DETERMINANTS OF INFORMATION AND COMMUNICATION TECHNOLOGY USAGE IN SECONDARY SCHOOLS IN GATUNDU DISTRICT, IN KIAMBU COUNTY IN KENYA.

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DECLARATION

This research project is my original work and has not been presented for a degree in any other university or for any other award.

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MOURICE KAGWE N (D53/CE/22170/2010)   DATE

This project has been submitted for review with my approval as university supervisor.

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ACKNOWLEDGEMENT

DEDICATION

I wish to dedicate this research project to my dear wife Mary, my two sons Kym and Dylan for the much support they have accorded me throughout my studies.

ABSTRACT

The purpose of this case study was to investigate the determinants of ICT usage in schools in Gatundu District. It focused on different categories of secondary schools in the district. This research is expected to aid schools evaluate their ICT usage strategies and make any necessary adjustments, since it was observed that over 50% of schools have a ratio of one computer to over 60 students, while the teacher computer literacy level stood at 46%. Even when the stakeholders undertake noble ICT projects in schools, it does not guarantee proper utilization by the beneficiaries. Some commentators claim that ICT is still underused in classrooms (for example, Cuban, 2001; Fuller, 2000; Loveless). The mere presence of ICT equipment and resources in schools does not necessarily ensure an appropriate application of ICT in classrooms (Dede, 2000). This study is also meant to benefit the government, sponsors and other interested stakeholders. The study adopted a logical approach used in research, using purposive judgmental sampling method. The sample frame being all ICT coordinators and teachers from all the school that were interviewed. Uma Sekeran (2004) writes that within this method, "the researcher chooses the subject who are most advantageously placed or in the best position to provide the information required" (2004:277). The target population is all the 60 schools in Gatundu district i.e. the only private school (St. John's Gakoe), all 6 provincial and all the 53 district schools in the district. Descriptive statistics will be used to analyze quantitative data and investigate the relationship between variables. The data will be collected through self-administered questionnaire and oral interviews.

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ABBREVIATION AND ACRONYMS

CBI   Computer-Based instruction

ESP   Economic Stimulus Program

G.O.K   Government of Kenya

ICT   Information and Communication Technology

IT   Information Technology

KIE   Kenya Institute of Education

NGO   Non-Governmental Organization

SITES   Second Technology in Education Study

CMC   Computer-Mediated Communication

M.O.E.   Ministry Of Education

UPS   Uninterrupted power supply

DEFINITION OF OPERATIONAL TERMS

Information and Communication Technology (ICT): this is commonly defined in education as a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. These technologies include computers, the internet, broadcasting technologies (radio and television), and others that use the telephone systems (Blurton 2004, quoted in Ministry of Education Manual).

Computer: this is a device that accepts, manipulates and processes information following a sequence of instructions.

Computer-Mediated Communication (CMC): this is when people communicate with each other via the Internet.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter explains the purpose of the research and is divided into the following sub-sections: background to the study, statement of the problem, research questions, research objectives, and research assumptions, rationale of the study, scope and limitations of the study.

1.1   Background of the Study

The government of Kenya, NGOs and the private sector have all had great interest in the development and use of ICT in the education institutions. There is general consensus that modern ICT is transforming varied spheres of human life especially teaching and learning (World Bank, 2004). In cognizance of the critical opportunities the ICT affords this country in terms of service delivery as well as teaching and learning, the G.O.K has invested heavily in the necessary infrastructure. These include and not limited to the laying of the fibre optic cable across the country, facilitating the growth of the telecommunication industry, provision of computers and related accessories to schools among others. One of the most noteworthy projects, being the one carried out through the Economic Stimulus Program (ESP), whose aim is to equip 1050 schools with ICT infrastructure as well as training of educators in ICT integration (Ministry of Education 2011).

The private sector and NGOs have over the years played an important role in ICT projects geared towards assisting public schools, a case in points being the 'CLICK' Project, initiated in the year 2004, whereby teachers selected from various disadvantaged schools across the country were trained in computer skills and each given a computer upon the completion of the training.
There are also many schools' and parents' sponsored initiatives hence necessity to audit the usage and performance of these projects. Much research has been carried out especially in the

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developed world, but admittedly, the circumstances in the developed world are different from those of the developing countries (Cullen 2003).

1.1.1   Economic Stimulus Program - ICT Projects in Gatundu District

Gatundu District has two constituencies of the 210 constituencies in Kenya that are benefitting from the Shillings 1.3 billion, provided by the G.O.K to equip the schools with the ICT facilities. This is being carried out under the Economic Stimulus Program. The objectives of the ESP – ICT projects are: To develop a cost-effective model for equipping education institutions with ICT facilities for use in teaching and learning; develop and implement a comprehensive capacity building program including teacher professional training and development; supply digital materials to schools for use in teaching and learning through the K.I.E as well as facilitate the establishment of a National Education Portal for sharing of digital content and enhance collaboration. The program is meant to supply the selected schools with the following ICT infrastructure: Computers, Laptops, UPS, printer, LCD projector, networking (local area network - LAN) and internet facility for accessing education portal among others (Ministry of Education 2011). This therefore is a major project that will change the state of ICT in schools in Kenya.

1.2 Statement of the Problem

The importance of ICT in schools cannot be over emphasized. The vision of the Ministry of Education (M.O.E) is stated in its National ICT policy of 2006 as follows: "To facilitate ICT as a universal tool for education and training. In order to achieve this vision every educational institution, teacher, learner and the respective community should be equipped with appropriate ICT infrastructure, competencies and policies for usage and progress. It calls for recognition of the fact that ICT provides capabilities and skills needed for a knowledge-based economy. It also calls for transforming teaching and learning to incorporate new pedagogies that are appropriate for the 21st century". It further states: "The M.O.E's mission is to facilitate effective use of ICT to improve access, learning and administration in delivery education programmes and services. The principal objective will be to integrate ICT in the delivery of education and training

curricula". This highlights the various independent variables namely; ICT infrastructures, Policy support, Individual characteristics and the dependent variable i.e. ICT adoption.

Research reveals that computer based instructions (CBI) while used hand in hand with the traditional teaching methods, can greatly improve education standards. Capper and Copple (1985) indicate that the single best-supported finding in research literature is that the use of CBI as a supplement to traditional methods produces results superior to those obtained in traditional methods alone. Analysis of private institute of learning reveals that they have over the years utilized the ICT, with immense benefits accruing from it. On the other hand, even when the stakeholders undertake such noble ICT projects in public schools, it does not guarantee proper utilization by the beneficiaries. Some commentators claim that ICT is still underused in classrooms (Cuban, 2001). The mere presence of ICT equipment and resources in schools does not necessarily ensure an appropriate application of ICT in classrooms (Dede, 2000). This is an undesirable situation since such investment is expensive and would have improved the students performance had it been utilized. This brings us to the question under investigation, namely, the state of ICT in schools in Gatundu District.

1.3 Research Objectives

1.3.1 General Objectives

The general objective of the study is to investigate the determinants of ICT usage in all secondary schools in Gatundu District.

1.3.2 Specific Objectives

The researcher was guided by the following specific objectives:

  i) To determine the impact of teachers' individual characteristics on ICT usage in selected secondary schools in Gatundu District.
  ii) To establish the effect of ICT infrastructure on ICT usage in schools in Gatundu District.

iii)   To establish the effect of availability and reliability of electricity on ICT usage in Gatundu District.

1.4   Research Questions

This research sought answers to the following questions among others:

i)   How do teachers' individual characteristics such as training in ICT affect its successful adoption?

ii)   How does the availability of funds for purchase and maintenance of ICT infrastructure in schools affect its usage?

iii)   To what extent does the availability and reliability of electricity affect the usage of ICT projects in schools in Gatundu District?

1.5   Significance of the study

This study will help the policy makers in education appreciate the importance of ICT usage in schools. It will further help them to identify factors affecting the usage of ICT in schools, aiding them overcome any possible bottlenecks in its successful utilization. This research is expected to add to the body of knowledge in this field.

