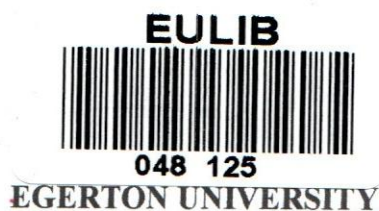


**INFLUENCE OF ICT INTEGRATION ON QUALITY OF INSTRUCTION, STUDENTS'
RECORDS MANAGEMENT AND INTRA UNIVERSITY COMMUNICATION IN
NAIROBI METROPOLITAN UNIVERSITIES IN KENYA**



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**A Thesis submitted to the Board of Postgraduate Studies in Fulfillment of the
Requirements for the Award of the Degree of Doctor of Philosophy in Curriculum and
Instruction of Egerton University**



October, 2013

2015/104438

DECLARATION AND RECOMMENDATION

DECLARATION

This is my original work and has not been presented previously for a degree or diploma in this or any other university.

Signature  Date 02/10/2013

Rhoda Karimi Gitonga

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RECOMMENDATION

This work has been submitted for examination with our approval as university supervisors.

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DEDICATION

To my parents Junius P. Gitonga and Edith Gitonga for teaching me the values of hard work, determination, persistence and positive thinking. To my husband, Isaiah Murithi and our sons Caleb Munene and Carson Mwenda for their encouragement and support in the course of my studies.

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ABSTRACT

The government of Kenya and most Kenyan universities have invested heavily in Information and Communication Technologies. Universities are buying computers, increasing bandwidth and connectivity while at the same time enhancing their other infrastructure to harness the potential benefits of this technology. However, little is known regarding how this investment is benefiting the country and specifically the university community in Kenya. The purpose of this study was to investigate the influence of ICT integration on quality of instruction, students' records management and intra-university communication in Kenyan universities from the perceptions of students and lecturers. The research design was a descriptive survey. The target population comprised of all the students, lecturers and senior administrative staff in the public and private universities in Nairobi metropolitan totaling to 70,427. Purposive sampling was used to select three public and three private universities to participate in the study. Stratified random sampling was used to select 1015 respondents from among students, lecturers and senior administrators. Two questionnaires, one for students and the other one for lecturers as well as one interview guide were used to collect data. Validity was determined by expert judgment. Based on a pilot study, a Cronbach alpha coefficient of 0.83 and 0.72 were obtained for students' and lecturers' questionnaires respectively. Data were analyzed using the Statistical Package for Social Sciences (SPSS). The study found that the universities had made ICT resources available to students and lecturers for use in instruction, students' records management and intra-university communication. However, students and lecturers were less aware of online ICT resources for teaching and learning. Students were accessing their records online and therefore making good use of students' records management resources. Lecturers on the other hand were increasingly using ICT resources in maintaining students' records. ICT integration was perceived as positively influencing the quality of instruction and students' records management based on students' and lecturers' responses. Students did not perceive ICT integration as influencing the quality of intra-university communication while lecturers perceived ICT integration to influence quality of intra- university communication. The findings of this study have provided information on the status of ICT integration in teaching and learning, students' records management and intra-university communication to the government and university policy makers that would be useful for institutional level policy formulation on ICT. The findings will help to establish how the investment in ICT is benefiting the country and specifically the university community in Kenya.

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LIST OF ABBREVIATIONS AND ACRONYMS

ICT	Information and Communication Technology
KENET	Kenya Education Network
KESSP	Kenya Education Sector Support Program
MOEST	Ministry of Education, Science and Technology
OECD	Organization for Economic Co-operation and Development
SPSS	Statistical Package for Social Sciences
KES	Kenya Shillings

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

There is a significant shift in the global economic and social environment which is characterized by changing patterns of trade and competition, technological innovations and globalization of information (Haddad, 2007). As a result, a very competitive global economy has emerged that is moving at high speed and driven by knowledge. The rate of proliferation of Information and Communication Technologies from the use of cell phones, low cost video cameras, personal digital assistants and laptops that are wirelessly connected to the Internet is changing the way people live, interact, work and play in the society (UNESCO, 2002; Kozma, 2005; Bhattacharya & Sharma, 2007; Chandra & Patkar, 2007). ICT has brought about an increase in new knowledge and use of new technologies. The new knowledge and new technologies have resulted into the creation of new products, services and jobs and reduced the cost of transport and communication (Kozma, 2005). As a consequence, there has been increased flow of capital, goods, services and knowledge between countries. Advances in computers and data networks are providing an environment in which more people are increasingly getting access to gigabytes of all kinds of communication anywhere and at any time (Varian, 1996).

Emergence of ICT as an accepted and necessary tool in schools and the school systems is one of the major global trends and developments that are influencing policy and planning in education among other things (Edmond, 2008). Edmond argues that school systems seeking to improve student outcomes, shortfalls of high-quality learning resources, trained teachers, and effective management of teaching and learning, are increasingly turning to ICT-based solutions to address these problems. This situation holds true for countries almost in all stages of economic development. Edmond found that significant efforts to place ICT in the service of learning, teaching and administration have been launched by most developing countries. Education is the driving force of economic and social development in any country (Cholin, 2005; Mehta & Kalra, 2006). It is therefore necessary to find ways to improve educational quality, accessibility and affordability for all, using the latest information and communication technologies available.

Integrating ICT in education has been argued to move instruction from conventional teaching to competency and performance based curricula, which is a shift away from teacher-centred forms of delivery to student-centred approach to learning. ICT supports and encourages independent learning (Oliver, 2002). ICT influences the way students are taught and how they learn (Hattangdi & Ghosh, 2008). There is growing need to explore ways in which teaching and learning can be made more efficient especially in terms of program delivery. This could be done by investigating the capacity of technology to provide customized educational programs to meet the needs of individual learners and the growing use of Internet as a tool for information access and communication (Kennedy & McNaught, 1997; Oliver & Towers, 2000). Other ways in which teaching and learning can be made more efficient especially in program delivery using ICT, includes the use of blogs, wikis, video podcasts, social networks and newsgroups; CD based audio and video programs, use of electronic journals as well as use of online courses. ICT has also played the role of providing teachers and students with access to up to date educational resources from the Internet (Wims & Lawler, 2007). This has greatly increased the quality of what is learnt.

Use of ICT in student record management has benefited students by enabling them access accurate information concerning their performance easily and faster. Universities' work of managing students' records manually is reduced. University managements also benefit from getting systematic and easy to use tools to support the decision making process in their institutions (Sevilla & Shabaya, 2007). Students are demanding for more accurate information and faster services. They, for example, would like to check their fee balances, enrol in their respective courses, pay fees and possibly print their results on-line away from campus. Universities have the responsibility to improve efficiency and quality of service to their students. They can do so by adopting the use of ICT. They can automate their core functions such as student admission process, fees payment, examination records management, among other functions.

Records management is a key driver in increasing organizational efficiency (United States National Archives and Records Administration, 2010). Records management improves the use of staff time by reducing the time spent looking for information. It facilitates the sharing of

information leading to better access to information, which improves decision-making. Records management reduces the unnecessary duplication of information. By reducing the amount of unnecessary information held, it is easier for individuals to concentrate on managing the information for which they are responsible. Records management identifies how long records need to be kept before they can be destroyed, or transferred to the university archives. By doing this, it reduces the costs associated with retaining unnecessary information. In short, records management improves control over information which has benefits in freeing up staff time and other resources, and help in increasing positive customer perception of service delivery. Records management thus improves the ability to plan and make informed decisions, which in turn increases accuracy, leads to greater productivity, and more motivated staff.

ICT-enabled communication is an electronically supported communication media ranging from telephone to the Internet and cellular technologies that organizations use to link individuals in electronically mediated communication (Niederman & Beise, 1999; Papows, 1998). This type of communication enhances quality of decision making, time taken to reach decisions and increases degree of focus on tasks. This in turn increases efficiency, productivity, improved collaboration, and easier coordination of activities. Thus, proper integration of ICT in communication can enable universities reap the benefits of timely quality made decisions, participation quality and a high degree of efficiency in coordination of activities. University administrators are using cell broadcast messaging and email broadcast services for internal communication. Cell broadcast is designed for simultaneous delivery of messages to multiple users in a specified area. A quick and reliable method of mass communication is important in order to keep the university community informed of important activities. With a built in email broadcasting system, university administrators are able to email all of their organization's active members at one time. They can even set up scheduled broadcasts to go out on a specific date and time. Each staff member in the system has a list containing all of the other staff members' email addresses and can broadcast emails direct to their in-boxes.

ICTs have been used in students learning in various fields. Makoul et al., (2010) engaged in a project in Northwestern University Feinberg School of Medicine, where Medical students encountered many challenging communication situations during the clinical clerkships. Makoul

and Zick created the Difficult Conversations Online Forum to give students an opportunity to reflect, brief and respond to others about their experiences. They concluded that the online forums assisted with problem based learning. This was by providing a template that encouraged students to reflect and dialogue about challenging communication situations. Ramanau and Geng, (2009) on the other hand researched on the use of wikis to facilitate group work at Oxford Brookes University in the United Kingdom. Their work reflected on the experience of introducing Wiki technology into a “Japanese for Beginners” module at the university and the evaluation of learner experiences that came thereafter. Although most students were not sure how group work on the wiki fitted into their studies, they agreed that resources created by their peers in the wiki spaces were easier to understand than text books.

McDermott, Eccleston and Brindley, (2010) discussed a project where students in School of Computing at the Robert Gordon University were encouraged to engage in using blogs to document their learning experiences. They found out that the experience of the students on reading and commenting on the blog was worthwhile due to the quality of information brought together on the student learning experience. From this experience, blogs were found to be useful in promoting reflective learning among students by providing a vehicle for the articulation and documentation of personally significant insights into the learning process over an extended period of time.

Despite the enormous potential and cost effectiveness of ICTs to support social networked learning and knowledge constructivism, it's application in institutions of higher learning in developing African countries is low (Ndume et al., 2008). Because of the functionalities provided by ICT tools, higher education institutions need to ensure that effective usage of these tools is made by both students and lecturers (Kroop et al., 2010).

One of Kenya's educational priorities is improving quality of teaching and learning (Republic of Kenya, 2005). Other priorities include improving communication infrastructure in the country. In addressing these priorities, the government has made several initiatives to support ICT provision in the education and communication sectors. These initiatives include the licensing of Safaricom and Orange 3G networks, Telkom wireless Internet, unified license regime and other initiatives

to increase access to ICT in the country. For example, in November 2006, Kenya entered into a partnership with a global telecommunications service provider, Emirates Telecommunication Establishment (Etisalat). This was meant to lay the undersea fibre optic cable, popularly known as the East African Marine System (TEAMs). TEAMs is supposed, through Internet, to connect eastern and Horn of Africa countries to the rest of the world (Kashorda & Waema 2008). This means that Kenya is now part of the global information super highway and will be able to operate on a more level platform with more established economies.

The government has continued to expand the rural electrification program covering all major trading centres countrywide. To this end, the government allocated KES. 7 billion in the 2009 budget (Hansard, 2009). Hansard further observed that the Kenyan economy had also been hooked up onto the global digital grid through the launch of the undersea fiber optic cables. To leverage on this broadband connectivity to accelerate economic growth and expand economic opportunities, the government allocated KES. 1.3 billion for the purchase of mobile computer labs for each constituency for use in Kenyan high schools. Hansard also found out that the government had launched a KES. 1 million laptop computer campaign countrywide in conjunction with broadband providers. This campaign was benefiting university students and other stakeholders by enabling them take advantage of the cheaper broadband available in the country for research and development. The government argues that the use of ICT in education and training institutions will play a major role in disseminating skills to the wider society and thus create positive impact in the economy (Kenya Government, 2004). ICT is viewed as a critical instrument for increasing the breath and richness of learning as well as fostering motivation for learning in the universities. The government as well as most Kenyan universities has invested heavily in ICT. Key initiatives include the Kenya Education Network (KENET) Bandwidth Expansion Project at a cost of US\$ 12 million (approximately Kshs. 1 Billion) and the East African Marine Cable System (TEAMs) at a cost of about Ksh. 6 billion (Research ICT Africa 2007).

It seems that, as new technologies such as mobile phones and social media emerge and are adopted, the characteristics of students have changed. They appear to have “different” needs, goals, and learning preferences than students in the past (Oblinger & Oblinger, 2005). Therefore,

there is need to understand and cater for their needs. The kind of students today are interested in self-directed learning opportunities, interactive environments, multiple forms of feedback, and assignment choices that use different resources to create personally meaningful learning experiences. They want assignments and class activities that have more hands-on, inquiry-based approaches to learning (Glenn, 2000). Hay (2000) argues that these students want more of hands-on, inquiry-based approaches to learning, and are less willing simply to absorb what is put before them. According to Carlson (2005), students demand independence and autonomy in applying their learning styles, which is impacting on a broad range of educational choices and behaviours, from "what kind of education they buy" to "what, where, and how they learn" hence the need to accommodate these students through the use of ICT.

Sharma (2012), in his paper the role of ICT for students' records management in the wake of Right to Information Act, cited a number of problems relating to poor or absence of records' management system in keeping of records in India. The author cited delays in filing and tracking appeals and complaints. In the Central government ministries in India records management system plays a vital role in timely disposal of a right to information application (GOI, 2012). Poor records management led to delays in processing right to information requests. Records which were critical for quick-turnaround in case of information request under Right to Information Act were absent most of the time. Even when the records were stored, retrieval of intelligible information was a challenge. These challenges in records management in India could be applicable to the scenario in Kenyan universities in relation to keeping of students records.

Use of ICT such as Bulk SMS has been known to enable people to communicate important announcements and notices to all or particular recipients on issues affecting them (Pal, 2010). This reduces administrative costs in the long-run due to the SMS effect of reaching many people simultaneously (Priporas & Mylona, 2008; Pal, 2010). The young generation in general is difficult to reach with traditional communication tools (Busk, 2007). ICTs such as mobile technology's bulk SMS system are necessary to contact, coordinate and mobilize people for any eventuality.

1.2 Statement of the Problem

Universities are investing in ICT by buying computers, increasing bandwidth and connectivity to harness the potential of using ICT in their teaching, learning and research, as well as management and communication of information within and outside the institutions. This investment seems not to be yielding expected results. Studies show that the application of ICT in institutions of higher learning in developing African countries is low. Studies carried out at the University of Dar Es Salaam, indicated that most students who used ICTs and particularly the internet did not use it for academic purposes. There is need to establish whether this situation stands true in Kenya by investigating whether the investment in ICT is benefiting the university community by studying the influence of ICT integration on quality of instruction, students' records management and intra-university communication in Kenyan universities.

1.3 Purpose of the Study

The purpose of this study was to investigate the influence of ICT integration on quality of instruction, students' records management and intra-university communication in Kenyan universities.

1.4 Objectives of the Study

The following were the research objectives:

- i) To determine the extent of integration of ICT in instruction, students' records management and intra-university communication.
- ii) To establish the influence of ICT integration on quality of instruction.
- iii) To establish the influence of ICT integration on quality of students' records management.
- iv) To determine the influence of ICT integration on quality of intra-university communication.
- v) To determine if there was a difference in the extent of ICT integration in instruction, students' records management and intra-university communication between public and private universities.

1.5 Research Questions

The following research questions guided this study:

- i) What is the extent of integration of ICT in instruction, students' records management and intra-university communication?

- ii) How is ICT integration influencing quality of instruction?
- iii) How is ICT integration influencing quality of students' records management?
- iv) How is ICT integration influencing quality of intra-university communication?

