2**	**3**	**4**	**5**
Existing infrastructure	**1**	**2**	**3**	**4**	**5**
School Core Competences	**1**	**2**	**3**	**4**	**5**
Good performance (without ICT integration)	**1**	**2**	**3**	**4**	**5**
School Culture (results oriented)	**1**	**2**	**3**	**4**	**5**

b) Change Forces; Please tick the appropriate corresponding scale.

1 = Very low (VL), 3 = Not sure (NS), 5 = High (H)
2 = Low (L) 4 = Moderate (M)

Change Force	VL	L	NS	M	H
Globalisation					
New opportunities	**1**	**2**	**3**	**4**	**5**
Competition	**1**	**2**	**3**	**4**	**5**
Customer Needs	**1**	**2**	**3**	**4**	**5**
Government Policy and Legislation	**1**	**2**	**3**	**4**	**5**
Mergers and Acquisitions	**1**	**2**	**3**	**4**	**5**
e-Business	**1**	**2**	**3**	**4**	**5**
New Technology	**1**	**2**	**3**	**4**	**5**

17. Which are the major challenges that you encounter in the use of ICT in school management functions? Please tick the appropriate corresponding scale.

1 = Strongly Disagree (SD), 3 = Not sure (NS), 5 = Strongly Agree (SA)
2 = Disagree (D) 4 = Agree (A)

Major Challenges	SD	D	NS	A	SA
Limited Time	**1**	**2**	**3**	**4**	**5**
Change of Attitude	**1**	**2**	**3**	**4**	**5**
Inadequate Experience	**1**	**2**	**3**	**4**	**5**
Maintenance of ICT Equipments	**1**	**2**	**3**	**4**	**5**
Internet Connectivity	**1**	**2**	**3**	**4**	**5**

18. What do you think would be the projected impact of ICT use in secondary school administration?

APPENDIX D3: QUESTIONNAIRE 3 FOR THE ICT TEACHER

This questionnaire is a part of a research study that intends to investigate the challenges of using Information and Communication Technology (ICT) in secondary schools in Kirinyaga county of Kenya. The main purpose is to investigate the challenges of using ICT in the administration of secondary schools in order to find the potential of integrating it in secondary school administration for effective and efficient service delivery. Feel free as you respond to the various items with utmost sincerity. Please note that your views and opinions in this exercise will be treated with all due confidentiality for the purpose of this study. Your cooperation is highly appreciated.

Part 1

This section intends to find some important details about you. Answer by putting a tick on the applicable number.

1. Your Gender:	Male	1
	Female	2
2. Age bracket	21 – 30 Years	1
	31 – 40 Years	2
	41 – 50 Years	3
	51 – 60 Years	4
3. Highest Professional Qualification	Certificate	1
	Diploma	2
	Degree	3
	Masters	4
4. Period of service as Teacher	1 Year and below	1
	2 Years	2
	3 Years	3
	4 Years and over	4
5. Highest ICT level training	Not trained at all	1
	Informal training	2
	Certificate Level	3
	Diploma level	4
	Degree level	5

6. Attendance of ICT integration Course in Pedagogy	Yes	1
	No	2
7. Experience in the use of ICT in Pedagogy	Not at all	1
	1 Year and below	2
	1 – 2 Years	3
	2 – 3 Years	4
	3 Years and over	5

Part 2

9. Do you have the following ICT Key competencies? Indicate your level of agreement by ticking the appropriate corresponding scale.
   1 = Strongly Disagree (SD), 3 = Not sure (NS), 5 = Strongly Agree (SA)
   2 = Disagree (D) 4 = Agree (A)

Key competency	**SD**	**D**	**NS**	**A**	**SA**
ICT Knowledge	**1**	**2**	**3**	**4**	**5**
ICT Skills	**1**	**2**	**3**	**4**	**5**
ICT Access	**1**	**2**	**3**	**4**	**5**
ICT Application	**1**	**2**	**3**	**4**	**5**

10. How would you rate yourself in the following factors in ICT integration? Please tick the appropriate corresponding scale.
    1 = Very low (VL), 3 = Not sure (NS), 5 = High (H)
    2 = Low (L) 4 = Moderate (M)

Factor	**VL**	**L**	**NS**	**M**	**H**
Resistance to change in ICT integration	**1**	**2**	**3**	**4**	**5**
Change Preparedness in ICT integration	**1**	**2**	**3**	**4**	**5**
Your attitude toward ICT integration	**1**	**2**	**3**	**4**	**5**
Approach towards ICT integration	**1**	**2**	**3**	**4**	**5**
Frequency in undergoing ICT integration course per year	**1**	**2**	**3**	**4**	**5**
Motivation level in ICT integration	**1**	**2**	**3**	**4**	**5**
Commitment level toward ICT integration	**1**	**2**	**3**	**4**	**5**