1.6   Scope of the Study

This study focused on all categories of schools in Gatundu District in Kiambu county namely, National, Private, provincial and district schools. It will undertake to gather information from teachers (ICT coordinators) and other ICT stakeholders.

1.7   Limitations of the study

Not much research has been done on ICT usage in Gatundu District. Most related data is from other districts and counties (Ministry of education, D.E.Os office – Gatundu). This data from other sources together with thorough research based on schools in the district will help overcome this limitation.

1.8   Assumptions of the study

This study assumed the following:

i)   The state of ICT variables remained constant over the duration of the study.

ii)   That the respondents were truthful and honest.

iii)   The state of ICT in the sampled schools is representative of other schools in the district.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter covers the Theoretical literature, Empirical literature and Conceptual framework.

2.2 Theoretical Literature

It is worth mentioning that ICT has and is expected to continue to play an immense role in all aspects of human advancement. The G.O. K, NGOs and the private sector have been using ICT, for instance the G.O.K jobs on the web sites and e-government. ICT is expected to be the next frontier hoped to provide employment to the youths and school leavers, since most of the natural resources-based engagements e.g. farming cannot match the huge numbers of young people graduating from schools. This makes government's proposed investment such as the much touted ICT-Konza city in Machakos, (groundbreaking done on 23rd January 2013) such a brilliant idea. Therefore, although this research study is under the Business Administration course, it is vital to look at the role of ICT in education since the schools provide manpower for the businesses and industries. This study focused on the theory of Diffusion of Innovations (Rogers, 2003) and traditionalist versus constructivist theories. First, the research discusses theory of Diffusion of Innovations, then traditionalist versus constructivist theories focusing on the role of the teacher, how learning occurs, as well as what software is often used in these two contrasting classroom practices.

2.2.1 Diffusion of Innovation

According to Rogers, diffusion research centers on the conditions, which increase or decrease the likelihood that members of a given culture will adopt a new idea, product, or practice. Hence, people's attitude toward a new technology is a key element in its diffusion. Roger's Innovation Decision Process theory states that innovation diffusion is a process that occurs over time through five stages: knowledge, persuasion, decision, usage and confirmation. Accordingly, the

innovation-decision process is the process through which an individual or other decision-making unit passes (i) from first knowledge of an innovation; (ii) to forming an attitude toward the innovation; (iii) to a decision to adopt or reject; (iv) on to usage of the new idea; and (v) finally to confirmation of this decision. (Rogers, 2003, p. 161) Studies have mainly focused on the first two stages of innovation decision process, that is, on knowledge of an innovation and attitudes towards it. This study will attempt to move further to the next three stages.

Rogers' (2003) theory of diffusion of innovation predicts that media as well as interpersonal contacts provide information and influence opinion and judgment. He argued that innovation occurrence consists of four stages: invention, diffusion or communication through the social system, time and consequences. The information is transmitted through networks, which are greatly dictated by opinion leaders hence they determine the likelihood that the innovation will be adopted. Innovation diffusion research has attempted to explain the variables that influence how and why users adopt a new information medium, such as the Internet. Opinion leaders exert influence on audience behavior through their personal contact, and through change agents. The five adopter categories are: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. These categories follow a standard normal curve; very few innovators adopt the innovation in the beginning (2.5%), early adopters making up for 13.5% a short time later, the early majority 34%, the late majority 34%, and after some time, finally the laggards make up for 16%. There are indications that teachers proceed to adopt ICTs in stages. Wells and Anderson (1995; cited in Myhre, 1998) report that teachers initially focus on their own interaction with the new medium, and as they gradually become comfortable with the technology they start deliberating upon potential learning benefits that would result from its use.

2.2.2 The Traditionalist Approach

The role that the teacher plays in transforming learning and teaching in the classroom cannot be over-emphasized. Two primary approaches to teaching in the classroom, the traditionalist approach and the constructivist approach, derive from teachers' beliefs and theories of what learning and teaching constitutes (Cloke and Sharif, 2001). The traditionalist approach to

learning sees the role of the teacher as central in the teaching process. In this view the teacher is the most knowledgeable person in the class and is the sole transmitter of knowledge. On the other hand, the learner, who is less knowledgeable, is the passive receiver of knowledge. Schömmer (cited in Howard, McGee, Schwartz and Purcell 2000, 455-456) sees the traditional teacher as someone who: generally believes that knowledge: (i) resides in authorities and is thus unchanging, (ii) concepts are learned quickly or not at all, (iii) learning ability is innate, and (iv) knowledge is simple, clear, and specific.

Pachler. N. (2000) illustrates the learning process that takes place in a traditionalist environment in the ICT classroom: In ICT terms, applications in the behaviourist tradition tend to follow an instructional pattern. Learning is broken down into a sequential series of small steps, each covering a piece of the subject domain or a particular skill. According to Alessi and Trollip's (2001:6-10), a successful instructional model has the following phases: presenting information (instructor-centred phase whereby he carries out the task first in order for the student to repeat the exact steps), guiding the learner (hybrid instructor-student-centered, whereby the student performs the instruction according to the instructor's example) and final phase which allows the learner to practice without much teacher's intervention and eventually assesses them. This model has a linear progression, moving systematically from a starting to an ending point, hence, it is behaviouristic in nature. Alessi and Trollip (2001) recommend that this model is also suitable for CBI. The teacher remains the transmitter of knowledge, since before adoption, he scrutinizes computer software such as the much hyped 'Smart Learner e-learning software' for teaching Mathematics and sciences, which was recently sourced from U.S.A but tailored to match local curriculum and is currently being debated by teachers. (The Sunday Nation, 10th February 2013).

2.2.3 The constructivist approach

The constructivist approach contrasts with the traditional approach. Constructivists hold that technology can help the students learn by allowing them to constructs knowledge and emphasizes inquiry, decision-making, problem-solving, critical thinking and reflection (Ivers, 2007). In other words, "knowledge is constructed in the mind of the learner" (Bodner et al., 2002). The role of the teacher is to facilitate the learning process. This means that the teacher

arranges the conditions in which learning is to take place, and acts in a supportive role towards the learner (Kennewell, 2004). The learner is not a passive receptor of information but an active participant in the construction of knowledge (Hokanson et al., 2000) Constructivist theory encourages integration of computer as a cognitive tool, and changes in teaching philosophy may also be a consequence of computer integration. Web-based instruction allows learners to construct meaning, engage in social interaction and problem-solve in a real-world context (Abbey, 2003)

Schömmer (cited in Howard, McGee, Schwartz and Purcell 2000) sees the constructivist teacher as someone who believes that knowledge is abstract, logical and learner-centered. Similarly, Moll (2002) defines the learning process in a constructivist paradigm as follows: Learning is an active process involving the learners constructing meaning for them. The process requires the application of knowledge, skills and values. It is a problem solving approach, which leads to "new" knowledge for the individual. The basis for the approach is discovery learning: new knowledge comes from reconstruction by discovery (2002:9). According to Duffy and Cunningham (2001:71) there is a widely accepted notion of what constructivism implies: "(1) learning is an active process of constructing rather than acquiring knowledge, and (2) instruction is a process of supporting that construction rather than communicating knowledge". They state further that, in contrast to behaviourism that focuses on the end product, constructivists focus on the whole activity rather than the end product.

Computer software applications can reflect constructivist theories. Squires and McDougall (2004) note that students' own methods of learning are encouraged through constructivist applications. In essence, it is not so much about what specific program the end user uses, but how these programs can be applied to reflect constructivist principles. In fact, a simple word processing program can be applied in a constructivist classroom by encouraging exploratory, enquiry-based learning (Brown, 1996). Simple tasks and assignments that learners usually do in a word processing program on a computer can be applied through a constructivist approach. Other software programs that can be used similarly include spreadsheets, databases, and simple web development programs. These software programs can be divided into categories such as the two identified by Squires and McDougall (2004) namely, content-free and subject-specific. In

content-free or generic software, word processors and spreadsheets are handled to carry out the tasks that the user wants the computer to carry out, for example, typing out documents, managing a database and performing calculations. Subject-specific software packages specifically pertain to the pedagogy and focus on specific subjects or topics (Squires and McDougall, 2004). Examples of these are the ones produced by KIE for the various subjects in the syllabus.