1.6 Research Hypothesis

The following research hypothesis guided this study:

H₀₁ There is no statistically significant difference in integration of ICT in instruction, students' records management and intra-university communication between public and private universities.

1.7 Significance of the Study

This study has provided educational planners and policy makers in Kenya with empirical data on which to base ICT policy formulation in order to promote ICT integration thus improve the quality of education in Kenya's higher education sector. The results of this study have also provided information on the status of ICT integration that would be useful input for institution-level policy formulation on ICT. The government and university sector will possibly be able to know how the investment in ICT is benefiting the country and specifically the university community in Kenya. From the lecturers' view point, the findings of this study provide direction for the improvement of their own teaching. It is hoped that lecturers will be able to gauge their own individual approaches to teaching using ICT. The findings have opened doors to future studies that may seek to investigate the possibilities of integration of ICT in other aspects of the university.

1.8 Scope of the Study

This study focused on establishing the perceptions on the influence of ICT integration on quality of instruction, students' records management and intra university communication from students' and lecturers' perspectives. This study involved only students, lecturers and senior administrative staff. The study was conducted among selected public and private universities in Nairobi Metropolitan.

1.9 Limitations of the study

- i) The limited geographical coverage may limit ability to generalize country wide. The sample was entirely from Nairobi metropolitan universities. The findings would be generalized with caution to other Kenyan universities.
- ii) ICT use in education is at a particularly dynamic stage in Kenyan universities, which means that there are new developments and announcements happening on a daily basis somewhere in the Universities. Therefore, the findings of this study need to be seen as “snapshots” that are current at the time they are taken; it is expected that certain facts and figures presented in the findings of this study may become outdated very quickly.

1.9.1 Assumptions of the Study

- i) The students, lecturers and senior administrative staff contacted willingly agreed to participate. Their responses were therefore assumed to reflect the true picture of the situation as it was on the ground and that they were knowledgeable on the area of ICT use and therefore they truly gave opinions on the influence of ICT use on instruction, student's records management and intra-university communication.
- ii) Studies conducted in the form of a survey research in a natural setting are normally accompanied by multiple limitations. Some of the limitations are avoidable while others are not, due to the dynamics of the field study setting. The current study was no exception. One of the limitations was the reliance of the research on self-reported measures in the form of questionnaires as the main source of gathering data. However, this study depended and presumed mostly on students', lecturers and senior administrators' openness and sincerity when responding to the questionnaires.

1.9.2 Operational Definition of Key Terms

For purpose of this study the following terms had the following meanings:

Blogs: Websites or part of a website allowing people to post comments. These websites maintain an ongoing chronicle of information. In this study, a blog was a part of a website where students and lecturers could post comments about topics learnt in class and allowed users to reflect, share opinions, and discuss various topics in the form of an online journal while readers commented on posts

Communication: According to Cambridge Advanced Learner's Dictionary, communication is the act of communicating with people. It is a process of transferring information from one entity to another. For the purpose of this study, communication referred to transmission of messages (electronic, video, audio, written) from one place to another within the universities. The parameters of communication that were measured in this research were be Speed, Cost, Ease of transmission, Ease of managing content feedback and Richness – multimedia.

Effective content presentation: In this study, effective content presentation meant that ICT provided a rich media mix, where learning and instruction material was in video, print animated and simulated form. It meant that there was variety in mode of presentation and this increases understanding.

Influence: From Cambridge Advanced Learner's Dictionary, the word influence means to affect or change how someone or something develops, behaves or thinks. In this study, the word influence referred to how ICT integration had some bearing on the quality of instruction, student records management and communication.

Information and communication technologies (ICT): ICT are a diverse set of technological tools and resources used for creating, storing, managing and communicating information. For the purpose of this study, ICT referred to a collection of technologies that are used to support teaching, learning, research activities, collaboration learning and inquiry, students' records management and intra university communication.

ICT Integration: ICT integration is the process of using any ICT (including information resources on the web, multimedia programs in CD-ROMs, learning objects, or other tools) to enhance student general cognitive capacities, moral values and attitude, as well as enhance students' technical ICT competences. In this study ICT integration also referred to making ICT available in the universities and using them in instruction, students' records management and intra university communication.

Instruction: According to Cambridge Advanced Learner's Dictionary, an instruction is the teaching of a particular skill or subject or something that someone tells you to do. For the purpose of this study, instruction referred to teaching and learning of concepts and attitudes in the university.

News Groups: Usenet newsgroups are Internet discussion groups on just about any topic. In this study, news groups referred to electronic conferences where the learners and the teacher shared their opinions on class topics, interests and hobbies online.

Perception: From Cambridge Advanced Learner's Dictionary, the word perception means opinion, often held by many people and based on how things seem. In this study, perception was an opinion that had been formed by students, lecturers and senior administrative staff on the influence ICT integration has on quality instruction, student's records management and intra-university communication

Podcasts: This is a multimedia digital file (either audio or video) made available on the Internet for downloading to a portable media player or a computer. For the purpose of this study, a podcast was a series of digital media files meant for teaching and learning (either audio or video) that were released episodically by the lecturers and often downloaded by students from the university website to their computers

Quality: ISO 8402 [ISO, 1986] defines quality as "the totality of features and characteristics of a product or service that bears on its ability to meet a stated or implied need". [Juran, 1988] defines quality as "fitness for use". For the purpose of this study, quality was the capacity to satisfy users needs and expectations.

Self Paced learning: In this study, self paced learning referred to the ability of ICT to give learners control of both the pace and sequencing of instruction. Fast learners can speed through a program while slow learners can take as much time as they need.

Senior Administrative Staff: These are senior management staff recruited directly into university management offices as their full time employment. For the purpose of this study, senior administrative staff included Deans, Directors and Chairs of departments. It also included Registrars and their deputies as well Vice Chancellors and their deputies.

Social Network: A social network is a social structure made up of individuals (or organizations) called "nodes", which are tied (connected) by one or more specific types of interdependency, such as friendship, kinship, common interest, financial exchange, dislike, sexual relationships, or relationships of beliefs, knowledge or prestige. For the purpose of this study, a social network referred to a social structure made up of individuals with a common interest that is sharing knowledge.

Student: According to Cambridge Advanced Learner's Dictionary, a student is a person who is learning at a college or university, or sometimes at a school. For the purpose of this study, a university student was a person enrolled in a degree program in one of Kenya's Public or private universities.

Students' records management: The term means those records that are: Directly related to a student; and maintained by the University or by a party acting for the University. The term does not include: Records that are kept in the sole possession of the maker of the record, and are not accessible or revealed to any other person except a temporary substitute for the maker of the record; Records of a law enforcement unit of the University or Records relating to an individual who is employed by the University. It is a software application for educational establishments to manage student's data. For the purpose of this study, Student Record Management referred to software that had the capabilities of managing student's data such as fees and examinations.

University: A university is an institution of higher education and research, which grants academic degrees in a variety of subjects. A university provides both undergraduate education

and postgraduate education. For the purpose of this research, a Public University was one which is established by Act of Parliament and largely supported from public funds while a Private University was one which is established in accordance with the Universities Act 1985 (cap 210B) and the Establishment of Universities rules .

University lecturer: According to Cambridge Advanced Learner's Dictionary a lecturer is someone who teaches at a university or college. For the purpose of this study, a Lecturer included personnel whose primary assignment is instruction, research, or public service. This included staff personnel who hold an academic rank with titles such as professor, associate professor, assistant professor, instructor, lecturer, or the equivalent of any of these academic ranks. The category did not include personnel with other titles, (e.g. dean, director, associate dean, assistant dean, chair or head of department), even if their principal activity is instruction or research.

Web 2.0 technologies: Web 2.0 has been referred to as “technology” (Franklin and Van Harmelen, 2007), as “second generation web-based tools and services” (Guntram, 2007), and as “a community-driven online platform or an attitude rather than technology” (Downes, 2005; Virkus, 2008). Some of the Web 2.0 applications and services are blogs, wikis, tagging and social bookmarking, multimedia sharing, podcasts, and social networking. For the purpose of this study Web 2.0 technologies referred to news groups, blogs, wikis, podcasts and social networking through face book and twitter.

Wiki: This is a website that allows the creation and editing of any number of interlinked web pages via a web browser using a simplified markup language or a text editor. In this study, a wiki referred to a website that was used collaboratively by multiple users especially students for personal note taking.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter starts by providing an overview of different phases of development in the use of ICT in education as well as the current international trends. The initiatives of different stakeholders to support ICT provision in the educational sector in Kenya and the various rationales for inclusion of ICT in the university education have been discussed. Together with this, literature focusing on the variables of interest in this study was reviewed. The chapter ends with the theoretical and the conceptual framework that guided this study.

2.2 An Overview of Different Phases of Development in the use of ICT in Education

Learning with ICT has evolved from software that supports students' individual learning based on mechanical drills to more advanced learning environments like the more developed cognitive tools and collaborative learning environments (Valtonen, 2011; Stahl et al., 2006; Jonassen, 1992). ICT in teaching has been known to use various formats ranging from traditional computer labs and presentation technologies to online learning and personal environments and social software. There has been several phases in the development of ICT in education. Koschmann (1996; 2001) and Lehtinen (2006) describe four phases of ICT use in education. The first phase was regarded as computer aided instruction or utopia of the computer viewed as a tireless and individual trainer, where learning goals were divided into smaller tasks that students could accomplish. ICT tools were able to provide instant feedback and control over the different tasks. The second phase was the utopia of the computer being viewed as an intelligent tutor. This is where software was developed to emulate the thinking and problem solving of domain experts. The software was to provide the student with a personal tutor that followed the progress of learning and provided feedback and support. The third phase was the utopia of the micro-worlds which was grounded in the constructivist theories of learning. Learning was seen as subjective construction of knowledge. ICT was used to provide students with environments for active inquiry and discovery. The computer provided the students with a safe environment for working and testing ideas. The fourth phase is regarded as "Computer Supported Collaborative Learning (CSCL) Paradigm" (Koschmann, 1996; 2001) or "utopia of collaborative learning" (Lehtinen,

2006). In this phase, the emphasis is on the collaborative and social factors of learning. ICT is used in education to support students' collaborative knowledge-building through collaborative work, sharing and explicating ideas and unique knowledge structures to provide a means of communication and inquiry and collaborative creations of knowledge.

Lehtinen (2006) later described another phase, utopias of multimedia and virtualization where new ICT technologies provide possibilities to effectively and interactively illustrate difficult content areas for students. Students can learn anytime and in any place through the developments in the Internet.

2.3 Current International Trends in ICT in Education

In a survey of 16 countries in the Caribbean on ICT and Education, Edmond (2008) described some of the current international trends in ICT in Education. The author described a trend where emphasis on learning was by doing (i.e., projects, activities, etc.) rather than learning by listening. He also described a trend where students and their instructors were increasingly collaborating in online projects where they were engaged in sharing information, knowledge, and research results to accomplish mutual goals.

There is an increasing awareness amongst educationists, researchers and administrators that the introduction of ICT into educational institutions calls for a change in learning and teaching patterns. In a study conducted by Vollstädt (2002), 73% of the experts polled for the Delphi Study conducted for the German Federal Ministry of Education and Research over a period of two years and culminating into a symposium in February 2002, believed that ICT would lead to a major change in the culture of learning due to the new learning efforts and possibilities linked to ICTs. They believed that ICT would promote more independent learning among students, encourage interaction among learners and their teachers, facilitate direct feedback, provide faster access to teaching materials; promote individualized learning, while at the same time increasing the demand for more social learning in group and team work.

The main purpose of the 2008 e-Readiness survey of East African universities was to assess the preparedness of about 50 East African universities to use Information and Communication

Technology (ICT) for teaching, learning, research, and management ((Kashorda & Waema, 2008). It aimed at developing generic and institutional roadmaps for universities committed to achieving higher stages of e-readiness. Wims and Lawler (2007) examined the impact of ICT projects in educational institutions in Rift Valley Province of Kenya. They found out that, though ICT in education had a positive influence there were challenges in its adoption. Key among these were staff training, mainstreaming of ICT across the curriculum and provision of adequate ICT equipment. However, these reports and studies did not show how the investment in ICT were benefitting the university community. Neither did they investigate the influence of ICT on quality of instruction, records management and communication. This necessitated this study.

2.4 ICT Provision in the Educational Sector in Kenya

The aim of Kenya's Vision 2030 is to promote the country's social-economic development. In the education sector, the Vision 2030 envisions a globally competitive sector that offers quality education, training and research for sustainable development (Republic of Kenya, 2008). ICT is viewed as a critical factor for translating the dream outlined in Vision 2030 into reality, as well as being an enabler in this quest to realise social-economic prosperity. The potential of ICT to create new services, sources of revenue and employment opportunities as well as increasing productivity and cost-effectiveness, makes its use in a wide range of fields inevitable (Iyanda & Ojo, 2008). President Kibaki in his speech during the official opening of an ICT conference in 2006 described the investment in ICT infrastructure and appropriate human skills as critical in establishing a digital society (Office of Public Communications, 2008).

The government of Kenya established a National ICT policy in January 2006. This policy aimed at improving the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services (Ministry of Information and Communication, 2006a). Livelihood here include not just income-earning opportunities, but also the capabilities, materials, social resources and activities required to provide a means of living (Chambers & Conway 1992). Livelihoods therefore encompass consumption levels, access to material and social resources, well-established social networks and the absence of inequality (Samson, 2008).

The ICT policy has several sections, including information technology, broadcasting, telecommunications and postal services. However, it is the section on information technology that sets out the objectives and strategies pertaining to ICT and education (Farrell, 2007). The relevant objective in this section states that the government will encourage "...the use of ICT in schools, colleges, universities and other educational institutions in the country so as to improve the quality of teaching and learning" pg.10 (National ICT Policy, 2006). This underlines the government's commitment to incorporate ICT in teaching and learning. The Ministry of Education was given the mandate to lead the monitoring and evaluation of the strategy's implementation in the education sector. The implementing agencies included the semi-autonomous government agencies within the Ministry of Education, the Network Initiative for Computers in Education, which is a consortium of NGOs involved in ICT in the education sector. Civil society organizations and academia and/or individuals with experience in ICT in education projects took part in this initiative (Farrell, 2007). The implementation is guided by overall government policies on education and ICT, specific education strategic documents for implementing ICT policy mandate, and global goals such as Education for All and the Millennium Development Goals (National ICT Strategy for Education and Training, 2006; Farrell, 2007).

Another key part of the implementation strategy is the Kenya ICT Trust Fund (KITF) formed in 2004 (Kenya ICT Trust Fund, Strategic Plan, 2006). The aim of the KITF was to spearhead ICT initiatives in education. Public sector organisations such as government ministries and other public institutions, private sector companies, donor partners, civil society, as well as academic and other educational institutions are free to join the fund as members. The general objective of this fund is to facilitate public and private partnerships that will mobilise and provide ICT resources to Kenyan public schools and community resource centres as well as provide assessment for E-readiness in tertiary institutions such as the universities among others. Member partners can apply for project funds to implement various ICT components outlined in the Fund's objectives (KITF, Strategic Plan, 2006). On the other hand Kenya Education Network (KENET) was established to create sustainable communication and networking among educational institutions in Kenya. This was expected to facilitate a wider uptake and use of the Internet technology in teaching, research, and sharing of other information resources with the general

populace at affordable cost (KENET, 2002). This initiative is spearheaded by Kenya's institutions of higher learning to establish a high-speed, reliable, and sustainable network for the interconnectivity of all learning institutions in the country. KENET members benefit by receiving substantially lower connectivity costs, as well as having access to technical support and staff training. Presently KENET is placing key interest in universities because of their rich information base and high literate user segment. It is approximated that collectively the universities hold 70 per cent of the country's library resources (Mutula & Musakali 2007). The KENET project therefore aims at providing the highest possible connectivity speeds to the universities that in turn are expected to become hubs to other educational institutions in their neighbourhoods (KENET, 2002). The achievements made through all these initiatives include the Internet connectivity of member universities by KENET directly or through licensed operators by 2008 as well as benefits realised from increased bandwidth that has seen more institutions getting on board and sharing data and information (Kashorda & Waema, 2008). The broadband used to distribute the network is the optical fibre leased lines to connect to universities and the same network was expected to be used to distribute the undersea cable bandwidth once it became available (Kashorda & Waema, 2008).