11. How would you rate school leadership along the following administrative functions in facilitating ICT integration? Please tick the appropriate corresponding scale.
    1 = Very low (VL), 3 = Not sure (NS), 5 = High (H)
    2 = Low (L) 4 = Moderate (M)

Criteria	VL	L	NS	M	H
Building school vision	**1**	**2**	**3**	**4**	**5**
Establishing school goals	**1**	**2**	**3**	**4**	**5**
Providing intellectual stimulation	**1**	**2**	**3**	**4**	**5**
Offering individual support	**1**	**2**	**3**	**4**	**5**
Modelling best practices & important organisational values	**1**	**2**	**3**	**4**	**5**
Creating a productive school culture	**1**	**2**	**3**	**4**	**5**
Developing structure to foster participation in decision making	**1**	**2**	**3**	**4**	**5**

12. How would you rate the school leadership in ICT integration along the following administrative structures? Please tick the appropriate corresponding scale.
    1 = Very low (VL), 3 = Not sure (NS), 5 = High (H)
    2 = Low (L) 4 = Moderate (M)

Administrative structure	VL	L	NS	M	H
Financial management	**1**	**2**	**3**	**4**	**5**
Setting directions	**1**	**2**	**3**	**4**	**5**
Developing staff	**1**	**2**	**3**	**4**	**5**
Principal agency	**1**	**2**	**3**	**4**	**5**
Building collaboration	**1**	**2**	**3**	**4**	**5**

13. What do you think would be the projected impact of ICT use in secondary school administration?

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14. Briefly explain the best motivational strategies the school leadership can address to effectively and efficiently Integrate ICT in education.

APPENDIX D4: INTERVIEW SCHEDULE 1 FOR SECONDARY SCHOOL PRINCIPAL

1. How do you perceive of ICT introduction in secondary school administration?

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2. What is your feeling concerning ICT integration preparedness in your school?

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3. How do you deal with staff laxity and resistance to change in the use of ICT?

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4. Do you feel the need for you to be ICT literate?

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5. Do you feel your own experience with ICT has any contribution in its integration in your school?

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6. Which ICT skills do you think are the most fundamental for the principal in school administration?

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7. What do you believe are the most important benefits of ICT in Education Administration?

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APPENDIX D 5: INTERVIEW SCHEDULE 2 FOR THE ICT TEACHER

1. How prepared are you in performing administrative tasks using ICT?

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2. Which ICT skills do you think are the most fundamental for school administrators?

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3. What are your expectations of your school management in facilitating the integration of ICT in administrative functions?

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4. Do you perceive yourself to play any key role in the ICT integration in your school administration?

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5. How would you like your school management to effectively facilitate you in the integration of ICT in the school administrative functions

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APPENDIX D6: OBSERVATION SCHEDULE FOR SCHOOL

1. **Category of School**
   a) Boys Secondary School.....
   b) Girls Secondary School.....
   c) Mixed Day Secondary.....

2. Administrative Documents
   a) School Strategic Plan
   b) School ICT Policy Guidelines
   c) Donor Policy Guidelines on ICT
   d) National ICT Policy of 2006
   e) Ministry of Education Science and Technology Strategic Plan (2006-2011)
   f) Sessional Paper N0.1 of 2005
   g) Kenya Vision 2030

3. Does the school have the following facilities to enhance ICT integration?

ICT Facility	No	Yes
a) Security Details	**1**	**2**
b) Computer Lab/Room	**1**	**2**
c) Electricity	**1**	**2**
d) Server	**1**	**2**
e) Intranet & Extranet / Infrastructural net work	**1**	**2**
f) Internet	**1**	**2**
g) Router	**1**	**2**
h) Wi-Fi connections	**1**	**2**
i) Printers	**1**	**2**
j) Photocopiers	**1**	**2**
k) Scanners	**1**	**2**
l) Fax	**1**	**2**
m) Projector	**1**	**2**
n) Web camera	**1**	**2**
o) Surveillance cameras	**1**	**2**
p) Word processing	**1**	**2**
q) Power point	**1**	**2**
r) Databases	**1**	**2**
s) Spread sheets	**1**	**2**
t) School information software	**1**	**2**
u) Operating manuals for computers & other ICT Peripherals /Equipments	**1**	**2**