2.3 Empirical Literature

2.3.1 ICT in education

Four major studies carried out in Kenya related to ICT recently that are worth noting are:

"An assessment of public secondary schools teachers' preparedness in integrating ICT for instruction: A case study of Ruiru Division, Thika District", done by Migwi Njeri in 2009. This study was based on the social cognitive theory by Bandura which states that behavior, cognition and content (environment), interact to form a reciprocal relationship which provides basis for understanding behavior. Behavior is determined by ones perception of their competency i.e. ability to carry out action in the specific area. This is also referred to as self-efficacy and is based on beliefs about what a person can accomplish with skills and knowledge he has. Self-efficacy is viewed as situation-specific, hence an individual will display different levels of self-efficacy in different situations. Bandura assumes that the acquisition of self-efficacy beliefs will be facilitated by four factors i.e. successful completion of a task (experience/mastery); Observation of a successful model (vicarious experience); verbal persuasion; and emotional or affective state.

The second study is "E-learning readiness among public primary teachers training colleges", by Maruti Soita, completed in 2010. This study was centered on Endogenous growth theory, which underscores the central role played by knowledge as a factor of production proposed by Paul Romer. Romer views knowledge as an additional factor of production and states that a country's capacity to take advantage of knowledge depends on how quickly it becomes a learning economy.

The third study is entitled, "An investigation into the extent of the use of ICT in public secondary schools in Naivasha district," carried out by Ngugi P. (2012). This study featured the 'classical organizational theory' by Max Weber, which stipulated that western civilization was shifting from value oriented thinking and affective action to technocratic thinking; as well as Henri Fayol's administrative theory which focuses on five roles of the management, i.e. planning, organizing, controlling, commanding, and coordinating.

The fourth relevant study by Munyaka J. (2012) has the title "Implementation of Government Policies on ICT in teaching and learning in primary schools teachers colleges in Kenya, which focused on the theory of 'cultural lag' as proposed by William Ogburn (1964), which assert that change takes place in material and non-material culture. Material culture refers to physical or technical aspects of a culture surrounding ones daily life, while non-material culture consists of thoughts and behaviour people learn as part of culture they are exposed to. Since these studies concentrated more on teachers' preparedness, it became necessary to carry out a holistic study that went beyond this, examining the state of ICT usage.

There are two major views regarding the use of ICT in education and its implications for society, which can be classified as the optimistic and pessimistic views (Howell and Lundall, 2000; Polikanov and Abramova, 2003; Selwyn 2001). The optimistic view embraces the use of ICT in education. Howell and Lundall (2000) mention two kinds of optimists – the inevitablilists and the euphoric or visionary optimists. The inevitabilists maintain that ICTs are a significant part of everyday life and that one should be acquainted with them. Furthermore, ICTs should be an important part of the school curriculum in order to prepare learners for the modern world of technology (Howell and Lundall, 2000). The euphoric and visionary optimists, on the other hand, maintain that ICTs, which are increasingly found in the economy, may change the way we live, communicate and work (Howell and Lundall, 2000).

In contrast, the pessimists' view is that ICTs represent the already huge digital divide that exists between the developed and the developing world (Howell and Lundall, 2000; Polikanov and Cuban, 2001). Not only do they maintain a pessimistic view in terms of the digital divide, but also in terms of how ICT is taught in the classroom. Stoll warns that computers encourage

students to hand in "hypermedia projects" instead of written assignments (1999:6). He further cautions that simply downloading any material from the Internet does not mean that the student has learnt anything. Many governments seem to embrace the optimistic view, by encouraging the usage of more and more computers into schools, believing that this medium will change pupils and society for the better (Mooij and Smeets, 2001) such as the G.O.K ambitious project of at least 300 computers for each constituency. This raises the question: how important are computers in schools in the information age?

The ministry of education policy document (2006) states that principal objective of the National ICT Policy is to facilitate sustainable economic growth and development, and poverty eradication through productive and effective technologies. The Policy also aims at pursuing progress towards full socio-economic inclusion of citizens through universal access. Further, the Policy seeks to stimulate investment in ICT sector while at the same time encouraging the spirit of innovation through research and development. The policy envisages harnessing the potential of ICTs and related emerging technologies to eradicate poverty, support universal primary education, improve maternal health, combat diseases, maximize agricultural production, ensure food security, promote trade and industry, ensure environmental sustainability, develop global partnerships for national development, and incorporate technology in mainstream usage of development policies.

2.3.2 Importance and uses of computers in schools

Although computers are seen as essential in the world today, the significance of computers in schools needs to be examined. As noted by Hokanson and Hooper: "Despite a history of achieving only marginal benefits from using technology in education, many schools and other educational organizations are investing heavily in computer technology" (2000:537). Even though there are challenges and doubts surrounding the usage of ICT in schools, computers are seen by many as important because of their continued usage in schools. Therefore, Chapman's argument concerning the importance of computers in a child's education: Computers are transforming communications and the economy, and every child should be exposed to this technology to understand the significance of this technology is very valid. Every high school

graduate should know how to use a computer and the Internet, understand how a computer works, have some grasp of how to find information on the Internet, and generally know how computers are used by the businesses, the government, educational institutions and people in their homes. At least students are expected to know how to type, how to use a word processor, how to navigate the Internet (Chapman, 1998:64-65).

Hawkridge, Jaworski and McMahon (1990:17) discuss four reasons why computers should be used in schools. The first two of these rationales deal with preparing learners for an industrialized world. These are the *social rationale*, according to which learners are trained to become computer literate, which prepares them for participation in a computer-rich world. In what they call the *vocational rationale,* Hawkridge *et al.* (1990) advocate that computer training should prepare students for their future jobs. The last two rationales deal with computer usage in the classroom. The *pedagogical rationale*s computers as integrated into the curriculum so that teaching and learning can be enhanced. The *catalytic rationale* sees the learner becoming independent from the teacher in using computers. There are many reasons why ICT is seen as important in schools, but this research will focus on two of them mentioned above as outlined by Hawkridge *et al.* in which the first two and the last two rationales are combined:

To prepare pupils for the future in an industrialized society: this relates to the social and vocational rationales of Hawkridge *et al*. In order to prepare pupils for the "information age", governments across the world spend huge amounts of money on the usage of ICT in schools (Pelgrum, 2001). ICT policies are drawn up, schools are supplied with computer hardware and software, and Internet connectivity is provided to schools. This is still evident today, where governments monitor the usage of ICTs in schools on a regular basis in order to enhance ICTs in their schools (Pelgrum, 2001). So why do governments spend such enormous amounts on computers in schools? It is often assumed that ICT, especially computers in schools, will lead to pupils being more productive future workers in the 'information age' (Leask and Meadows 2000; Pelgrum 2001). This applies even to the developing countries, as evidenced by the rapid adoption of ICT in learning institutions in Kenya.

As a mechanism for learning and teaching: this refers to the pedagogical and catalytic rationales suggested by Hawkridge *et al*. (1990). In order to equip pupils with the technological skills to make a significant contribution in an ICT rich world, careful consideration should be given to how to integrate computers into teaching and learning. It is known world over that, ICTs can advance high order thinking skills such as comprehension, reasoning, problem-solving and creative thinking and enhance employability. Wakefield (1996:408) defines higher-order thinking skills as "relatively complex cognitive performances, the ultimate purpose of which is not efficient use of memory but problem solving". These cognitive performances can include critical thinking (evaluative skills, broadly defined); problem solving (finding and solving a problem through analysis, synthesis and evaluation); metacognition (an awareness of one's own thought processes and the skills used in these thought processes) (Wakefield, 1996:410).

Computer uses in schools are varied, some among them most important ones are discussed as follows:

Administration. Administrative, managerial and teaching staff members use computers for administrative purposes. Examples of using computers for administration include typing and printing of official documents, lesson plans and worksheets; designing and typing other documents (e.g. school reports, timetables, tests); creating a database of teachers and pupils; creating spreadsheets for maintaining the school budget; and for keeping records of assessments. If Internet connectivity is available, computers can be used for reading and responding to official e-mail messages and for creating and maintaining the official school website. Many teachers use computers, either their own computers at home or the school's computers, mainly for administrative purposes.