2.5 Integration of ICT in University Education in Kenya

The integration of ICT in higher education has been guided by a number of rationales. These are the pedagogical, economical and social rationales. Each of these is discussed showing reasons as to why ICT should be incorporated in teaching and learning.

2.5.1 Pedagogical Rationale

The need for effective functioning in the knowledge society and coping with continuous change has led to the demand for higher levels of competencies (Kozma, 2005). There are new learning approaches such as resource-based, problem-based, project-based and competency-based learning that demand a high degree of information literacy. These new learning approaches demand a paradigm shift from dominant teaching methods involving pre-packaging information for the students, to facilitating learning in authentic and information rich contexts. There are different ways in which teaching and learning can be made more efficient especially in program delivery through the use of ICT. Some of these ways include the use of blogs, wikis, video

podcasts, social networks, and newsgroups, audio programs, video compact discs, use of electronic journals as well as use of online courses. Web 2.0 tools such as blogs have also been used to promote reflective learning among students (Mc Dermott et al., 2010). The usage of blogs also acts as an important tool to enhance teamwork and foster a learning community within the class (Kan, 2011). Wikis have been used to promote group work (Ramanau & Geng', 2009), and online discussion forums (Newsgroups) to assist with problem-based learning (Makoul et al., 2010). Face- book/twitter have the potential to support social learning through community networking services such as wall pasting, chatting, content sharing and tagging (Alexander, 2008). Technology can be used to enable the process of, as well as enhance learning. Inappropriate use of technology can lead to negative effects (Johnson & Aragon, 2003; Russell, 1999). Lecturers need to choose appropriate technological tools for their teaching and justify why they are needed for the topics being studied, what added value the technologies may offer and how they may support the instructional process.

The justification for use of ICT in teaching and learning is that it highly motivates students as well as having unique instructional capabilities such as helping students visualize data/problems, or tracking learning progress. It also provides support for innovative instructional approaches such as collaborative learning and problem-based learning and increased teacher productivity and student knowledge construction (Roblyer, Edwards, & Havriluk 2004; Moallem, 2003; Wilson & Lowry, 2000). Integrating ICT into teaching and learning has therefore become a great concern for many educators. Computer-based learning and teaching has made learning more efficient and more interesting for the learners. Education is one area in which ICT deployment with the resultant improvement in access to information, promises to deliver tangible results (Wims & Lawler 2007). Use of ICT is likely to bring about learner-centred approaches to teaching and learning. These approaches are supported by Freire's liberation theory of 1970's that stressed on the importance of dialogical approach to education. ICT facilitates a pedagogical shift that encourages interaction between teachers and learners. When used well, ICT can facilitate a two-way information flow between teachers and learners. Using ICT in education to produce ICT-literate, versatile, adaptable workforce is also consistent with the human capital theory on education (Hawkins, 2002). Augmenting the skills of the workforce in this way has the

potential to benefit the economy at large, and improve the individual student's earnings and employment potential.

ICT can play the role of providing teachers and students with access to up-to-date educational resources (Wims & Lawler, 2007). This can greatly increase the quality of what is learnt. Students are provided with the current market skill requirements in their careers of interest. This has the potential of reducing disparities between the skills acquired by graduates and those required by the market. Use of web-based learning, educational television and radio programs as well as use of audio-visual materials has addressed the problem of education accessibility especially because it has brought education services to people who could not come to schools or educational institutions. ICT can support various types of interactions ranging from learner-content, learner-learner, learner-teacher, and learner-interface (Chou, 2003; Moore, 1989). These types of interactions make the learning process more interactive and learners become more actively engaged in the learning process. These types of interactions are also likely to make instructors demonstrate the component behaviours used to define quality instruction as supported by Feldman (1976). These components include clarity, knowledge, intellectual stimulation, organization and enthusiasm.

2.5.2. Economic Rationale

In the economic rationale, ICT are seen as instruments that enable schools to meet the skills and the learning needs of the information society, thus fulfilling the needs of the economy (OECD, 2001). ICT plays the role of preparing the future workforce and supporting economic development with an economic goal of sustainable economic growth (Kozma, 2005). Sustainable economic growth includes increases in productivity that may occur through the absorption of more skilled and productive work-force and the creation of new knowledge (Stiglitz & Walsh, 2002). ICT can be used to develop students' capacity to use technology to solve complex real-life problems while at school, which can later be applied in the work-place for higher productivity (Kozma, 2005). ICT can also be used to develop life-long learning skills which support knowledge creation, innovation and entrepreneurialism in a knowledge economy.

The value of technology development and innovation is not in the technology itself but in its benefits to the citizens, for businesses and the society as a whole (Liikanen, 2002). The critical issue here is the productivity development through ICT literacy. This is the key element in human capital development because only the growth of productivity can lead to higher real income, improve the competitiveness of companies and guarantee the financing of public services. According to Liikanen, one main element behind the drive to improve productivity is investments in ICT. Thus newly acquired information capabilities can act as an agent for change for individuals, and communities, by enhancing their abilities to engage with formal institutions in the economic, political, social and cultural spheres of their lives. In business, Liikanen views an eBusiness environment that will create a favourable, reliable and open environment, which encourages enterprises, in particular Small and Medium Enterprises, to invest in information and communication technologies as well as in the human resources to reap the benefits in eBusiness. Literature reports that ICT use can provide advantage for businesses in the form of access to extended markets, information (Zinkhan, 2002), resources (Baourakis, Kourgiantakis, & Migdalas, 2002), improved efficiency (Buhalis & Main, 1998), and networking (Smallbone, North, Baldock, & Ekanem, 2002). ICT are both strategic and practical tools for addressing the challenges of development and inclusion. They are key to access and empowerment, and they act as a medium for information and knowledge transfer. Providing access to information to all users is key to development and ICT can assist in doing this (Myhill, 2002). Inclusion in the context of an information society involves connecting people, giving them access to information, and to affordable communication tools (Riga, 2006). It involves empowering them by building their human potential and capacity. This entails expanding access to education and skills development as well as reducing gaps in ICT usage. It also involves the use of ICT to overcome exclusion, improve economic performance, employment opportunities, quality of life, social participation and cohesion (Timmers, 2008).

2.5.3 Social Rationale

In the social rationale, competence in ICT is seen as a prerequisite for participation in society (OECD, 2001). The idea in this case is to articulate specific ways that ICT in education can support social goals. The key change ICT brings to society is that it allows people to make new connections, connections which challenge traditional assumptions about what is possible and

when it is possible. As people continue to use ICT, new social interactions appear through use of the email and chat rooms, skype and these have profound implications for the social support networks (Casal 2007, Liikanen 2002). Social norms are being affected by ICT especially the Internet, which is creating new networks through which individuals can share values and experiences. This supports a better life since some of the cultural barriers are relaxed while the strong cultural practices that encourage health seeking behaviours are promoted (Casal 2007). ICT supports collaboration and knowledge sharing. Knowledge and expertise form part of the culture and also a key factor in production (Information Science Advisory Board, Finland 2000). Policies that emphasize the need to develop information society skills among students such as research networks and open education systems, helps them to actively participate in the information driven society (European Commission, 2000). In addition, digital literacy that provides students with new skills and knowledge they need for personal and professional development also helps them participate in the knowledge economy. Those policies that address the social inequalities such as access to ICT for rural schools most of which might be attended by a significant percentage of the nation's poor population, who have been traditionally underserved by the education system, serves to support people's participation in the society. These policies address the contribution of ICT to learning, where collaborative projects are promoted between countries and cultures, thus promote intercultural dialogue, mutual understanding and social integration among the people (Kozma, 2005).

2.6. ICT and Quality of Students' Records Management in the Universities in Kenya

Students' Records Information Systems is a software application for educational establishments to manage student data. Students' Records Information Systems provide capabilities for entering student test and other assessment scores, building student schedules, tracking student attendance, and managing many other student-related data needs. There is little aggregation of student data in today's school systems. Information is often redundant and difficult to share. The purpose of implementing a school management system is to provide a comprehensive computerized system, for capturing, storing, retrieving and analyzing student data (Baker, Keeton & Martin, 2005; Shepherd & Yeo, 2003). Utilizing the student records management system with the university's local area network, will allow for communication and retrieval of data throughout the university departments.

The creation and maintenance of records relating to the students of an institution are essential to managing the relationship between the institution and the student. This can be done through providing support facilities and other services to the student. The institution is capable of tracking the students' academic progress and measuring their achievement. The institution can also provide support to the students after they leave the institution. In addition, students' records contain data which the institution may aggregate and analyse to formulate future strategy, planning or service provision. The nature of students' records and the personal information they contain demands that they be stored in facilities and equipment or electronic systems which are secure and accessible only to authorized staff whose work requires them to have access. Integrated student records management systems allow for more efficient organization of university's data. Powerful reporting and querying capabilities permit administrators to track and analyze data in ways that were not previously possible (Bozeman & Spuck, 1994). Due to the administrative importance of choosing an effective integrated student records management software product, university administrators should be able to provide important information about their current and future record keeping needs. University administrators should determine the degree to which a software product will be utilized in order to contribute to institutional improvement (Bers, 1992).

The benefits accruing from a well established student records management system are many. The staff can access exactly what they need and when they need it. This can make them far more effective in playing/ performing their roles. Lecturers can be better organized and this can give them more time to be with the students. Administrative staff can have immediate access to students' information. They can see at a glance the academic records of a student and provide an informed opinion with regard to the students' progress. Essential data can be available in an easily accessible form (Femea & Abdur-Rahman, 1999). Records management systems also provide rapid access to records, and ensure the integrity of the records and the security of record-keeping processes (U.S. National Archives and Records Administration, 2010). This in turn increases positive customer perception in service provision. Records management improves the ability to plan and make informed decisions, which in turn increases accuracy, leads to greater productivity and more motivated staff.

2.7 ICT and Quality of Internal Communication in the Universities in Kenya

ICT generally benefits the organization's communication in terms of improving efficiency. Efficiency consists of two elements namely time and costs (Zimmermann & Finger, 2005). ICT provide faster information access and processing, leading to increased time efficiency. On the other hand, use of ICT by organizations in communication leads to more timely information that translates into better decision making. This increases client satisfaction and improved corporate image (Fichman, 2004). The use of ICT in an organization's communication process helps the end-users achieve the benefits of more cost effective communication than traditional written and telephone communication methods (O'Brien, 1993). Use of ICT in this area minimizes information float and telephone tag. Electronic mail, voicemail, facsimile, face-book and other forms of communication using ICT eliminate the effects of mail that is lost in transit, or phone lines that are frequently busy. The cost of labour, materials and postage for office communications is greatly reduced. In the corporate world, deals can easily be made through email and video conferencing, something that was not possible during the industrial age. In addition, mobile phone technology has made it possible for people to check and send messages on the go, thus allowing us to be connected every day and at any time. Communication is important in all education sectors. ICT can support dialogue and collaborative learning in both campus-based courses and off-campus ones. Students can share documents simultaneously and everyone can edit together in real time. Collaborative benefits extend to faculty and staff as well.

Intra- university communication helps maintain the safety of students, faculty and administration members in a number of critical ways. This type of communication can allow campus security officers to receive messages, phone calls and voicemails on VoIP-enabled mobile devices enabling them to respond to situations with speed (Nortel, 2007). Intra university communication ensures that key decision makers and administrative officials are easily located and available to respond in the event of a crisis. When it comes to planning among students and staff, intra university communication helps people coordinate and share critical information efficiently. Using ICT, the learner can have a quick feedback, either from fellow students or from the teacher/tutor. This can enhance both the learning process and increase motivation. According to Fåhræus & Männikkö (1997), quick and personal feedback is very important for students.

However, it takes a lot of time to provide all students with such feedback. The lecturer can therefore use the strengths in ICT to increase speed and efficiency of the communication process.

2.8 Theoretical Framework

This study was guided by the Activity Theory propagated by Issroff and Scanlon (2002). These authors attempted to apply Activity Theory in learning with computers which helps to understand the role of ICT in teaching and learning. Activity Theory builds on the work of Vygotsky (1978). It conceptualizes learning as involving the learner, the task and mediating object such as a computer. In Activity Theory, the basic unit of analysis is enlarged from human action to include a minimal meaningful context which is the activity. The activity is under continuous change and development and contains artifacts which have mediating roles. An activity is a form of doing, directed to a task. An activity is motivated by the need to transform the task into an outcome. The relationship between the learner and the task of activity is mediated by a tool. This tool can be either a material object or a tool for thinking. This system is represented in figure 1:

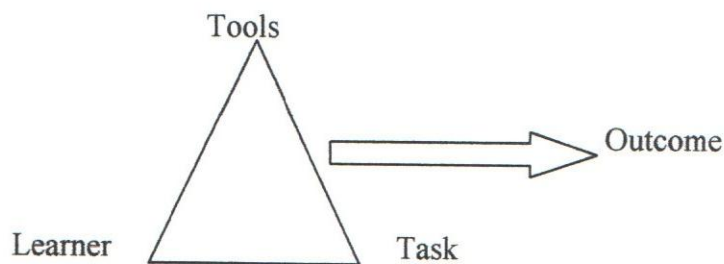


Figure 1: Representation of Basic Activity Theory

However, the activity represented on Figure1 could not deal with the relations between an individual and his or her environment in an activity. Engeström (1987) therefore introduced a third main component — the community which lead to two new relationships namely Learner-community and community-task. This is represented in Figure 2.

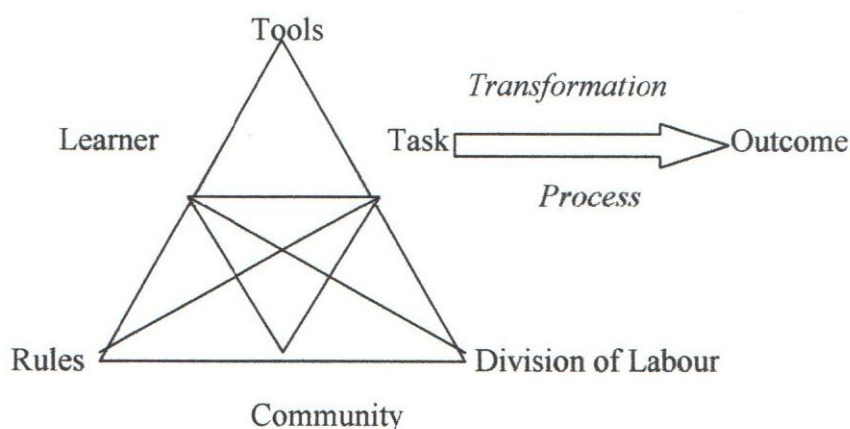


Figure 2 : Representation of Activity System

Engeström (1987) conceived Activity Systems as shown in Fig. 2. There are three mutual relationships between the learner, the task and the community. The relationship between learner and task is mediated by tools, while the relationship between learner and community is mediated by rules. The relationship between task and community is mediated by the division of labour. The tool is anything used in the transformation process while the rules are explicit and implicit norms, conventions and social relations within a community. The division of labour is the clear and implied organization of a community as related to the transformation process of the task into the outcome. Activities are not isolated units, but nodes in crossing hierarchies and networks which are influenced by other activities.

In this study, ICTs are viewed as tools that may be used to improve the quality of instruction, student's record management and intra-university communication. Activity theory gives an understanding of how to link different aspects of classroom management. For example, there can be a rich understanding of intersection of tools, tasks and culture in handling different situations in class. Activity theory also helps understand that students can actively be engaged in the learning environment and interact with learning materials. With the mix of tutor guidance and active learning, students are able to teach each other new content and promote learning. Activity Theory therefore provides an effective framework for understanding and describing the learning experience for students, teachers and administrators when using technology.

2.9 The Conceptual Framework

The perception of the influence of ICT integration on quality of instruction, students' records management and intra-university communication in Kenyan universities may be articulated by the perception of lecturers, students and senior administrative staff. Figure 3 shows a diagrammatical representation of the relationship between the variables.

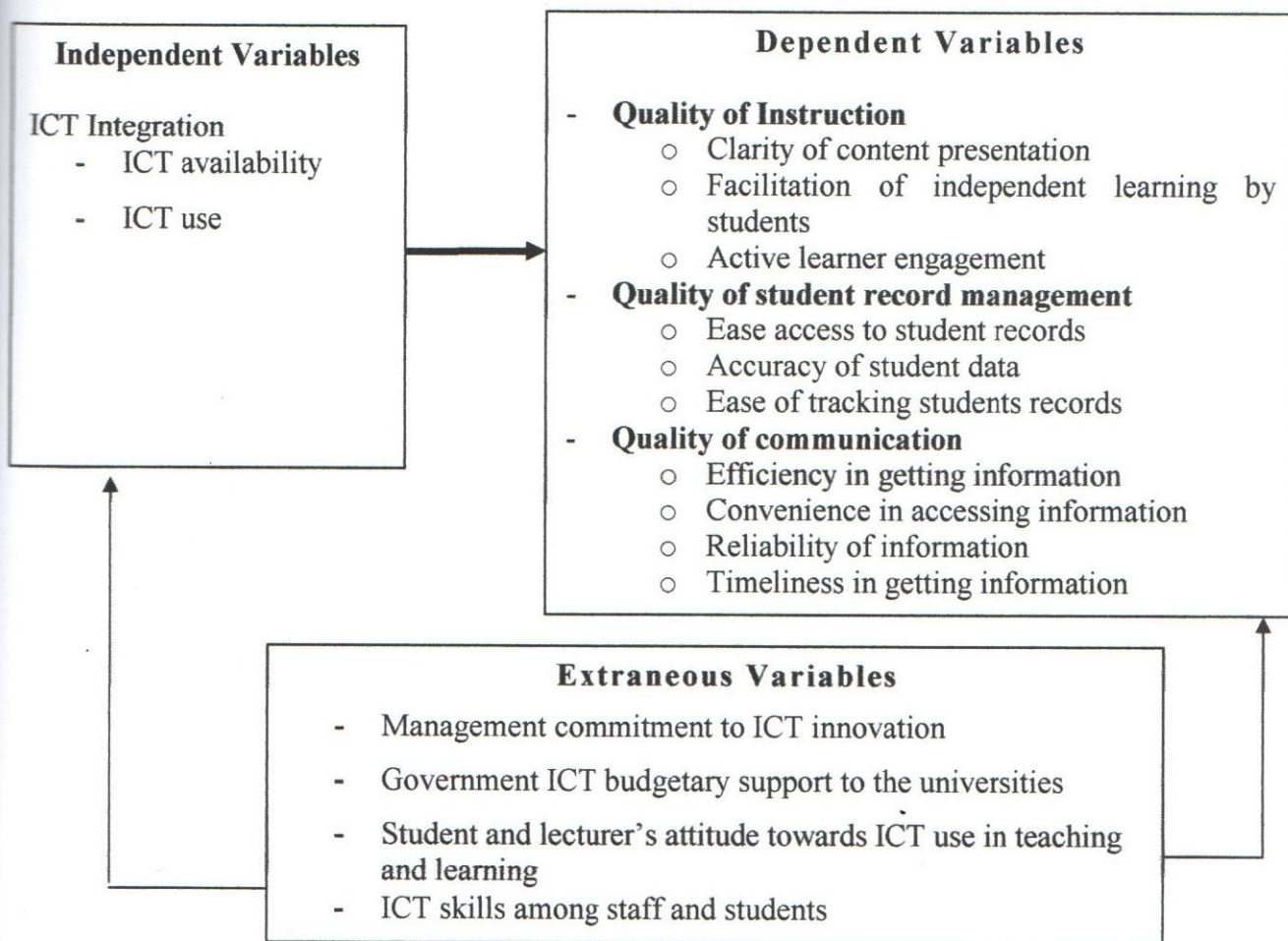


Figure 3: Relationships between Variables of the Study

From the conceptual frame-work, the independent variable of the study was ICT integration, which encompassed ICT availability and ICT usage in the universities. On the other hand, this independent variable was perceived by students and lecturers to influence the quality of instruction, quality of students' records management and quality of intra- university communication, which were the dependent variables.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the research methodology by describing the research design, location of the study, target population, sampling procedures and the sample size, instrumentation, data collection and analysis procedures.

3.2 Research Design

The research design was descriptive survey. This study design can be used to describe the characteristics of a particular individual or group of variables (Kothari, 2007). It can also be used to determine how people felt about a particular issue by enabling them to describe their experiences (Mc Burney & White, 2004). Descriptive survey design lays a greater emphasis on sample selection because the major concerns is to obtain a broad picture of the social problem prevailing in the defined universe and make recommendations to bring about the desired change (Majumdar, 2005). It was ideal because surveys are suitable for sampling a relatively large population. Ndirangu (2000) argues that surveys are very good vehicles for collecting original data for the purpose of studying attitudes and orientations of a very large population.

3.3 Location of the Study

The study was carried out in the Nairobi metropolitan. According to the Ministry of Nairobi Metropolitan (2008), Nairobi metropolitan is that region that extends some 32,000 square kilometers from Nairobi city centre. This covers 15 No. local authority areas – City Council of Nairobi (684 km²); County Councils of Kiambu, Olkejuado, Masaku and Thika; Municipal Councils of Ruiru, Thika, Kiambu, Limuru, Mavoko, and Machakos; and Town Councils of Karuri, Kikuyu, Kajiado, and Kangundo. This region includes areas in which the institutions of the study are located. This region significantly depends on the city for employment and social facilities. This region has the highest number of both public and private universities.

3.4 Target Population

The target population comprised of all individuals and objects that the researcher could

reasonably generalize findings to (Cooper & Schindler, 2006; Mugenda, 2008). The target population for this study was all the students, lecturers and senior administrative staff in all the public and private universities in Nairobi Metropolitan. For the purpose of this study, the target population is as shown on Table 1:

Table 1
Target Population

Universities	No. of Students	No. of Lecturers	No. of Administrative staff
Public Universities			
University of Nairobi	33,806	1,411	330
Kenyatta University	17,662	720	250
Jomo Kenyatta University of Agriculture & Technology	5,637	503	150
Private Universities			
Strathmore University	1,818	208	100
Daystar University	3,906	220	140
Catholic University of East Africa	3,256	200	110
United States International University	3,407	210	100
Scott Theoretical College	245	50	20
Aga Khan University	567	65	40
Nazarene University	1,469	150	70
Methodist University	2,198	180	80
Kiriri Women University of Science and Technology	768	70	30
Total	74,739	3,987	1,420

Source: Respective University's Websites and Kenya Statistical Abstract 2008.

There were some key characteristics of the population that were of interest in this study. Nairobi metropolitan area has experienced a decline in the cost per megabyte in KES of data transmitted

ICT services are closer to the people than any other region in Kenya (Kenya National Bureau of Statistics, 2010). This area has highest proportion of the population in Kenya using computers and the Internet. The region leads in the ownership of all basic household ICT equipment and Internet connectivity in the country. This implies that the population in this region is likely to be exposed to higher experiences in using ICTs and has a generally good ICT infrastructure.

3.5 Sampling Procedures and Sample size

Purposive sampling was used to select the universities from which the sample was drawn. The main objective in this type of sampling was to pick cases that were typical of the population being studied. The researcher's judgment was used to select the respondents who best met the purposes of the study. Three public universities were selected because they were the only public universities with their main campuses within Nairobi metropolitan. The three private universities were selected because they were among the first established among all the private universities. Table 2 shows the selected universities from which the sample was drawn. Stratified random sampling was then used to select the three categories of respondents namely; students, lecturers and senior administrative staff from the target population. Students were sampled because the ICT policies were expected to facilitate their learning, communication and management. Lecturers were sampled because they were the people who used the ICT for teaching and communication. They also interact with the students on a daily basis. Senior administrative staff were selected because they were considered as the ones who influenced policy decisions. They also used ICT for communication and students' record management.

Table 2:

Accessible Population

These were the universities from which the sample was draw and are as shown on Table 2.

Universities	Students	Lecturers	Administrative staff	Total
University of Nairobi	33,806	1,411	330	35,547
Kenyatta University	17,662	720	250	18,632
Jomo Kenyatta University of Agriculture & Technology	5,637	503	150	6,290
Strathmore University	1,818	208	100	2,126
Daystar University	3,906	220	140	4,266
Catholic University of East Africa	3,256	200	110	3,566
Total	66,085	3,262	1080	70,427

Source: Respective University's Website and Kenya Statistical Abstract 2008.

According to Mugenda and Mugenda (1999), the minimum sample size can be determined using the following formula:

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

Where:

n = the minimum sample size if the target population is greater than 10,000

Z = the standard normal deviate at the required confidence level.

p = the proportion in the target population estimated to have characteristics being measured. Use 0.5 if unknown.

$$q = 1-p$$

d = the margin of error.

If the target population is less than 10,000 then the minimum sample size is obtained using the formula:

$$n_s = \frac{n}{1 + \frac{n}{N}}$$

Where:

n_s = the minimum sample if the target sample size is less than 10,000

n = the minimum sample size if the target population is greater than 10,000

N = the estimate of the population size.

Using the Mugenda and Mugenda formulae, the relationship between sample size and total population is that as the population increases the sample size increases at a diminishing rate and remains relatively constant at slightly more than 380 cases.

Table 3 shows the distribution sample size calculated using the formulas above with $Z=1.96$, $p=q=0.5$ and $d = 0.05$. A sample size of 386 students, 344 lecturers and 285 administrative staff was obtained that totaled up to 1015.

Table 3:

Sample Size

Universities	Students	Lecturers	Administrative staff	Total
University of Nairobi	197	149	87	433
Kenyatta University	103	76	66	245
Jomo Kenyatta University of Agriculture & Technology	33	53	40	126
Strathmore University	11	22	26	59
Daystar University	23	23	37	83
Catholic University of East Africa	19	21	29	69
Total	386	344	285	1,015

Once the required sample size was determined, proportional allocation was used to obtain the number of students, lecturers and administrative staff that were included in the sample from each of the selected universities. For example, the sample of 197 students from Nairobi University was calculated as follows:

$$\frac{33806}{66085} \times 386 = 197$$

The other sample sizes were calculated in a similar manner. To select individual respondents, the researcher visited the university students' common halls where the questionnaires were given to the individual students who had identifications. The respondents of interest in this case were the university student and hence, there was no need to identify the respondents through their departments or faculties. For the lecturers, the researcher visited their offices and gave individual respondents the questionnaire while in the case of administrative staff, the researcher booked appointments with each individual and interviewed them.

3.6 Instrumentation

Two self constructed questionnaires were used to collect data, one for each of the categories of respondents, the students and lecturers. These were the students' questionnaire (QS), and the Lecturers' questionnaire (QL). An interview guide namely senior administrator's interview guide (SAIG) was used to collect data from the senior university administrators.

3.6.1 Students' Questionnaire (QS)

The students' questionnaire collected information from the students. This questionnaire was used to identify the ICT facilities available in the universities, and the use of these facilities by students for learning, intra university communication and accessing their records. It also captured the student's perception on the influence of ICT integration on quality of instruction, students' records management and intra-university communication. It had fifty nine questions distributed among three sections. A five point Likert scale and dichotomously scored items were used.

3.6.2 Lecturers' Questionnaire (QL)

The lecturers' questionnaire collected information from the lecturers. The questionnaire was expected to capture the following: ICT facilities available in the university for lecturers in

teaching, intra-university communication and students' records management. It also captured the lecturers' opinions on the influence of ICT integration on quality of instruction, Students' records management and communication. It had sixty-two questions distributed among three sections. A five point Likert scale and dichotomously scored items were used.

3.6.3 Senior Administrator's Interview Guide (SAIG)

The Senior Administrator's Interview Guide (SAIG) collected information from the senior universities administrators. The interview guide captured the following: Availability of ICT resources in the university for use by students and lecturers. It had five questions.

3.7 Validity

This is the degree to which correct inferences can be made based on results from an instrument (Fraenkel & Wallen, 2003; Christensen & Johnson, 2000). Content and construct validity were determined. Construct validity is the degree to which an instrument measures an intended hypothetical psychological construct or non-observable trait, while content validity is the degree to which an instrument logically appears to measure an intended variable. It is determined by expert judgment (Fraenkel & Wallen, 2003). Five lecturers from the Department of Curriculum, Instruction and Educational Management at Egerton University Njoro, were given the instruments to help ascertain these dimensions of validity. Pilot testing was then done so that any weak items could be reviewed and any missing information included, based on the outcome of the exercise. Piloting was done at KCA University which did not participate in the actual study. Twelve respondents from the three categories of subjects to be studied were selected. These numbers are supported by Julious (2005), who argues that when there is no prior information to base a sample size on, the recommended sample size for a pilot study is twelve (12) subjects per group of respondents.

3.8 Reliability

Reliability refers to the consistency or stability of the scores got from tests and assessment procedures (Christensen & Johnson, 2000). If a test or assessment procedure is reliable, it will produce similar scores or responses on every occasion. Data obtained from the pilot study was used to compute the reliability of the instruments. For this study, reliability was measured using

Cronbach alpha coefficient. The overall reliability coefficient of the students' questionnaire was 0.83 and the lecturers' questionnaire was 0.72. Reliability of 0.70 or above was acceptable for the research (Swales & Bhatti, 2002). Cronbach Alpha was the most appropriate method for use when the items are weighted or the rating scale is summated (Gliem & Gliem, 2003).

3.9 Data Collection Procedures

A letter of introduction was obtained from the Graduate School of Egerton University to the National Council of Science and Technology to apply for the research permit. After this, participating universities were contacted for permission to conduct the research in their institutions. Administrators, lecturers and students of the selected universities in the study were then informed of the intended study in writing. Appointments were booked when the researcher would visit the universities to administer the questionnaires and interview the senior administrators. The researcher administered the questionnaires in person to the respondents in order to increase the response rates. The respondents were given two weeks to fill them in and thereafter the researcher collected them for analysis.