Communication. The Internet-based means have become very effective mechanism to communicate by using applications such as electronic mail (e-mail) as a supplement to teaching in the classroom (Hassini, 2004). Many learning institutions employ virtual and distance learning. When people communicate with each other via the Internet, it is called Computer-Mediated Communication (CMC) (Lamb and Smith, 1999:23). These applications can also be used effectively in the ICT classroom. For example, learners can communicate with each other

through an interactive website called *e-pals* and *e-portals* like the ones used by Kenyatta University to exchange ideas, complete projects, and communicate.

Teaching and learning. Although the role of the teacher in the classroom is indispensable the introduction of ICTs into the classroom has the potential to transform many people's traditional way of thinking about education (Kennewell, 2004). According to Kennewell, education is no longer seen as the teacher transmitting knowledge to the pupils. Cuban (2001) also supports this view, and says many professionals believe that computers are replacing conventional teaching practices. This is exemplified by the fact that, e-learning has become so popular.

Research. The Internet remains an effective electronic research mechanism that students can employ to undertake in-depth research. However, conducting Internet research is more than just 'surfing' the Internet for information. Effective Internet research tools and methods need to be employed before reliable research can be done. Teachers and learners need to be familiar with and knowledgeable about different tools and methods that can be employed. A few examples of different Internet research tools are directories, search engines, e-mail directories, newsgroups, software search tools, File Transfer Protocol and (Morrison, Lowther and DeMeulle, 1999).

Publicity and *Marketing*. An effective way to market the school is through the school website, created and maintained by dedicated teachers, pupils or parents of the school. Wells (2001) suggests that the ICT policies and processes will be upheld and ICT progression will be significant in the curriculum if an exceptional website is developed. The main priority for a school's website, therefore, is to disseminate information about school activities, courses, location of the school, staff and pupils, and so on.

Regional centers of excellence. Many schools with computer laboratories and Internet connectivity can and should use these facilities commercially to get funds for maintenance. Since they are in most instances located in isolated places or at least away from the towns, it is prudent that they use these facilities for outreach programmes as a further strategy to market the school and support the local community. For example, schools can promote the use of the computer laboratory to interested members of the public to teach computer skills. Computer-skilled

teachers can act as instructors. Schools can cut a niche in this area, since they can offer quality at lower prices as they are not purely commercially motivated like other enterprises.

Entertainment. Though this should be approached with moderation and should be monitored by the teachers, entertainment can greatly benefit the learners, among other things providing break from monotonous and taxing academic work. In addition to all the other uses, computers are also used for playing games, be it for educational or for leisure purposes. Depending on the type of software that is used, games can be interactive, communicative or thought-provoking (Klopfer, 2005). Even for very young learners, mathematical skills and language can be enhanced through the use of mathematical games. Furthermore, Klopfer maintains that learners' cognitive and motor skills can be improved by interaction with each other through playing games. These uses of computers in schools are as illustrated below:
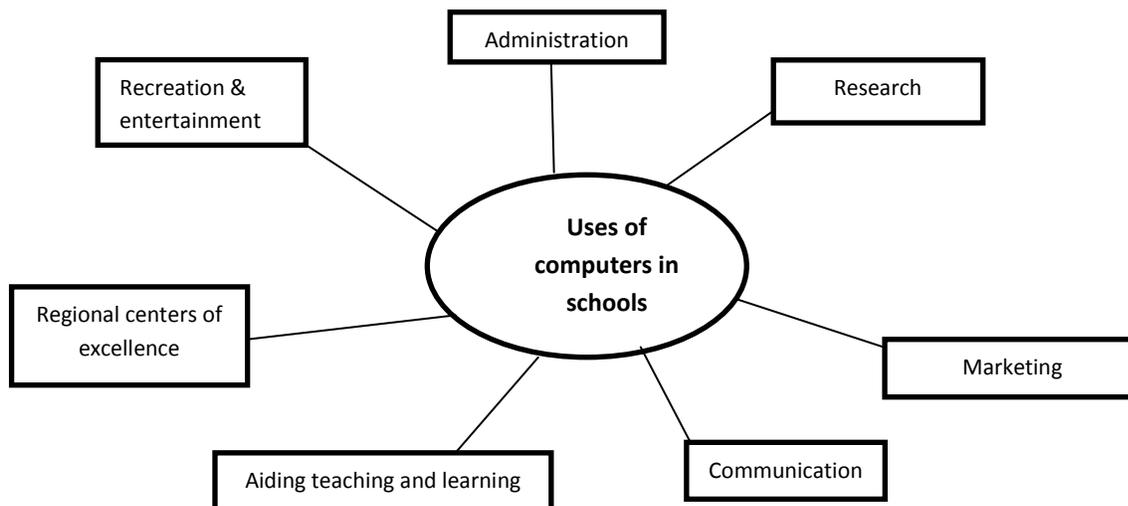
Figure 2.1: The uses of computers in schools   (Source: Researcher 2012)

2.4 Theoretical/Conceptual Framework

According to Uma, theoretical framework shows the relationships among variables that are deemed to be integral to the dynamics of the situation being investigated i.e. identifying the

network of relationship among the variables considered important to the study of any given problem situation; while conceptual framework is a diagrammatic representation of the same.

2.4.1 Factors That Influence the Use of Computers in Schools

The great emphasis on equipping schools with ICT facilities brings us to another important question: what are the factors that influence the use of computers in schools? Pelgrum (2001) lists some of these as: personal ideas about the contribution that technology can make to the processes of teaching and learning and classroom management; Teachers' characteristics such as knowledge and skills; the number of computers and ICT infrastructure; and difficulty in integrating ICTs instruction in classrooms. In related a study, Ely (1993) similarly distinguishes three major conditions, relevant to ICT integration in classrooms, these are: dissatisfaction with the status quo, existence of knowledge and skills, and availability of resources. Ely's existence of knowledge and skills relates to Pelgrum's factor relating to teachers lack knowledge and skills. Equally, Ely's availability of resources is similar to Pelgrum's number of computers and ICT infrastructure. Finally Ely's dissatisfaction with the status quo is directly related to what Zhao and Cziko (2001) term as discrepancies that activate the individual i.e. factors to do with confidence. Mooij and Smeets (2001) explain that if teachers are not confident in their ability or competence to handle computers this may influence their willingness to introduce technology in their classrooms. This ICT competence factor is the same that Zhao and Cziko (2001) refer to as Control Principle. Other factors significantly influencing ICT use in schools according to Mooij and Smeets (2001) are school manager's policy and budgetary decisions. These factors are illustrated below:

Independent Variables   **Dependent Variable**

Intervening Variables

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┌─────────────────────────┐      ┌──────────────────────┐
│ National ICT Policy     │      │ Teachers'            │
│                         │      │ motivation,          │
└─────────────────────────┘      │ students' attitude   │
                                 └──────────────────────┘
┌─────────────────────────┐                │
│ Funds (for purchase &   │                │              ┌──────────────────────┐
│ maintenance)            │                ▼              │ ICT usage i.e. number │
└─────────────────────────┘                               │ of ICT equipment and  │
                                 ─────────────────────────▶│ frequency of usage.   │
┌─────────────────────────┐                               └──────────────────────┘
│ Teachers' individual    │
│ characteristics         │
└─────────────────────────┘