3.9.1 Data Analysis

Both qualitative (from interviews) and quantitative (from questionnaires) data was obtained for analysis. Immediately the questionnaires were received, they were checked for accuracy. This was done by checking whether the responses were legible, whether all important questions were answered, whether the responses were complete and whether all the contextual information was included (Kombo & Tromp, 2006). A coding system was used to find a quick and easy way to organize the data so that it could be analysed. Codes are used to identify particular responses (Robson, 1993). The interview results were analyzed using thematic analysis. This was done where the responses were written down and grouped into similar arguments to draw a conclusion. Once the data was coded, it was entered into the computer for analysis. The Statistical Package for Social Sciences (SPSS version 12) was used for data analyses. Descriptive statistics in form of means, standard deviations and percentages were used to analyse data from questionnaires. ICT integration index and quality of instruction, quality of students' management and quality of intra-university communication indices were correlated using Pearson Product-moment Correlation Coefficient. The assumption in using Pearson Product-moment Correlation

Coefficient was that the data type was interval data that was normally distributed from a randomly selected sample. T-test was used to determine if the means were significantly different between the extent of ICT integration in public and private universities. T-test was used with the assumption that the data type was interval data that was normally distributed with two independent samples that had equal variances. All tests of significance were tested at a confidence level of 95%.

Table 4:
Summary of Data Analysis

Objective/ Hypothesis	Independent variables	Dependent Variables	Statistical Technique
i) To determine the extent of integration of ICT in instruction, students' records management and intra-university communication.	ICT integration	Instruction, students' records management and intra-university communication.	Percentages and Means
ii) To establish the influence of ICT integration on quality of instruction.	ICT Integration	Quality of Instruction ▪ Content presentation ▪ Self paced learning ▪ Intellectually stimulating	Pearson Product-moment Correlation Coefficient
iii) To establish influence of ICT integration on quality of students' records management.	ICT Integration	Quality of Student's Record Management ▪ Access to student records ▪ Accuracy of student data ▪ Easily track students records	Pearson Product-moment Correlation Coefficient.
iv) To determine the influence of ICT integration on quality of intra-university communication.	ICT Integration	Quality of Communication ▪ Efficiency ▪ Convenience ▪ Reliability ▪ Timeliness	Pearson Product-moment Correlation Coefficient
v) H ₀₁ There is no statistically significance difference in integration of ICT in instruction, students' records management and intra-university communication between public and private universities.	ICT Integration In Public and Private Universities	Quality of Instruction, intra-university communication and students' records management	T-test.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1. Introduction

This study investigated the influence of ICT integration on quality of instruction, students' records management and intra-university communication in Kenyan universities. This chapter presents the results and discussion of the findings of the study. The responses from the respondents were analyzed using SPSS version 12 for windows. The study sought to answer the following research questions and hypothesis:

- i) What is the extent of integration of ICT in instruction, students' records management and intra-university communication?
- ii) How is ICT integration influencing quality of instruction?
- iii) How is ICT integration influencing quality of students' records management?
- iv) How is ICT integration influencing quality of intra-university communication?
- v) H_{01} There is no statistically significant difference in integration of ICT in instruction, students' records management and intra-university communication between public and private universities.

4.2 Response Rate

Two hundred and thirty one (231) students' and 219 lecturers' questionnaires respectively, were filled, returned. A sample of 122 senior administrative staff were interviewed. This gave a response rate of 60% for students, 64 % for lecturers and 43% for senior administrative staff. This response rate was favorable according to Mugenda and Mugenda (2003) in which they assert that a 50% response rate is adequate, 60% good and above 70% rated very well. Saunders, Lewis and Thornhill (2007) suggest that an average response rate of 30% to 40% is reasonable for deliver and collect survey method. Hager, Wilson, Pollack and Rooney (2003) recommend 50% while Sekaran (2003) recommends 30% as an adequate response rate for descriptive surveys. Based on these assertions, this implied that the response rate for this study was adequate.

4.3 Extent of Integration of ICT in Instruction, Students' Records Management and Intra-University Communication

The first objective of the study was to investigate the extent of integration of ICT in instruction, students' records management and intra-university communication. The measures of ICT integration were ICT availability and use. In order to achieve this objective, analysis was done at three levels in these aspects. On the first level on availability, the aspects investigated were:

- i) ICT resource availability for instruction
- ii) ICT resource availability for students' records management
- iii) ICT resource availability for intra-university communication

Students, lecturers and senior administrative staff responded in the three areas.

4.3.1 Students' Awareness of the Availability of ICT Resources for Instruction

Students were asked whether they were aware of the availability of ICT resources for instruction in their universities. Their responses were as shown on Table 5:

Table 5:

ICT Resources Available for Instruction

ICT Resources	N	Responses (%)	
		Yes	No
Personal computers	231	89.2	10.8
Projectors (LCD)	230	82.6	17.4
E-learning management system	231	65.4	34.6
E-journals	228	55.7	44.3
Interactive CD or DVD	226	62.8	37.2
Video cameras	227	57.3	42.7
Face-book/twitter	224	80.8	19.2
Online experts	219	53.0	47.0
Search engines	221	61.5	38.5
Video conferencing	225	39.1	60.9
News groups	226	47.8	52.2
Blogs	224	54.9	45.1
Wikis	226	53.1	46.9
Video podcasts	224	22.3	77.7

Source: Field data

Table 5 shows that majority of the universities sampled had computers and projectors used for teaching and learning, judging by the high percentage of students' responses on their awareness of the existence of personal computers (89.2%) and projectors (82.6%) for instruction. At the same time, it was apparent that the computers were connected to the Internet based on the high percentage rate of awareness of face-book (80.8%), e-learning management systems (65.4%) and search engines (61.5%). According to the e-readiness survey report of East African universities of 2009, about 50% of the universities had an e-learning management system. This would appear to be so among the metropolitan universities where there is a high number of students who were

aware of the existence of an e-learning management system in their institutions. However, students were less aware of other online ICT resources for instruction such as video-conferencing (39.1%), newsgroups (47.8%), and Video podcasts (22.3%). This may be attributed to the fact that they were likely not to be using them as part of the learning tools in their programs. The students may also not be aware of the availability of these technologies for learning. In a study conducted to determine undergraduate and high school students' attitudes towards the use of Web 2.0 technologies in English, Yalcin (2011) reported that lack of awareness of Web 2.0 tools by both students and lecturers reduced their efficacy in teaching and learning.

Students' data on awareness of the availability of ICT resources for instruction was analyzed using descriptive statistics and in particular, percentages and means. Means were used to compute an ICT availability index for instruction. The ICT availability index was computed by first assigning value 0 for a No response and value 1 for Yes response since the items on the questionnaire under ICT resource availability for instruction were dichotomously scored. The scores for each individual respondent were summed up and divided by 14 to get individual mean score. The total number of items under ICT availability for instruction were Fourteen (14). To get the mean score for 231 respondents, the sum of individual index for availability was divided by 231. The range of scores was 0 to 1. A decision rule was determined as a basis of judgment on the degree of awareness of availability of ICT resources for instruction. The decision rule was that if the mean score was greater than 0.5, then students were aware of the availability of ICT resources for instruction, otherwise, they were regarded as not aware of the availability of ICT resources for instruction. An ICT availability index was eventually computed and a mean index for 231 items was 0.60 ± 0.25 . Therefore, a mean score of 0.60 indicated that students were aware of the availability of ICT resources for instruction.

4.3.2 Student's Awareness of the Availability of Students' Records Management Systems

On the availability of ICT facilities for maintaining their records, the students were asked if they were aware of the availability of their personal records from the university database systems and

can access them through the intra-university network or the internet. Their responses were as shown on Table 6:

Table 6:

Records Available to Students

Records Available	N	Responses (%)	
		Yes	No %
Fees balances	231	65.4	34.6
Exam transcripts	224	54.9	45.1
Exam results	228	53.1	46.9

Source: Field data

Table 6 shows that the students were aware of the availability of their personal records such as fees information (65.4%), exam transcripts (54.9%) and exam results (53.1) on their university's database system. On the open ended part of this question, they indicated that they were aware of their other records online such as the loans given to them by the Higher Education Loans Board hostel booking information and registration for courses information.

An ICT availability index in students' records management was also computed and a mean index for 231 items was 0.57 ± 0.38 . The ICT availability index was computed by first assigning value 0 for a No response and value 1 for Yes response. The scores for each individual respondent were summed up and divided by 3 to get individual mean. Three (3) were the total number of items under ICT availability for students' records management. To get the mean score for 231 respondents, the sum of individual index for availability was divided by 231. The range of scores was 0 to 1. Therefore, a mean score of 0.57 indicated that students were aware of the availability of ICT resources for students' records management.

4.3.3 Students' Awareness of the Availability of ICT Resources for Intra-University Communication

Students were asked whether they were aware of the availability of ICT resources for intra-university communication in their universities. Their responses were as shown on Table 7:

Table 7:

ICT Resources available for Intra-University Communication

ICT Resources	N	Responses (%)	
		Yes	No %
Mobile phone	231	98.7	1.3
E-mail	231	92.6	7.4
Bulk SMS	231	68.0	32.0

Source: Field data

From Table 7, most students were aware of the mobile phone's use (98.7%) for intra-university communication. This is probably because use of the mobile phone enables faster communication and feedback. This observation is supported by Leung and Wei (2000) who argues that mobility, immediacy and instrumentality were the strongest instrumental motives for cell phone use. Retting (2003) observed that college students familiarity and confidence with information technology had created expectations of immediacy, interactivity, personalization and mobility. The mobile phone is also the fastest growing and most popular ICT resource in Kenya. This is due to heavy investment in telecommunications and particularly in mobile phone services (Tilvawala, Mylers & Andrale, 2009). In a study to investigate mobile practices of Irish teenagers, Cawley and Hynes (2010) reported that the mobile phone was a deeply embedded device in the lives of teenagers. This is also echoed by Ruppel and Vecchione (2012) in a study titled "It's research made easier! SMS and chat reference perceptions", who reported that more students owned a mobile phone than a laptop or a personal computer. This observation would seem to apply to Kenya as well.

Table 7 also shows that 92.6 % of students were aware of the availability of e-mail services for intra-university communication. This is an indication that the use of e-mail for intra-university

communication has grown tremendously over the years. Kashorda and Waema (2008) had earlier reported that 72% of the students in Kenya were using e-mail.

Bulk SMS messaging is the medium that enables instantaneous notification of a target group of people, regardless of their location, on an issue of common interest. From Table 7, 68% of the students were aware of the existence of the bulk SMS messaging services in their institutions. The reason why the percentage in awareness of bulk SMS system was lower than that of the e-mail was probably because the e-mail has been in use much longer than messaging (Isaacs et al., 2002). When sending the bulk SMS, there is the assurance that it reaches the inbox of the correct recipient and in most cases, it will be the recipient who will open it (Raju, 2011). For this reason most of the organizations and universities prefer the SMS to reach their customers (students). This explains the high percentage of students' awareness of the existence of bulk SMS messaging in their universities. Lenhart et al. (2010) pointed out that taking a look at future students, it is likely that one in three teens would send more than 100 text messages a day or 3000 texts within a month. Smith (2011) also echoed that 9 in 10 smart phone owners used text messaging with about 95% of 18 to 29 year olds sending or receiving text messages. It seems only natural for the university administration to take advantage of this technology already in the hands of students and use it for intra-university communication.

An ICT availability index in intra-university communication was computed and a mean index for 231 items was 0.86 ± 0.21 . The ICT availability index was computed by first assigning value 0 for a No response and value 1 for Yes response. The scores for each individual respondent were summed up and divided by 3 to get individual mean. Three (3) were the total number of items under ICT use for intra-university communication. To get the mean score for 231 respondents, the sum of individual index for use was divided by 231. The range of scores was 0 to 1. Therefore, a mean score of 0.86 indicated that students were using ICT resources for intra-university communication. Therefore, a mean score of 0.86 indicated that students were aware of the availability of ICT resources for intra-university communication.

4.3.4 Lecturers Awareness of the Availability of ICT Resources for Instruction

The next aspect of the question investigated lecturers' perceptions on ICT integration in instruction, students' records management and intra-university communication. Table 8 shows their responses:

Table 8:
Availability of ICT Resources for Instruction

ICT Resources	N	Responses (%)	
		Yes	No
Personal computers	207	96.1	3.9
Projectors (LCD)	206	93.7	6.3
E-learning management system	183	86.3	13.7
E-journals	174	80.5	19.5
Interactive CD or DVD	168	79.8	20.2
Video cameras	154	51.3	48.7
Face book/twitter	150	64.7	35.3
Online experts	145	53.8	46.2
Search engines	147	60.5	39.5
Video conferencing	148	37.8	62.2
News groups	148	41.9	58.1
Blogs	146	39.0	61.0
Wikis	142	35.9	64.1
Video podcasts	110	34.5	65.5

Source: Field data

From Table 8, it is clear that the universities had made available ICT resources for use by their teaching staff, judging by the fact that the majority were aware of the existence of personal computers (96.1%), LCD projection systems (93.7%), e-learning management systems (86.3%) and e-journals (80.5%). It would also appear from Table 8 that individual universities in the

Nairobi metropolitan area were investing substantially in ICT and in particular making available the Internet. This is because lecturers were aware of the availability of ICT services such as e-learning management systems (86.3%), e-journals (80.5%), Face-book/twitter (64.7%), search engines (60.5%) and online experts (51.3%) that become available with Internet connectivity. Kenyan universities have continued to invest in increasing bandwidth through the KENET Consortium of Kenyan Higher Education Institutions while the government on the other hand is improving the regulatory environment to ensure the growth of the ICT sector (Kashorda & Waema, 2008). However, lecturers were less aware of online resources for teaching and learning such as video-conferencing (37.8%), newsgroups (41.9%), and Video podcasts (34.5%). In a study of the use of Web 2.0 tools in Library and Information Science education in India, Sawant (2012) reported that the academics' had a low level of awareness of the Web 2.0 tools such as Wiki, blogs and podcasts for instruction. This may be attributed to the fact that they probably lacked the skills and confidence to use them in teaching as observed by the same author who pointed out that the effective use of Web 2.0 applications was dependent on academics' familiarity and interaction with these tools and the opportunities that they had for exposure to the applications as well as their level of skills. This Indian experience would seem to apply to Kenya as well.

In a recent report by the Kenya Ministry of Higher Education, Science and Technology, entitled "Tivet ICT Baseline Survey Report 2011", it was observed that teaching staff lacked confidence to integrate ICT in teaching and learning, bearing in mind that this was true even among teaching staff that had ICT knowledge. Other authors had earlier pointed out that geographical location and financial constraints were no longer the key barriers to the use ICT but limited familiarity and comfort with such technology (Luck & Laurence, 2005; Lee & Hutton, 2007).

An ICT availability index in instruction was eventually computed and a mean index for 210 items was 0.53 ± 0.27 . The ICT availability index was computed by first assigning value 0 for a No response and value 1 for Yes response. The scores for each individual respondent were summed up and divided by 14 to get individual mean. Fourteen (14) were the total number of items under ICT availability for instruction. To get the mean score for 210 respondents, the sum of individual index for availability was divided by 210. The range of scores was 0 to 1.

Therefore, a mean score of 0.53 indicated that lecturers were aware of the availability of ICT resources for instruction.