┌─────────────────────────┐
│ ICT Infrastructure      │
└─────────────────────────┘
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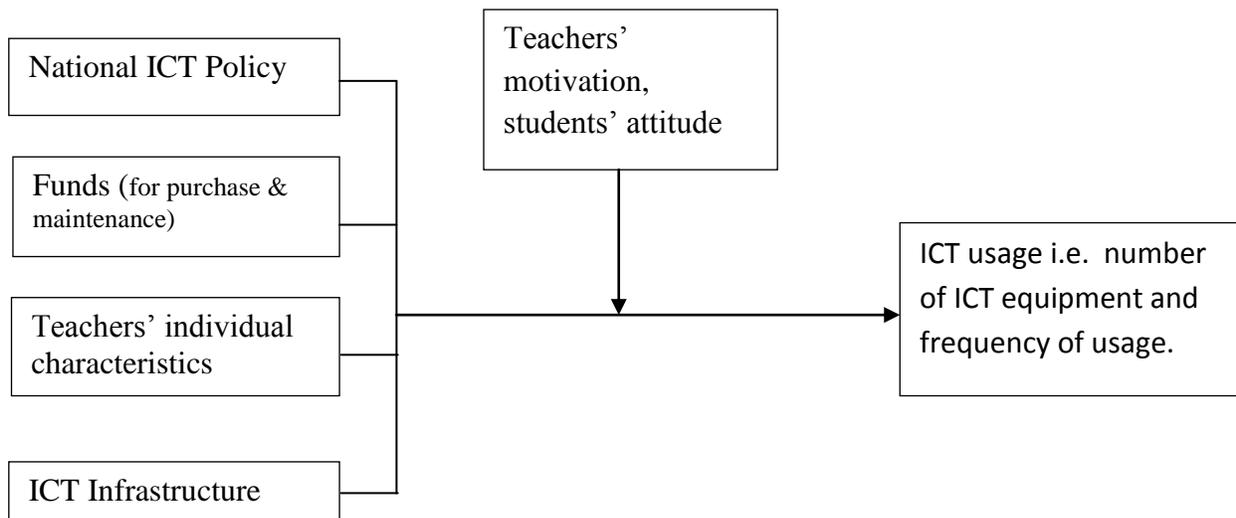
Figure 2.2: Factors influencing usage of ICT in schools
(Source: Researcher 2012)

As noted in figure 2.2 above, the four main variables, Infrastructure (Power, computers, Internet connectivity), funds for purchasing and maintenance, level of teachers training and National ICT policy greatly affect successful usage of ICT programs in learning institutions.

Availability of Funds. This factor determines the number of computers at a school, whether they are used for teaching and learning, or just for administrative purposes only. In the Second Information Technology in Education Study (SITES), conducted in 1997-1999 and involving 26 countries, it was found that an insufficient number of computers in schools was the main reason for not realizing a school's computer-related goals (Pelgrum, 2001:173).

ICT Infrastructure

Availability of power. Availability of reliable power supply (from Kenya Power), is a very important determiner of whether the school undertakes to buy and implement ICT projects. This is because running generators regularly to power computers is very expensive, while solar power may be unreliable, rendering these projects almost impossible for most schools hence the need for regular and reliable power from the national grid (author).

Internet connectivity. This depends on whether the internet providers can avail network and if the school has computers. The high cost of connectivity has been observed to hamper ICT usage in Kenya. This is especially so for the poor schools, which cannot afford the high cost of Telecommunication and Internet used for academic purposes. The move to equip schools with ICT and Internet connectivity is mainly initiated by governments. In some cases, the private sector, in collaboration with the government as well as educational institutions and members of the school community, also contributes to internet acquisition. By and large, it is the school's duty to maintain this provision, since sponsorship is normally for a limited duration (author).

The National ICT Policy

The ministry of education policy document (2006) guides schools their use of ICT hence it is another variable. In the area of human resource development, the policy emphasizes integrating ICTs in teaching curriculum at all levels of education; establishing e-educational networks for sharing educational resources and promoting e-learning at all levels; encouraging and supporting ICT training for decision-makers, community and civil society leaders; creating opportunities and providing assistance for the disadvantaged, women and the youth to acquire ICT competencies and skills; and enhancing capacity for research and development in ICT sector.

Individual's characteristics

Effective teacher training. The educator is the key to the usage of educational reform (Schofield, 1997). Educators' knowledge, skill, and philosophy determine their instructional methods (Staub & Stern, 2002) and have significant effects on the students that they teach (Brophy & Good, 1986). Educators ultimately determine whether and how computers will be used. Therefore teacher training in ICT and computer use is of paramount importance, if successful usage of ICT into the curriculum is to be achieved. Untrained or inadequately trained teachers might be disinterested and may therefore develop a resistance to using the computers in the classroom (Anderson, 2002). McFarlane emphasizes that: teachers who are uncomfortable with computers, and who fail to see how they can be used to enhance learning, simply do not use them. One-day awareness courses are clearly inadequate to address this huge skill gap, yet this is the most commonly experienced form of in-service training. This is often the case, such as the recently help "g-funze one day seminar" by the Google, held at KICC, in Nairobi in April 2011. These training programs usually emphasize computer skills training, rather than using the computer to enhance teaching and learning. Therefore, adequate time should be availed to train educators, by very skilled instructors, spanning at least several consecutive weeks if not months. Teachers' motivation and students' attitude towards learning using the ICT will affect its successful usage, since if teachers are not motivated, they will not encourage its use. Therefore these are seen as the intervening variables.

Teacher's attitudes and beliefs in ICTs use

Teachers' attitudes and beliefs affect the way technological innovation is applied in education. They tend to use technology in ways shaped by their own personal perspectives on the curriculum and on their pedagogical practices (Cohen, 1987; Cuban, 2001; Lai et al., 2001). Bullock (2004) found that teachers' attitudes are a major enabling or disabling factor in the adoption of technology. Similarly, Kersaint, Horton, Stohl, and Garofalo (2003) found that teachers who have positive attitudes toward technology feel more comfortable using it and usually incorporate it into their teaching. Woodrow (1992) asserts that any successful

transformation in educational practice requires the development of positive user attitudes toward the new technology. The development of teachers' positive attitudes toward ICT is a key factor not only for enhancing computer usage but also for avoiding teachers' resistance to computer use (Watson, 1998). The teachers' attitudes and beliefs also influence what they themselves learn from education and training programs and what didactic practices they make use of in their classrooms (Clark & Peterson, 1986; Fang, 1996; Pajares, 1992; Zeichner et al, 1987). Research has shown that many educational reform initiatives have failed precisely because they did not influence the beliefs or the practices of the teachers (Cohen & Ball). However, significant positive correlations exist between teachers' attitudes towards ICTs and five independent variables namely cultural perceptions, computer competence, computer access and computer training (Albirini & Abdulkafi, 2006).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the various methodologies that are employed in the study. It describes research design, the target population, sampling frame, sampling technique, data collection instrument, data collection procedures, pilot test and data processing and analysis.

3.2 Research Design

This study adopted descriptive research design, which according to Martyn Shuttleworth (2008) is a scientific method involving observing and describing behaviour of subjects without influencing them in any way i.e. natural behaviour. The method is used to get a general overview of the subject. It involved collection of data about the usage of ICT, classification, analysis, comparison and interpretation of data (Kombo & Tromp 2006), guided by theories, so as to meet the objectives of the study.

3.3 The Target Population

Mugenda and Mugenda (2003) define population as an entire group of individuals, events or objects having a common observable characteristic i.e. aggregate of all that conforms to a given specification. The population for this study is made up of all 60 schools in Gatundu district and sample frame being all ICT coordinators and teachers from all the school, that were interviewed.

3.4 Sampling strategy

This case study attempted to obtain information about ICT from schools and other stakeholders such as ICT champions, education officers and teachers among others, using purposive or judgemental sampling method. Uma Sekeran (2004) writes that within this method, "the

researcher chooses the subjects who are most advantageously placed or in the best position to provide the information required". Therefore the research will focus on all the 60 schools registered for K.C.S.E by Kenya National Examination Council (K.N.E.C) in Gatundu district i.e. the only private Secondary school (St. John's Gakoe) all the 6 provincial schools and all the 53 district schools in the district (K.N.E.C Manual 2012). The full list of schools is as illustrated in table 3.0 below.