4.3.5 Lecturers' Awareness of the Availability of ICT Resources for Student's Records Management

Lecturers were asked whether they were aware of ICT resources for students' records management in their universities. Their responses were as shown on Table 9:

Table 9:

ICT Resources for Students' Records Management

ICT Resources	N	Responses (%)	
		Yes	No
Spreadsheet programs for entering students grades	189	88.9	11.1
Database programs for maintaining students records	182	86.3	13.7
Grade book templates for tracking students grades	174	72.4	27.6
E- learning platform for maintaining students records	180	70.0	30.0

Source: Field Data

From Table 9, most lecturers were aware of the availability of ICT resources for students' records management, judging from the fact that 88.9% were aware of spreadsheet programs for entering students' records, while 86.3% were aware of the existence of database programs for maintaining and tracking students' records. Li, Moselhi and Alkass (2006) argue that database systems are essential in supporting project tracking and control functions. Further, Table 9 shows that 70% of the respondents were aware of the availability of the e-learning platforms for maintaining students' records. This is because, many universities in the Nairobi metropolitan like Kenyatta and Daystar Universities were increasingly making available to the lecturers the ICT resources such as the Uni-plus online database and online grade book systems respectively for entering students' grades and keeping other students' records like class attendance. It would appear that the universities expect lecturers to be aware of these ICTs for students' records management. Lloyd (2005) argues that the intent of the lecturer in using ICT may be to meet

mandatory requirements or meet community expectations to use ICT rather than to provide truly new integrative experiences.

An ICT availability index in students' records management was eventually computed and a mean index for 191 items was 0.76 ± 0.31 . The ICT availability index was computed by first assigning value 0 for a No response and value 1 for Yes response. The scores for each individual respondent were summed up and divided by 4 to get individual mean. Four (4) were the total number of items under ICT availability for students' records management. To get the mean score for 191 respondents, the sum of individual index for availability was divided by 191. The range of scores was 0 to 1. Therefore, a mean score of 0.76 indicated that lecturers were aware of the availability of ICT resources for students' records management.

4.3.6 Lecturers Awareness of the Availability of ICT Resources for Intra-university Communication

Lecturers were also asked whether they were aware of ICT availability for intra-university communication. Table 10 shows their responses:

Table 10:
ICT Resources for Intra-university Communication

ICT Resources	N	Responses (%)	
		Yes	No
Bulk SMS system	177	79.7	20.3
E-mail broadcasts	177	88.4	11.6
Mobile phone	179	87.0	13.0

Source: Field Data

From Table 10, it is clear that most lecturers were aware of the availability of ICT resources for intra-university communication. This is judging by the fact that 88.4% of the respondents were aware of the e-mail broadcasts while 87% were aware of the availability of the mobile phone for intra-university communication. On the open-ended part of this question, the lecturers indicated that they were aware of their university's website which was also used for communication. They

reported that they were informed of the university reporting dates and graduation dates from the university website. In a study to investigate the use of ICTs in Higher Education Institutions in Mozambique, Zeininger (2009) reported the use of the websites for information communication and service delivery. He pointed out that websites acted as ambassadors that made higher education institutions visible, better linked and better able to satisfy the digital environment of both staff and students.

Ranking of universities and research institutions using their websites has become a common practice. Webometrics ranking is among the first ranking that ranks world universities based on their online visibility through their websites (University of Nairobi Annual Report, 2011). If the content on the website is enriched and the design improved, then the website is likely to be ranked higher in the webometrics ranking. Some of the universities in the study have performed well in the webometrics ranking like in January 2012, University of Nairobi was ranked 17th in Africa, and 1st in Kenya, (University of Nairobi Annual Report, 2011). This meant that the university's website was made available to students, lecturers and the world at large and its content was enriched for good communication with students, lecturers and the external environment.

An ICT availability index in intra-university communication was eventually computed and a mean index for 183 items was 0.81 ± 0.28 . The ICT availability index was computed by first assigning value 0 for a No response and value 1 for Yes response. The scores for each individual respondent were summed up and divided by 3 to get individual mean. Three (3) were the total number of items under ICT availability for intra-university communication. To get the mean score for 183 respondents, the sum of individual index for availability was divided by 183. The range of scores was 0 to 1. Therefore, a mean score of 0.81 indicated that lecturers were aware of ICT resources for intra-university communication. Therefore, a mean score of 0.81 indicated that lecturers were aware of the availability of ICT resources for intra-university communication.

4.3.7 Availability of ICT Resources for Instruction as Perceived by Senior Administrative Staff

Another aspect of the first objective investigated availability of ICT resources for instruction as perceived by senior administrative staff based on a number of criteria. The results were as indicated on Table 11:

Table 11:
Senior Administrators' Responses on Availability of ICT

ICT resources Availability	Senior Administrators' Responses by University (N= 122)					
	Nairobi	KU	JKUAT	Daystar	Catholic	Strathmore
i) Average number of students per computer in the university	14	13	12	9	5	1
ii) Percentage of computers connected to the Internet (%)	90	95	80	100	100	100
iii) Internet bandwidth per 1000 students in the university (Mb/s)	5	4	2	1	2	3
iv) Presence of a separate budget line for ICT	Yes	Yes	Yes	Yes	Yes	Yes
v) Total ICT cost as a percentage of the total expenditure of the institution (%)	9	10	3	4	5	6

Source: Field Data

Table 11 shows that the average number of students per computer in the universities varied from one university to the other. Strathmore had the lowest number of students per computer while Nairobi University had the highest number. Strathmore's ICT policy could be advocating for personalized ICT use thus having a computer-student ratio of 1:1. However, student-computer ratio may be affected by the number of students in a university. Private universities had smaller numbers of students as compared to public universities. Therefore, their computer-students ratio was lower as is shown on the Table. According to the KENET e-readiness survey in 2007, the

recommended benchmark on computer-student ratio was 1 personal computer per 10 students. Thus, all private universities have surpassed this ratio.

Table 11 further shows that the percentage number of computers connected to the Internet is above 80% in all universities surveyed. This showed a deliberate effort by the universities' management to ensure use of ICT for learning. Public universities had larger numbers of students and bigger campuses than private universities and therefore, it would be expensive to connect all computers to the Internet. However, these universities seem to be doing reasonably well.

On Internet connectivity speeds or bandwidth, Table 11 shows that all universities had very good Internet speeds with the University of Nairobi's Internet bandwidth at 5Mb/s per 1000 students while Kenyatta university bandwidth per 1000 students was at 4Mb/s. Private universities had also good bandwidth connections per 1000 students ranging from 3mb/s in Strathmore University to 1mb/s in Daystar University. It would appear that Kenyan universities had improved on their connectivity speeds judging from observations made by Rodrigues (2008), who indicated that most Kenyan universities could only afford about 256 kb/s. According to the KENET e-readiness survey in 2007, Internet bandwidth of 1Mb/s per 1000 students was the recommended benchmark. It would appear that the universities studied had surpassed this. This finding again was an indicator of the Kenyan universities managements' commitment in improving ICT resource availability to students and faculties.

In a study on the impact of the optical fiber network and increased bandwidth on e-resources in Malawi, Mapulanga (2012) points out that institutions of higher learning are migrating from dial-up and leased line types of Internet connectivity, which have been inadequate in provision of e-resources, to interconnections in the optical fiber Super Highway. This has resulted into more bandwidth and more advanced means of communication being available to these institutions (Echezona & Ugwuanyi, 2010). Mapulanga (2012) further argues that universities are now purchasing more bandwidth through the optical fiber networks at lower costs. This justifies the increased bandwidth capacity in Kenyan institutions of higher learning.

With regard to ICT budget allocations, Table 11 shows that the universities had a separate budget line for ICT which catered for Internet bandwidth costs, improvement of campus networks, and acquisition of computers and accessories. It would appear that Kenyan universities had improved on budget allocation to ICT thus disapproving the observations by Swarts and Wachira (2009) when discussing the KENET e-readiness survey in 2007. They observed that institutionally, the leadership in universities had not prioritized ICT, thus resulting into their low allocation of operational budgets. Among the universities studied, Kenyatta University and the University of Nairobi had the highest percentage of total budget allocated to ICT while Daystar and JKUAT had the lowest budgetary allocation to ICT.

ICT availability and use are prime indicators of ICT integration. Availability of ICT alone cannot be a measure of ICT integration. Authors such as Punie, Zinnbauer, and Cabrera (2006) argue that the traditional approach of counting the number of computers (with or without Internet connectivity) according to the number of students in the classroom is an interesting and useful comparative measure but not sufficient to indicate the impact of ICT in education. Therefore usage should also be taken into account, both quantitatively (e.g. frequency of use) and qualitatively (e.g. how are computers used, and for what), as well as usage both by teachers/instructors and students. HELIOS (2006) also analyzed where the different European countries stood in terms of progress in e-learning. The criteria that were taken into account for this analysis were availability of ICT infrastructure and access to ICT. Those countries that were well advanced in e-learning also had specific plans on digital content availability and accessibility. When the basis for ICT use is in place and there is access of ICT to almost everyone at the university, then there is increased ICT integration.

4.4 Use of ICT

The second aspect of the first objective investigated the extent to which the available ICT resources were used in instruction, student's records management and intra-university communication. The findings were reported based on responses from students and lecturers.

4.4.1 Use of ICT Resources in Instruction by Students

Students were asked whether they used the ICT resources in instruction. Their responses were as shown on Table 12:

Table 12:

ICT Use in Instruction by Students

ICT Resources	N	Responses (%)		
		Agree	Neutral	Disagree
Personal computers	230	70.8	11.8	17.4
Projectors (LCD)	226	61.5	16.8	21.7
E-learning management system	229	48.5	16.1	35.4
E-journals	228	37.8	21.8	40.4
Interactive CD or DVD	230	40.0	20.4	39.6
Video cameras	229	28.4	16.6	55.0
Face book/Twitter	228	59.7	13.1	27.2
Online experts	225	36.5	15.9	47.6
Search engines	229	56.3	14.0	29.7
Video conferencing	228	21.4	20.2	58.4
News groups	228	34.2	15.8	50.0
Blogs	230	34.4	25.2	40.4
Wikis	226	41.6	19.0	39.4
Video podcasts	229	19.2	20.1	60.7

Source: Field data

Table 12 shows that not all the ICT resources that were available in the universities were being utilized. For example, 55.7% of students were aware of the availability of e-journals but only 37.8% used them to help them in their learning and research. Sixty five point four percent (65.4%) of the students were aware of the e-learning management systems but only 48.5% were using them. This observation was earlier reported by Badu and Markwei (2005), in a study to

explore the awareness and use of the Internet and its resources by students at the University of Ghana. It was found that most students were aware of the resources in the Internet but used them relatively infrequently. It seems from Table 12 that students were using Personal computers (70.8%), Projection systems (61.5%), Face-book/Twitter (59.7%) and Search engines (56.3%) in instruction. However, the percentages of students using Web 2.0 tools such as blogs (34.4%), wikis (41.6%), video podcasts (19.2%), and news groups (34.2%) were very low. This probably was a result of ignorance, negative attitude, lack of appropriate skills on Internet use and/or technophobia. Some recent studies have found out that many students lack the required skills to use Web 2.0 tools efficiently (Bawden et al., 2007; Hudges, 2009, Al-Daihani, 2010). In a study to investigate whether the social software was really a "killer app" in the education of net generation students, Feuer (2011) pointed out that students reported a moderate amount of usage of Web 2.0 applications with the exception of social networking technologies whose adoption was common place. In a study to explore Internet access and use among undergraduate students in three Nigerian universities, Ani (2010) affirms a relatively poor level of use of online resources, electronic journals and online databases by students.

Students' data on use of ICT resources for instruction was analyzed using descriptive statistics and in particular, percentages and means. Means were used to compute an ICT use index for instruction. The ICT use index was computed by first assigning value 1 for disagree response, 2 for neutral and value 3 for agree response. This was because the questionnaire items under ICT resource use for instruction were on a Likert scale and had to be collapsed as follows: agree and strongly agree were collapsed to agree response, while disagree and strongly disagree were collapsed to disagree response. The scores for each individual respondent were summed up and divided by 14 to get individual mean. Fourteen (14) were the total number of items under ICT use for instruction. To get the mean score for 230 respondents, the sum of individual index for use was divided by 230. The range of scores was 1 to 3. A decision rule was determined as a basis of judgment on the degree of use of ICT resources for instruction. The decision rule was that if the mean score was greater than 1.5, then students were using the ICT resources for instruction, otherwise, they were regarded as not using ICT resources for instruction. An ICT use index was eventually computed and a mean index for 230 items was 2.06 ± 0.56 . Therefore, a mean score of 2.06 indicated that students were using ICT resources for instruction.

To determine the extent of ICT integration in instruction from students' perspective, the ICT integration index was computed by summing up the availability index and use index. The range of scores for ICT availability index in instruction was 0-1 while the range of scores for ICT use in instruction was 1-3. Therefore, the range of scores for ICT integration in instruction was 1-4. A decision rule was determined as a basis of judgment on the extent of ICT integration in instruction. The decision rule was that if the mean score was greater than 2.0, then the extent of ICT integration in instruction was high from the students' perspective; otherwise, the extent of ICT integration for instruction was regarded as low. An ICT integration index was eventually computed and a mean score of 2.65 ± 0.76 was obtained. Therefore, a mean score of 2.65 indicates that the level of ICT integration in instruction from the students' perspective is high.

4.4.2 Student's Use of ICT in Students' Records Management Systems

On the use of ICT facilities for maintaining their records, the students were asked if they were able to access their personal records from their university database systems through the intra-university network or the internet. Their responses were as shown on Table 13:

Table 13:

Records Accessibility by Students

Records Accessible	N	Responses (%)	
		Yes	No %
Fees balances	231	88.3	11.7
Exam transcripts	229	74.7	25.3
Exam results	228	82.0	18.0

Source: Field data

Table 13 shows that the students were able to access their personal records online. This is evidenced by the fact that most of them (88.3%) could access their fees status, 74.7% could access examination transcripts and 82% could access examination results online. On the open ended part of this question, students indicated that they could obtain examination timetables online. They were also informed of the loans given to them by Higher Education Loans Board

(HELB) online, book hostels, register for courses, and get the University programs and receive breaking news online. Sevilla and Shabaya (2007) had observed that academic institutions were automating core functions such as student admission process, fees payment, examination records management among other functions and making them available for students on-line. The impact of this automation is evidenced in some of the universities in the Nairobi metropolitan where management information systems allowed students to register, check their fees balances, and results online (Hoosen, 2010). Acosta (2004) agreed that there was a demand to automate university processes and this demand was becoming important in line with university quality assurance procedures. Automated university services resulted into more accurate information delivery and faster service provision.

Students' data on use of ICT resources for students' records management systems was analyzed using descriptive statistics and in particular, percentages and means. Means were used to compute an ICT use index in students' records management systems. The ICT use index was computed by first assigning value 0 for a No response and a value 1 for Yes response. This was because the questionnaire items under ICT resource use for students' records management were dichotomously scored. The scores for each individual respondent were summed up and divided by 3 to get individual mean. Three (3) were the total number of items under ICT use for students' records management. To get the mean score for 231 respondents, the sum of individual index for use was divided by 231. The range of scores was 0 to 1. A decision rule was determined as a basis for judgment on the degree of use of ICT resources for students' records management. The decision rule was that if the mean score was greater than 0.5, then students were using the ICT resources for students' records management, otherwise, they were regarded as not using ICT resources for instruction. An ICT use index was eventually computed and a mean index for 231 items was 0.81 ± 0.34 . Therefore, a mean score of 0.81 indicated that students were using ICT resources for students' records management.

To determine the extent of ICT integration in students' records management from students' perspective, the ICT integration index was computed by summing up the availability index and use index in students' records management. The range of scores for ICT availability index in students' records management was 0-1 while the range of scores for ICT use in students' records

management was 0-1. Therefore, the range of scores for ICT integration in instruction was 1-2. A decision rule was determined as a basis of judgment on the extent of ICT integration in students' records management. The decision rule was that if the mean score was greater than 1.0, then the extent of ICT integration in students' records management was high from the students' perspective; otherwise, the extent of ICT integration for students' records management was regarded as low. An ICT integration index was eventually computed and a mean score of 1.38 ± 0.55 was obtained. Therefore, a mean score of 1.38 indicates that the level of ICT integration in students' records management from the students' perspective is high.

4.4.3 Use of ICT Resources by Students for Intra-university Communication

The students were also asked whether they used the ICT resources for intra-university communication in their universities. Their responses were as shown on Table 14:

Table 14:

Use of ICT by Students for Intra-university Communication

ICT Resources	N	Responses (%)		
		Agree	Neutral	Disagree
Mobile phone	230	85.7	6.1	8.2
Email	185	70.4	18.7	10.9
Bulk SMS	150	64.9	0.1	35.0

Source: Field data

Table 14 shows that 85.7% of the students indicated that they used mobile phone for intra-university communication while 70.4% used the e-mail. The reason for the high percentage of mobile phone use could probably be its attributes such as affordability, portability, convenience, cost of calling, versatility, and simplicity in usage. McNamara (2009) points out that the interplay between access, affordability, the growing multi-functionality of mobile devices, and the development and roll-out of mobile applications relevant to the needs of majority of the people, makes the mobile phone popular. Hellström (2010), argues that mobile phones make communication more efficient, often more private, and increase efficiency in daily activities, time management and general organization. According to Mintel Survey Report that delved into

smart-phone functionalities used by different age groups within a 30-day period in November 2010, 75% of 18-24 year olds surfed the Internet on their mobile phones while 69% of the same age group used the mobile phone to send or receive SMS (Intel, 2011). This age group is similar to the age of students in the Kenyan universities. Therefore a general characteristic that affects this group of students is that nearly all of them have mobile phones. They can call the lecturers and the university can communicate with them through the bulk SMS. With Internet enabled mobile phones, they can communicate through e-mail or access their universities' websites for information on various issues of concern.

From Table 14, 70.4% of students using e-mail for intra-university communication indicated that communication through e-mail had been recognized as a tool for collaboration amongst the students and their lecturers. In a study to explore Internet use by students of the university of Dar es Salam, Luambano and Nawe (2004) reported that 68% of students used the email for communication purposes. In a study to investigate the differences between instant messaging and e-mail among college students in USA, Lancaster et al., (2007) pointed out that about 91% of those aged 18-19 used email. This widespread usage of the mobile phone by this age group would appear universal among college students.

Table 14 further shows that 64.9% of the students indicated that their universities used the bulk SMS system for intra-university communication. Notable studies on SMS usage have been done in the past and among them are studies by Priporas and Mylona (2008). In a study to explore the reaction of university students towards political SMS campaigns, the researchers found out that students and the young generation in general were difficult to reach with traditional communication tools. Politicians were using mobile technologies such as bulk SMS system to coordinate events and mobilize the students for political campaigns. Another example of bulk SMS use with younger generation was in a US presidential campaign of 2007 where the two major democratic candidates namely Barrack Obama and Hillary Clinton used bulk SMS to communicate with the younger voters (Busk, 2007).

The University administrators use bulk SMS to coordinate events when the students are away from the university. Bulk SMS enable university administrators to communicate important

announcements and notices to all or particular students on issues affecting them (Pal, 2010). This reduces administrative costs in the long-run due to the SMS effect of reaching many students simultaneously (Priporas & Mylona, 2008; Pal, 2010).

In general, Table 12 shows a serious under-utilization of ICT in instruction by students. However, Table 14 shows that ICT was well utilized by students in intra-university communication. One area that was seriously underutilized was the online resources for learning. Luambano and Nawe (2004) pointed out that students' use of the Internet at the University of Dar es Salam for instruction and particularly information retrieval was limited but for communication was quite commendable. Other researchers have supported similar findings, for example, studies conducted by Waema (2000), and Rockman (2004) established that students may have picked skills for sending emails, chat and communicating through social networks, but many had not learnt how to use the Internet for learning purposes. Sandars and Schroter (2007) investigated the use of Web 2.0 technologies by medical students and practitioners. They tried to identify their familiarity and use for medical education and found out that medical students had a high awareness but low usage of Web 2.0 applications with the exception of instant messaging and social networking. In a study to investigate the use of Web 2.0 tools by Greek students, Garoufallou and Charitopoulou (2011) suggested that introducing Web 2.0 into the curriculum would be the most effective way to teach students the use of a variety of Web 2.0 tools such as blogs, wikis and podcasts.

Students' data on use of ICT resources for intra-university communication was analyzed using descriptive statistics and in particular, percentages and means. Means were used to compute an ICT use index for intra-university communication. The ICT use index was computed by first assigning value 1 for disagree response, 2 for neutral and value 3 for agree response. This was because the questionnaire items under ICT resource use for intra-university communication were on a Likert scale and had to be collapsed as follows: agree and strongly agree were collapsed to agree response, while disagree and strongly disagree were collapsed to disagree response. The scores for each individual respondent were summed up and divided by 3 to get individual mean. Three (3) were the total number of items under ICT use for intra-university communication. To get the mean score for 231 respondents, the sum of individual index for use was divided by 231.

The range of scores was 1 to 3. A decision rule was determined as a basis of judgment on the degree of use of ICT resources for intra-university communication. The decision rule was that if the mean score was greater than 1.5, then students were using the ICT resources for intra-university communication, otherwise, they were regarded as not using ICT resources for intra-university communication. An ICT use index was eventually computed and a mean index for 231 items was 2.11 ± 0.78 . Therefore, a mean score of 2.11 indicated that students were using ICT resources for intra-university communication.

To determine the extent of ICT integration in intra-university communication from students' perspective, the ICT integration index was computed by summing up the availability index and use index in intra-university communication. The range of scores for ICT availability index in intra-university communication was 0-1 while the range of scores for ICT use in intra-university communication was 1-3. Therefore, the range of scores for ICT integration in intra-university communication was 1-4. A decision rule was determined as a basis of judgment on the extent of ICT integration in intra-university communication. The decision rule was that if the mean score was greater than 2.0, then the extent of ICT integration in intra-university communication was high from the students' perspective; otherwise, the extent of ICT integration for intra-university communication was regarded as low. An ICT integration index was eventually computed and a mean score of 2.96 ± 0.82 was obtained. Therefore, a mean score of 2.96 indicates that the level of ICT integration in intra-university communication from the students' perspective is high.

4.4.4 Lecturers' Responses on Use of ICT in Instruction

Lecturers were asked whether they were using the ICT resources in instruction. Their responses were as shown on Table 15:

Table 15:
ICT Resources in Use by Lecturers for Instruction

ICT Resources	N	Responses (%)		
		Agree	Neutral	Disagree
Personal computers	187	91.5	1.6	6.9
Projectors (LCD)	195	87.7	5.1	7.2
E-learning management system	174	67.2	15.0	17.8
E-journals	161	59.6	23.7	16.7
Interactive CD or DVD	157	59.8	16.0	24.2
Video cameras	142	40.2	21.1	38.7
Face-book/Twitter	143	42.0	16.7	41.3
Online experts	142	45.1	16.2	38.7
Search engines	141	57.5	9.2	33.3
Video conferencing	139	25.9	1.6	51.8
News groups	141	27.6	5.1	48.2
Blogs	143	25.9	15.0	51.8
Wikis	145	30.3	23.7	46.9
Video podcasts	142	19.7	16.0	52.1

Source: field data

Table 15 shows that the lecturers were using personal computers (91.5%), projection systems (87.7%), e-learning management systems (67.2%), e-journals (59.6%) and search engines (57.5%). Not every ICT resource available to the lecturers was being fully utilized in instruction. For example, 86.3% of lecturers were aware of e-learning management systems but only 67.2% were using them in teaching, while 80.5% of the lecturers knew of the availability of the e-journals but only 59.6% were using them. This probably could be as a result of ignorance on their use, negative attitude, lack of appropriate skills on Internet use and/or technophobia as had been mentioned with respect to the students.

Table 15 also shows that lecturers were not using the Web 2.0 tools such as blogs (25.9%), wikis (30.3%) and video podcasts (19.7%) for instruction. In a research conducted to study the use of Web 2.0 tools in Library Information System education in India, Sawant (2012) presented almost similar results with the ones shown on Table 14 on the use of Web 2.0 technologies in teaching where use of wikis scored 25 % while use of face-book for teaching scored 41.2%. He argued that nearly half of the instructors had never used wikis. He also indicated that the main problem in the use of Web 2.0 tools for instruction was lack of training programs for instructors to use these tools. Use of new learning media such as blogs, wikis and podcasts for facilitating learning in developing countries of Africa was cited to be very low (Ndume et al., 2008). Robler et al. (2010) pointed out that most faculty members clung to old and familiar technologies such as email and were far less likely to adopt and use social media for teaching and student interaction purposes. This was echoed by Cao and Hong (2011) who reported that a significant percentage of the faculty members stuck to the traditional techniques in teaching and communication.

This observation is also supported by Otieno (2008) who pointed out that the expertise levels of lecturers in IT skills were very low. He observed that attitude towards new technologies was a factor responsible for low usage of ICT in colleges. Similarly, Peansupap and Walker (2005) found out that ICT user's motivation was also related to their attitude toward technology such as perceived clear advantage of use, ease of use, relevance to their jobs, and professional credibility. Likewise, Igbaria, Parasuraman and Baroudi (1996) observed that usefulness and ease of use motivated professionals and managers to use computers. In technology acceptance model that explains the use, intention to use and acceptance of new technology, the two predictors of information technology usage are perceived usefulness and ease of use (Lancaster et al., 2007). Users were more likely to use and adopt computer technology if they thought that it was useful in improving their productivity and performance and if it required less effort to learn how to use it. Sawant (2012) further argues that effective use of technology is dependent on academics' familiarity and interaction with technology tools, the opportunities they have for exposure and their level of skills. The universities have a role to play in helping lecturers and students to use ICT facilities by facilitating institution based ICT professional development through ICT seminars or conferences. Cao and Hong (2011) argue that the more ready the faculty members

feel they are, the more likely they will utilize Web 2.0 technologies such as blogs, wikis and podcasts for instruction.

Lecturers' data on use of ICT resources for instruction was analyzed using descriptive statistics and in particular, percentages and means. Means were used to compute an ICT use index for instruction. The ICT use index was computed by first assigning value 1 for disagree response, 2 for neutral and value 3 for agree response. This was because the questionnaire items under ICT resource use for instruction were on a Likert scale and had to be collapsed as follows: agree and strongly agree were collapsed to agree response, while disagree and strongly disagree were collapsed to disagree response. The scores for each individual respondent were summed up and divided by 14 to get individual mean. Fourteen (14) were the total number of items under ICT use for instruction. To get the mean score for 199 respondents, the sum of individual index for use was divided by 199. The range of scores was 1 to 3. A decision rule was determined as a basis of judgment on the degree of use of ICT resources for instruction. The decision rule was that if the mean score was greater than 1.5, then lecturers were using the ICT resources for instruction, otherwise, they were regarded as not using ICT resources for instruction. An ICT use index was eventually computed and a mean index for 199 items was 1.79 ± 0.76 . Therefore, a mean score of 1.79 indicated that lecturers were using ICT resources for instruction.

To determine the extent of ICT integration in instruction from lecturers' perspective, the ICT integration index was computed by summing up the availability index and use index. The range of scores for ICT availability index in instruction was 0-1 while the range of scores for ICT use in instruction was 1-3. Therefore, the range of scores for ICT integration in instruction was 1-4. A decision rule was determined as a basis of judgment on the extent of ICT integration in instruction. The decision rule was that if the mean score was greater than 2.0, then the extent of ICT integration in instruction was high from the lecturers' perspective; otherwise, the extent of ICT integration for instruction was regarded as low. An ICT integration index was eventually computed and a mean score of 2.22 ± 1.03 was obtained. Therefore, a mean score of 2.22 indicates that the level of ICT integration in instruction from the lecturers' perspective is high.

4.4.5 Lecturers’ Responses on Use of ICT for Students’ Records Management

Lecturers were asked whether they used the ICT resources for students’ records management. Table 16 shows their responses:

Table 16:
Use of ICT Resources for Student’s Records Management

ICT resources	N	Responses (%)		
		Agree	Neutral	Disagree
• Spreadsheet programs for entering students grades	184	79.9	10.9	9.2
• Database programs for maintaining students records	185	81.6	8.1	10.3
• Grade book templates for tracking students grades	185	76.7	10.3	13.0
• E-learning platforms for maintaining students records	187	66.9	13.3	19.8

Source: Field data

From Table 16, it was clear that lecturers were using ICT resources for students’ records management judging by the fact that 79.9% of the lecturers were using spreadsheet programs such as Microsoft Excel to enter and compile students’ grades, while 81.6% of the lecturers were using online database programs such as Uni-Plus for entering student’s marks. Seventy six point seven percent (76.7%) were using the grade-book system in doing this. This probably could be as a result of the universities in Nairobi metropolitan having policy requirements that compel all lecturers to use such ICT resources for students’ records management. Lecturers are in-serviced in ICT use for keeping students records such as grades and attendance while at the same time they are expected to produce computerized work as a matter of policy. This includes processing of marks. Lecturers who have no ICT skills have no choice but to learn. This observation is supported by UNESCO International Institute for Capacity Building in Africa (UNESCO-IICBA) whose strategy advocates for capacity building of instructors while, at the same time, producing tangible outputs through the development processes (UNESCO-IICBA, 2012).

Lecturers’ data on use of ICT resources for students’ records management was analyzed using descriptive statistics and in particular, percentages and means. Means were used to compute an

ICT use index for students' records management. The ICT use index was computed by first assigning value 1 for disagree response, 2 for neutral and value 3 for agree response. This was because the questionnaire items under ICT resource use for students' records management were on a Likert scale and had to be collapsed as follows: agree and strongly agree were collapsed to agree response, while disagree and strongly disagree were collapsed to disagree response. The scores for each individual respondent were summed up and divided by 4 to get individual mean. Four (4) were the total number of items under ICT use for students' records management. To get the mean score for 188 respondents, the sum of individual index for use was divided by 188. The range of scores was 1 to 3. A decision rule was determined as a basis of judgment on the degree of use of ICT resources for students' records management. The decision rule was that if the mean score was greater than 1.5, then lecturers were using the ICT resources for students' records management, otherwise, they were regarded as not using ICT resources for students' records management. An ICT use index was eventually computed and a mean index for 199 items was 2.59 ± 0.59 . Therefore, a mean score of 2.59 indicated that lecturers were using ICT resources for students' records management.

To determine the extent of ICT integration in students' records management from lecturers' perspective, the ICT integration index was computed by summing up the availability index and use index in students' records management. The range of scores for ICT availability index in students' records management was 0-1 while the range of scores for ICT use in students' records management was 1-3. Therefore, the range of scores for ICT integration in students' records management was 1-4. A decision rule was determined as a basis of judgment on the extent of ICT integration in students' records management. The decision rule was that if the mean score was greater than 2.0, then the extent of ICT integration in students' records management was high from the lecturers' perspective; otherwise, the extent of ICT integration for students' records management was regarded as low. An ICT integration index was eventually computed and a mean score of 3.19 ± 0.98 was obtained. Therefore, a mean score of 3.19 indicates that the level of ICT integration in students' records management from the lecturers' perspective is high.