Table 3.0 List of schools in Gatundu District

	SCHOOL'S NAME	CATEGORY
1	St. Francis Girls Mangu	Provincial
2	Muhoho High School	Provincial
3	Karinga Girls High school	District
4	Ituru High School	Provincial
5	Mururia High School	Provincial
6	Gatitu Secondary School	District
7	Muthiga Secondary School	Provincial
8	Kairi Secondary School	Provincial
9	Kiriko Secondary School	District
10	Icaciri Secondary School	District
11	Mutuma Secondary School	District
12	Kimunyu Secondary School	District
13	Githaruru Secondary School	District
14	Gatuguru Secondary School	District

15	Kiangunu Secondary School	District
16	Handege Secondary School	District
17	Gachika Secondary School	District
18	Ng'enda Secondary School	District
19	Makwa Secondary School	District
20	Gikindu Secondary School	District
21	Gakoe High School	District
22	Nembu Secondary School	District
23	Ndundu Secondary School	District
24	Wamwangi Secondary School	District
25	Kibiru Secondary School	District
26	Ndekei Secondary School	District
27	Kanjuku Secondary School	District
28	Kagio Secondary School	District
29	Ndarugu Secondary School	District
30	Muthurumbi Secondary School	District
31	Mbichi Secondary School	District
32	St. Joseph Workers Mangu Secondary School	District
33	Njahi Secondary School	District
34	Nyamagara Secondary School	District

35	Kiamwangi Secondary School	District
36	Kahugu-ini Secondary School	District
37	Ng'ethu Secondary School	District
38	Nyamathumbi Secondary School	District
39	Uceke-ini Secondary School	District
40	Gathiru Secondary School	District
41	Igegania Secondary School	District
42	Mataara Secondary School	District
43	St. Stephen Ndiko Secondary School	District
44	Gathuri Secondary School	District
45	Gacece Secondary School	District
46	Kiamwirigi High School	District
47	Kairi Rumwe Secondary School	District
48	Gitare Secondary School	District
49	Matunguru Secondary School	District
50	Kamutua Secondary School	District
51	P.C.E.A. Makuyu-ini Secondary School	District
52	Maria-ini Secondary School	District
53	Gatitu Mixed Secondary School	District
54	Ruburi Secondary School	District

55	St. John Gakoe Secondary School	Private
56	I.H.M. Kairi Girls High School	District
57	Mukurwe Secondary School	District
58	Kiganjo Secondary School	District
59	Munyu-ini Secondary School	District
60	Kiamworia Secondary School	District

(Source: K.N.E.C Manual 2012)

3.5 Data collection tools and techniques

This research was based on a case study approach, which is combines both qualitative and quantitative methods (Bell, 2007), which includes the use of documents and interviews. The researcher together with his assistant administered questionnaires as a means of data collection. Also, government officials, ICT champions, coordinators and teachers, were interviewed. The target interviewees were assured of brevity of the questionnaires so as to enhance response rate since they are understandably busy officers. The main purpose of the interview was to elicit responses from the interviewees by directing questions to them. This research made use of open-ended questions, an in-depth understanding of the responses of the participants can be acquired (Berg, 2004), providing a wider perspective of the issues regarding the usage and integration of ICT in schools.

3.5.1 Validity and Reliability of the Research instruments

The researcher designed the questionnaire factoring in validity and reliability. According to Mugenda and Mugenda (2003), a research instrument is reliable if it yields consistent results after repeated trials. Reliability of the questionnaire was achieved by two pretests in two schools different from the ones that were later researched on and results analyzed in order to make any appropriate correction. On the other hand, validity which is the degree to which results obtained

from the analysis of the data actually represent the phenomenon under study; was achieved by comparing the questionnaire with others from related research studies. In addition, the analysis from the pretest informed the researcher whether the instrument measured what it was meant to measure (Saunders et al., 2009).

CHAPTER FOUR

DATA ANALYSIS, RESULTS INTERPRETATION & DISCUSSION

4.1 Introduction

This chapter presents the results of the analysis of the data collected and draws their interpretation based on the analysis. It covers Data collection procedures and analysis questionnaire rate, sources of funding and availability of ICT infrastructure as well as teachers individual characteristics among others.

4.2 Data collection procedures, Logistical and ethical issues

The researcher obtained introduction letter from Kenyatta University after which the researcher booked appointments with schools ICT coordinators, teachers and administrators to visit the schools and administer questionnaires and interviews. The respondents were assured of confidentiality and allowed time to fill questionnaires and interviews were conducted.

4.3 Data analysis and presentation

This analysis of data is meant to address the purpose of the study, namely to investigate the determinants of ICT usage in schools in Gatundu District. Both qualitative and quantitative approaches were used to analyze data. Descriptive statistics was used to analyze quantitative data and to investigate relationship between the independent variables, i.e. Infrastructure (Power, computers, Internet connectivity), funds for purchasing and maintenance, level of teachers training as well as National ICT policy with the dependent variable usage of ICT programs in learning institutions. Data was later analyzed and presented in tables and graphs, ratios e.t.c.

eventually, the data presented was studied to draw conclusions indicating how each variable affects usage of ICT in schools in Gatundu district.

4.4 Questionnaire Response rate

Berg (2004) states that response rate of 70 per cent and above is good. Therefore the questionnaire return rate was commendable at 98 percent mainly because the researcher and his assistant were able to establish direct contact between them and the respondents.

4.5 Sources of funding and availability of ICT infrastructure

ICT equipment in most of the schools i.e. 87% were acquired through the schools' own initiative and funds as compared to 13% of schools which benefited from the government Economic stimulus package initiatives (ESP). This accounts for the huge discrepancies on the number of computers in each school. Schools that benefited from the ESP, had bigger numbers of computers and other ICT equipment since they were provided with 11 Computers, 1 Laptops, 11 UPS, 1 printer, 1 LCD projector, networking (local area network - LAN) and internet facilities. This causes discrepancies in the computer students' ratios, which in some schools was found to be one computer in over a hundred students in schools which did not benefit from government funding as compared to ratio of between one computer for a maximum of 50 students in benefiting schools in Gatundu district.

Table 4.1 Computer – students' ratio in schools

		Number of Student per Computer					
	1 - 9	11 -20	21 - 30	31 - 40	41 - 50	51 - 60	61 & above
No. of schools	0	6	9	6	9	-	30
% of schools	0	10%	15%	10%	15%	-	50%

Source: (Survey data, 2012)

It was observed that in schools where the ratio of computer versus students was tolerably low, they were able to use them in teaching and research, i.e. in 50% of schools they were used by teachers in lesson preparation and research, while 15% of all the schools used them directly in class hence are able to integrate ICT in learning as guided by the National ICT policy. The schools that were using their ICT infrastructure for computer literacy for both students and teachers were 20%. In 50% of all the schools, the ratio could not allow for the use of computers and other ICT infrastructure in teaching hence they reserved them exclusively for administrative purposes, including exams preparation and student ranking, in the accounting department, personnel management, publicity and correspondence among others as evident from the findings.

Figure 4.1 Computer – students' ratio in schools
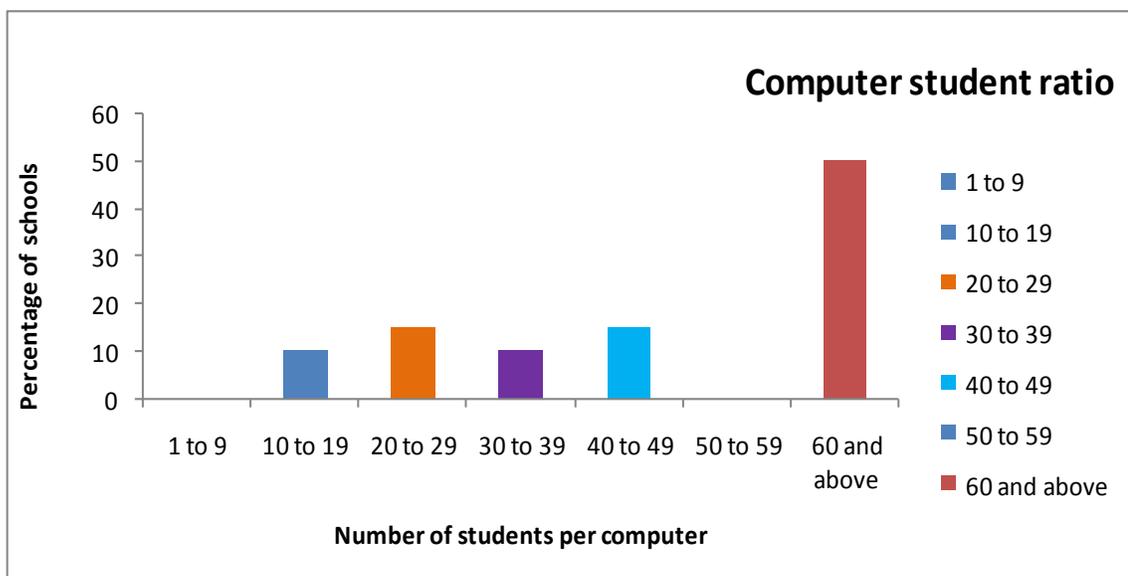
Source: (Survey data, 2012)

Availability of power. Availability of reliable power supply (from Kenya Power), is a very important determiner of whether any school undertakes to buy and implement ICT projects. All the secondary schools had power supply from Kenya power. On average ICT usage was interrupted once per week by power black outs in these schools.

4.6 Individual's characteristics

This research sought to establish how well the teachers are trained in computer and ICT, with the results indicating that 46% of teachers had either been trained within the schools with this infrastructure or had taken the courses in ICT on their own. The number of teachers trained in ICT use was considerably high in schools benefitting from government sponsorship, since they were officially trained during the initiation of these projects, with some schools recording 90% computer literacy. In schools with high computer literacy amongst the teachers, the ICT infrastructure was readily used since 'untrained or inadequately trained teachers might be disinterested and may therefore develop a resistance to using the computers in the classroom' (Anderson, 2002).

4.7 Respondents Level of Satisfaction with ICT Infrastructure

The respondents were asked the question: To what extent are you satisfied with the following? Give your rating in the scale of 1 – 5 (where 1 = very dissatisfied, 2 = dissatisfied, 3 = neither satisfied nor dissatisfied, 4 = satisfied, 5 = very satisfied; the response was as follows:

Table 4.2 Respondents Level of Satisfaction with ICT Infrastructure

		Respondents Rating				
		1	2	3	4	5
1	The usage of ICT in your school	10%	5%	40%	45%	-
2	Number of computers in your school	10%	35%	15%	40%	-
3	Availability/accessibility of internet in your school	50%	10%	5%	35%	-

Source:(Survey data, 2012)

The above table displays respondents' answers to the question, to what extent they were satisfied with the usage of ICT, number of computers, availability and accessibility of internet in their respective schools, interestingly, no respondent said that he was very satisfied with any of the variables. Their responses were as show in the table above and illustrated in the charts below.

4.7.1 Respondents Level of Satisfaction with ICT usage

10% of the respondents said that they were very dissatisfied with the usage of ICT, 5% were dissatisfied while 40% were neither satisfied nor dissatisfied while 45% were satisfied;

Figure 4.2 Respondents Level of Satisfaction with ICT usage
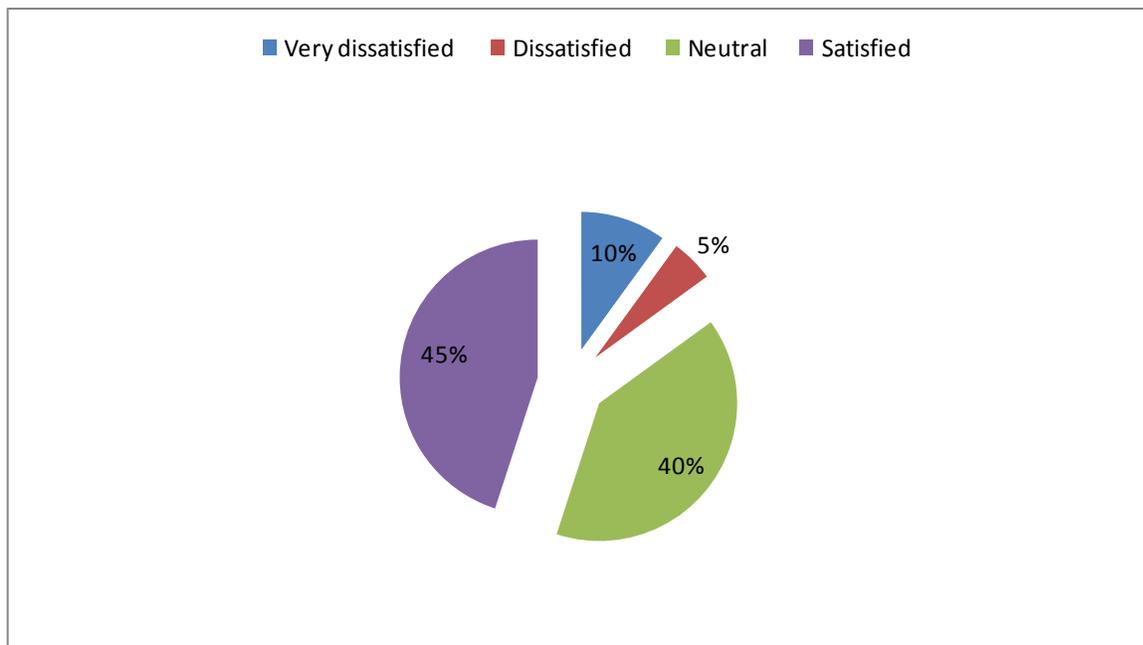
Source: (Survey data, 2012)

4.7.2 Respondents Level of Satisfaction with number of computers

10% of the respondents said that they were very dissatisfied with number of computers, 35% dissatisfied, 15% were neither satisfied nor dissatisfied while 40% were satisfied.

Figure 4.3 Respondents Level of Satisfaction with number of computers

Source: (Survey data, 2012)

4.7.3 Respondents Level of Satisfaction with internet availability/accessibility

50% were very dissatisfied with availability and accessibility of internet, 10% were dissatisfied, 5% were neither satisfied nor dissatisfied while 35% were satisfied.

Figure 4.3 Respondents Level of Satisfaction with internet availability/accessibility
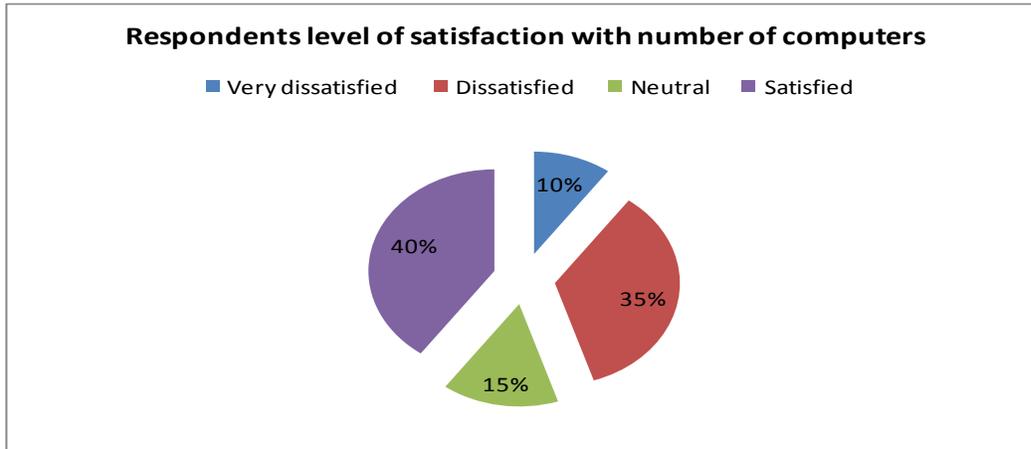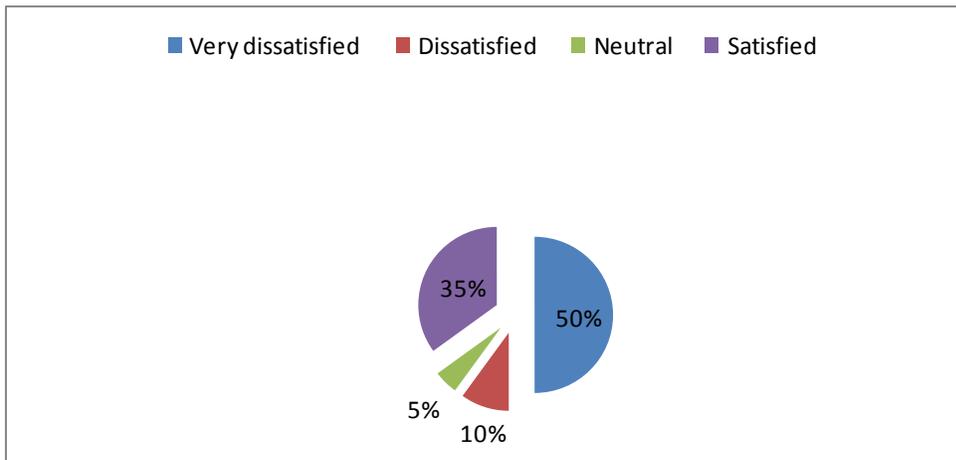

Source: (Survey data, 2012)

This level of satisfaction is considerably low and indicates that the respondents feel that enough funds are not allocated for financing this ICT infrastructure especially the internet.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter summarizes determinants of ICT usage in Gatundu District. It consists of summary of the findings, conclusion of the study, recommendations and suggestions for further research.

5.2 SUMMARY

This research has evaluated the various variables and theories that have a bearing on ICT usage. These variables include ICT Infrastructure (Power, computers, Internet connectivity), funds for purchasing and maintenance, level of teachers training and National ICT policy. Most of the schools do not have power problems apart from the black out which averaged at one instance a week. In half the number of schools in Gatundu district, the number of students sharing one computer is over 61 in some schools as high as 250 especially in cases where there was no government funding. In these schools, the computers are virtually out of bound to student. Other than the schools funds, government is the main funder of computers for schools. In most schools the internet is not very operational even the ones that benefitted from government funding since the funding was only for the year of project initiation. Only 15% of the schools used ICT infrastructure directly in class hence are able to integrate ICT as stipulated in the National ICT policy. Nearly half the number of teachers (46%) are computer literate.

5.3 CONCLUSION

It is important for each school to identify the state of the following main variables i.e. ICT Infrastructure (Power, computers, Internet connectivity), funds for purchasing and maintenance, level of teachers training and National ICT policy. This is because they affect the ICT usage. Generally, the number of computer literate teachers was very high in schools where the number of computers was considerably big especially where the government funded the projects.

Therefore teachers do not seem to be the impediment for ICT usage in Gatundu District. However more funds should be availed to enable schools acquire more ICT infrastructure and integrate the ICT in class teaching and lower the student computer ratio to acceptable levels. More teachers should be encouraged to take computer courses to raise the literacy level from the current 46%. Power was not a major issue affecting the usage of ICT but internet was with only 35% satisfaction level among the respondents.

5.4 Recommendations

Since in about 50% of schools the ratio of computer per student is above 60, schools should invest more funds in the ICT infrastructure as it is not prudent to rely on donations and government funding. This is because it was observed that funding is the cause of the poor computer student ratio in some schools and even when they were funded, often they would not manage to maintain the infrastructure or even sustain the internet. However the government should consider assisting more disadvantaged schools and where possible allow them to use the infrastructure commercially to get funds for maintenance.

5.5 Suggestions for Further Research

Further better funded research could be carried out using a different methodology especially over a longer period of time to establish whether there is any improvement on the usage of ICT. Similar studies but on a nationwide scale may shed further light on the ICT usage in Kenya.

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APPENDICES

APPENDIX 1

LETTER OF INTRODUCTION

P.O. BOX 26355 – 00504

NAIROBI

12TH APRIL 2013.

Dear Respondent,

My name is Mourice Kagwe Ndungu, a Masters of Business Administration in Kenyatta University and I am carrying out research on determinants of ICT usage in Gatundu District.

I will use a questionnaire and interview schedule for which and your invaluable input will be highly appreciated. The information will be treated with confidence and will strictly used for academic purposes only.

I thank you in advance for your precious time spent to fill in the questionnaire and answer the interview.

Yours faithfully,

Mourice Kagwe N

Reg. no. D53/CE/22170/2010

School of Business

Kenyatta University.

APPENDIX 2: QUESTIONNAIRE

This questionnaire is meant to collect information on the factors affecting ICT use in schools in Gatundu district. This information is being sought solely for academic purposes and will be treated with strict confidence. Kindly answer the questions by writing a brief statement or ticking the choices provided as will be applicable.

SECTION 1: PERSONAL INFORMATION

1. What is your level of Education?

    a) Secondary   ☐

    b) Tertiary college   ☐

    c) University graduate   ☐

    d) University postgraduate   ☐

    e) Other (please specify) …………………………….

2. What is your position in this institution? ……………………………

3. In which age bracket do you fall?

    a) 20 – 30   ☐

    b) 31 – 40   ☐

    c) 41 – 50   ☐

    d) Over 50 years. ☐

SECTION 2: INSTITUTION'S INFORMATION

4. What category is your school?

    a) National   ☐   b) Provincial   ☐

    c) District   ☐   d) Private   ☐

5. To what extent are you satisfied with the following? Give your rating in the scale of $1 - 5$ (where 1 = very dissatisfied, 2 = dissatisfied, 3 = neither satisfied nor dissatisfied, 4 = satisfied, 5 = very satisfied

No		Respondent's rating				
		1	2	3	4	5
1	The usage of ICT in your school					
2	Number of computers in your school					
3	Accessibility of the computer laboratory					
4	Teacher training in computer skills					
5	Availability/accessibility of internet in your school					

6. How did your school obtain the computers?

    a) Donations   ☐

    b) Fundraising   ☐

    c) School funds   ☐

    d) Government funding.   ☐

7. How many computers do you have? …………..

8. What other ICT equipment do you have? (Kindly indicate quantities)

  ………

  ………

9. Who initiated the acquisition of these computers? …………………………………………

10. How are your computers maintained?

…………………………………………………………………………………………..

11. What support have you received from the government? ………………………………………

…………………………………………………………………………………………………

12. Do you collaborate with the private sector in maintenance of ICT equipment? Yes/No.

If yes, how? …………………………………………………………………………………

13. How does your school generally use the computer?

a) Administration   ☐

b) Teaching   ☐

c) Computer literacy   ☐

d) Internet research   ☐

e) Projects and assignments ☐

14. Do teachers in your school make use of the computers? Yes/No.

If yes, for what purpose? …………………………………………………………………………

15. What proportion of your teachers are skilled in the use of computers? ……………………….

Among those skilled, where and how did they receive the training? ………………………….

…………………………………………………………………………………………………

16. How often did power failure (black out) interrupt sessions in the computer laboratory in the:

a) Last two weeks?.............., b) Last one month?....................

17. What is your school's student population? ....

18. How many hours per week do the students use the computers for the following:

a) Supervised research and learning?............................

b) Supervised pass time and entertainment? …………………

SECTION 3: QUESTIONS FOR STUDENTS:

19. How often do you use computers in a week for the following activities?

a) Research and Studies?................. b) Entertainment?...................

20. To what extent are you satisfied with the following? Give your rating in the scale of 1 – 5 (where 1 = very dissatisfied, 2 = dissatisfied, 3 = neither satisfied nor dissatisfied, 4 = satisfied, 5 = very satisfied

No		Respondent's rating				
		1	2	3	4	5
1	The usage of ICT in your school					
2	Number of computers in your school					
3	Accessibility of the computer laboratory					
4	Teacher training in computer skills					
5	Availability/accessibility of internet in your school					

Thank you very much for your precious time taken to complete the questionnaire.

APPENDIX 3: INTERVIEW SCHEDULE FOR BURSAR

1. How often do you use the following ICT tools in carrying out your duties?

    a) Computers: Very often ☐ Often ☐ Rarely ☐

    b) Telephone: Very often ☐ Often ☐ Rarely ☐

    c) Internet: Very often ☐ Often ☐ Rarely ☐

2. Which other ICT resources do you have in your department?

    ....

    ....

3. Are your accounting systems computerized?

4. What are the benefits of using ICT in management?

    ....

    ....

5. Do you face any challenges in using ICT?

    ....

    ....

6. What suggestion would you give that can improve use of ICT?

    ....

    ....

Thank you very much for your precious time taken in this interview.