4.4.6 Lecturers' Responses on Use of ICT for Intra-university Communication

The lecturers were asked whether they used the ICT resources for intra-university communication. Table 17 shows their responses:

Table 17:
Use of ICT Resources for Intra-university Communication

ICT resources	N	Responses (%)		
		Agree	Neutral	Disagree
Bulk SMS system	184	72.8	8.7	18.5
E-mail broadcasts	181	85.9	0	14.1
Mobile phone	185	85.5	0	14.5

Source: Field data

It was evident from Table 17 that most lecturers were using ICT resources for intra-university communication. Quick and reliable method of mass communication was important in order to keep the university community informed of important university activities. E-mail broadcasts are communication systems put into place that allow a member of the organization to e-mail all of the organization's active members at one time. Eighty five point nine percent (85.9%) of the lecturers were using the e-mail broadcasts for intra-university communication while 85.5% used the mobile phone. Email broadcasts would be used as a communication medium if there was no perceived physical presence to accomplish a particular task. For example, email could be used to make announcements such as meeting schedules (Lancaster et al., 2007).

Bulk SMS systems on the other hand are designed for simultaneous delivery of messages to multiple users in a specified area. From Table 17, 72.8 % of the lecturers were using the bulk SMS system for intra-university communication. According to Rheingold (2002), SMS was actively used because it offered a cost effective, efficient and convenient way of communicating. When used correctly, SMS technology can offer immediate response, more engagement and interaction (Mavuso, Makana & Anbu, 2012). This makes it possible for administrators to communicate with lecturers and students.

One characteristic that a mobile phone has is to dislocate the idea of home (Morley, 2006). This observation is echoed by Cawley and Hynes, (2010) who argued that mobile ICT are anywhere and anytime applications. They also pointed out that the application of the mobile phone as a communication medium tends not to occur among social groups who are sharing the same spaces but among dispersed social contacts. This makes it possible for university administrators, students and lecturers to effectively communicate with each other.

In general, there was a serious under-utilization of ICT resources and in particular the Web 2.0 tools by lecturers for instruction. Web 2.0 tools such as blogs have been used to promote reflective learning among students (Mc Dermott et al., 2010). The usage of blogs also acts as an important tool to enhance team cooperation and foster a learning community within the class (Kan, 2011). Wikis have been used to promote group work (Ramanau & Geng', 2009), and online discussion forums (News groups) to assist with problem-based learning (Makoul et al., 2010). Face- book/Twitter have the potential to support social learning through community networking services such as wall pasting, chatting, content sharing and tagging (Alexander, 2008). Despite the enormous potential and apparent cost effectiveness of new learning media for facilitating social networked learning, its application by institutions of higher learning in developing African countries is low (Ndume et al., 2008). Because of the functionalities provided by the social networking tools, higher education institutions need to ensure that effective usage of these tools is made by both students and lecturers (Kroop et al., 2010). Universities in the Nairobi metropolitan were using ICT resources more in management of students' records and intra-university communication than in the teaching and learning processes.

Lecturers' data on use of ICT resources for intra-university communication was analyzed using descriptive statistics and in particular, percentages and means. Means were used to compute an ICT use index for intra-university communication. The ICT use index was computed by first assigning value 1 for disagree response, 2 for neutral and value 3 for agree response. This was because the questionnaire items under ICT resource use for intra-university communication were on a Likert scale and had to be collapsed as follows: agree and strongly agree were collapsed to agree response, while disagree and strongly disagree were collapsed to disagree response. The

scores for each individual respondent were summed up and divided by 3 to get individual mean. Three (3) were the total number of items under ICT use for intra-university communication. To get the mean score for 187 respondents, the sum of individual index for use was divided by 187. The range of scores was 1 to 3. A decision rule was determined as a basis of judgment on the degree of use of ICT resources for intra-university communication. The decision rule was that if the mean score was greater than 1.5, then lecturers were using the ICT resources for intra-university communication, otherwise, they were regarded as not using ICT resources for intra-university communication. An ICT use index was eventually computed and a mean index for 187 items was 2.65 ± 0.57 . Therefore, a mean score of 2.65 indicated that lecturers were using ICT resources for intra-university communication.

To determine the extent of ICT integration in intra-university communication from lecturers' perspective, the ICT integration index was computed by summing up the availability index and use index in intra-university communication. The range of scores for ICT availability index in intra-university communication was 0-1 while the range of scores for ICT use in intra-university communication was 1-3. Therefore, the range of scores for ICT integration in intra-university communication was 1-4. A decision rule was determined as a basis of judgment on the extent of ICT integration in intra-university communication. The decision rule was that if the mean score was greater than 2.0, then the extent of ICT integration in intra-university communication was high from the lecturers' perspective; otherwise, the extent of ICT integration for intra-university communication was regarded as low. An ICT integration index was eventually computed and a mean score of 3.41 ± 0.86 was obtained. Therefore, a mean score of 3.41 indicates that the level of ICT integration in intra-university communication from the lecturers' perspective is high.

4.5 Influence of ICT Integration on Quality of Instruction

The second objective of the study investigated how ICT integration in instruction was perceived to influence the quality of instruction by both students and lecturers. To achieve this objective, responses were captured at two levels as follows:

- i) Influence of ICT integration on quality of instruction from the students' perspective.
- ii) Influence of ICT integration on quality of instruction from the lecturers' perspective.

4.5.1 Influence of ICT Integration on Quality of Instruction from the Students' Perspective

The students were asked to give their views on how the use of ICT in instruction in their universities influenced their learning. For the purpose of analysis, the items were grouped into similar instruction experiences that included self paced learning, active learner engagement, variety of learning experiences and content presentation. Their responses were indicated as shown on Table 18:

Table 18:

Influence of ICT Integration in Instruction on Quality of Instruction from students' perspective

Influence of ICT integration in instruction on quality of instruction (Indicators of Quality)	N	Responses (%)		
		Agree	Neutral	Disagree
Self Paced learning				
• Enables me to utilize individualized instruction thus learn at my own pace	226	76.5	13.4	10.1
• Provides learning which gives me individualized feedback	225	68.5	17.3	14.2
Active Learner engagement				
• Rarely involves me actively in the learning process	205	34.7	15.6	49.7
• Rarely brings about a dynamic presentation that captures my attention in class	228	33.3	22.8	43.9
Variety of learning experiences				
• Helps visualize learning experiences	229	83	9.6	7.4
• Access a variety of learning experiences	227	82	9.2	8.8
• Illustrates phenomena that might be dangerous to view directly in real life	225	52.9	20.9	26.2
• Rarely improves learning effectiveness by highlighting concepts through the use of visuals	213	24.4	17.4	58.2
• Provides learning materials that are enhanced by colour, sound, pictures and this attracts attention	225	74.7	8.4	16.9
• One can repeatedly study the subject content	224	75.4	11.6	13
• Is boring and wastes a lot of my time	221	12.2	8.1	79.7
• Makes it possible to learn materials which are enhanced by sound, animations etc	227	71.8	14.5	13.7
• Caters for my learning needs	227	68.2	16.4	15.4
Content Presentation				
• Makes content presentation easier to understand	227	76.7	13.6	9.7
• Rarely illustrates learning concepts clearly	223	28.2	22.0	49.8

Source: Field Data

From Table 18, it appears that use of ICT enables students to utilize individualized instruction thus enabling them to learn at their own pace (76.5%). A study by Coleman, a global learning manager at Unilever echoed that e-learning was an effective training method because it allowed people to learn at their own pace (Green, 2005). Norberg et al. (2011) pointed out that online learning responds to student's lifestyle by providing flexible learning opportunities leading to high satisfaction levels. Earlier, Agostilio (2002) had pointed out that ICT engaged learners and allowed them to explore, simulate abstract concepts, encouraged self learning and enabled them to address complex problems.

ICT are known to actively engage the learners, despite the low percentage figure on Table 18, (49.7%). ICT can support various types of interactions that range from learner-content, learner-learner, learner-teacher, and learner-interface (More, 1989; Chou, 2003). These types of interactions make the learning process more realistic and learners more actively engaged. This observation is supported by Wang and Woo (2007) who pointed out that effective ICT integration can promote student-engaged learning. Wikis, blogs and news groups would support learners to communicate with others during their collaborative tasks and this could enhance active learner participation (Minocha, 2009; Philip & Nicholls, 2009).

From all the learners, ICT were valued to provide a variety of learning experiences. Table 18 shows that 52.9% of the students agreed that use of ICT in learning illustrated phenomena that might be dangerous to view directly in real life (e.g. viewing the eclipse of the sun). Several researchers have argued that ICT can support new instructional approaches and at the same time make the somewhat hard-to-implement instructional methods more feasible through simulations (Wilson & Lowry 2000; Moallem 2003; Roblyer, Edwards & Haviluk 2004). The students also agreed that ICT use in learning enabled them to access a variety of learning experiences (82%). This meant that ICT linked learners to various information sources and learning experiences. Respondents also agreed that use of ICT in learning made it possible for them to learn materials which were enhanced by sound and animation (71.8%). In a study to examine the efficiency of digital learning at the university level, Katz et al. (2011) noted that the use of the cellphone is multi-dimensional and cellphone technology now provides technological possibilities including voice, text, still camera, video, paging and geo-positioning capabilities. These tools provide a

rich variety of platforms that enhance the learning process. This observation is supported by Arulchelvan (2012) who points out that Interactive content, graphics and animations make lessons stand out and help imprint the material on the student's mind.

It also appears from Table 18 that ICT makes content presentation easier to understand (76.7%). This observation is supported by Newby et al. (2010) and Smaldino et al. (2011), who argue that educational media for teachers and learners can be used to present materials in a manner learners can easily assimilate. They pointed out that when the education media is enhanced by ICT, it increases the overall effectiveness of instructional materials through enhanced presentations.

The responses on Table 18 however, could mean that the students were aware of how ICT integration was likely to influence learning. Equipped with this knowledge, they may have responded to the questions with a bias on what ICT was capable of doing and not what was actually happening on the ground. This was evidenced by Table 13 where the percentages of respondents who agreed that ICT was being used in learning was actually low in most of the ICT resources mentioned. Consequently, the use of ICT in instruction was likely to affect a student's opinion on whether ICT integration influenced instruction or not. This observation is supported by Achale, Tani, and Lilly (2007), who pointed out that the actual use in practice of technologies for educational purposes can lead to perceived results such as the perceived importance of technology use.

Means were used to compute quality of instruction index. The quality of instruction index was computed by first assigning value 1 for disagree response, 2 for neutral and value 3 for agree response. This was because the questionnaire items under quality of instruction were on a Likert scale and had to be collapsed as follows: agree and strongly agree were collapsed to agree response, while disagree and strongly disagree were collapsed to disagree response. The scores for each individual respondent were summed up and divided by 15 to get individual mean. Fifteen (15) were the total number of items under students perceptions on the influence of ICT on quality of instruction. To get the mean score for 229 respondents, the sum of individual index on quality of instruction was divided by 229. The range of scores was 1 to 3. A decision rule was determined as a basis of judgment on the degree of influence of ICT integration on quality of

instruction. The decision rule was that if the mean score was greater than 1.5, then ICT integration was influencing quality of instruction from students' perspective, otherwise, students regarded ICT integration not to influence quality of instruction. A quality of instruction index was eventually computed and a mean index for 229 items was 2.28 ± 0.39 . Therefore, a mean score of 2.28 indicated that students perceived ICT integration to influence quality of instruction.

4.5.2 Correlation between the ICT Integration Index in Instruction and Quality of Instruction Index in Instruction.

A Pearson Product-moment Correlation Coefficient was computed to determine whether there was a relationship between ICT Integration index in instruction and quality of instruction index. The results were as displayed on Table 19:

Table 19:

Pearson Product-moment Correlation Coefficient between ICT Integration Index in Instruction and Quality of Instruction

			Quality of instruction Index.
ICT Integration Index	Pearson Product-moment Correlation		0.485*
	Coefficient		
	Sig. (2-tailed)		0.000
	N		229

*** Correlation is significant at the 0.05 level (2-tailed)**

From the students perspective, the results revealed that the relationship between ICT Integration and quality of instruction was significant ($r = 0.485$, $n = 229$, $p \leq 0.000$)

4.5.3 Influence of ICT Integration on Quality of Instruction from the Lecturers' Perspective

The second aspect of the second objective investigated how ICT integration in instruction influenced quality of instruction from the perception of the lecturers. For the purpose of analysis, the items were grouped into similar instruction experiences that included content

presentation, learning materials, individualized instruction and learner motivation. Their responses were indicated as shown on Table 20:

Table 20:

Influence of ICT Integration on Quality of Instruction from the lecturers' perspective

Influence of ICT integration on quality of instruction (Indicators of Quality)		Responses (%)		
	N	Agree	Neutral	Disagree
Content Presentation				
• Content presentation always made much easier	207	93.7	3.9	2.4
• Content presented in a way that helps students learn	205	92.2	4.9	2.9
• Dynamic presentation that captures students’ attention	185	80.5	14.7	4.8
• Material presented in a more organized way	180	83.9	8.3	7.8
Learning Materials				
• Well prepared because of access of variety of information in different formats	202	78.2	15.4	6.4
Individualized instruction				
• I spend more time diagnosing and correcting students problems	204	58.8	19.7	21.5
• More time to consult with individual students	200	71	20.0	9
• Ability to teach on one-to-one basis	192	70.8	9.9	19.3
Learner motivation				
• Ability to involve multiple senses of learners	187	81.2	12.4	6.4
• Increase of instruction appeal by attracting attention	184	79.3	16.4	4.3
• Illustrates many learning concepts	175	76	12.5	11.5

Source: Field data

Table 20 indicates that majority of lecturers agreed that ICT integration in instruction was influencing the quality of instruction. For example, 93.7% of the lecturers agreed that when they used ICT for instruction, content presentation was always made much easier, while 92.2% agreed

that they presented the content in a way that helped students learn. The high percentage of respondents in agreement with the positive influence of ICT on instruction may be attributed to the fact that the lecturers generally were integrating computer-based technology in their existing teaching strategies. However, it could be that the lecturers were aware of the influence technology had on instruction and therefore with this knowledge they acknowledged the positive influence of technology on instruction. Several researchers have pointed out that new media may be in use but there may be little or no pedagogical change (Trinidad, Clarkson & Newhouse, 2004; Lloyd, 2005). In a study to measure the instructors' readiness to use ICT in schools in Benin, Cameroon, Ghana and Mali, with the objective of determining if the instructor's were involved in the process of integrating ICT into education in those countries, Boakye and Banini (2008) noted that despite some instructors not using ICT at all, they agreed generally that the computer had changed the way students learn.

From Table 20, it appears that lecturers appreciated the role ICT was playing in providing them with access to a variety of information in different forms (78.2%). ICT can play the role of providing instructors and students with access to up-to-date educational resources (Wims & Lawler, 2007). This can greatly increase the quality of what is learnt. It can also make instructors feel well prepared for the lessons because they have what it takes to provide the students with the updated instructional materials.

Further, the Table shows that 71% of the lecturers agreed that the use of ICT in instruction gave them more time to consult with individual students while 70.8% agreed that when using ICT in instruction, they had the ability to teach on one-to-one basis. ICT are known to link learners to various information sources and support innovative instructional approaches such as collaborative learning. This allows instructors more time for facilitation in the classrooms thus increasing instructor productivity and students knowledge construction (Wilson & Lowry, 2000; Roblyer, et al., 2004).

It appears from Table 20 that ICT increases learner motivation. This is evidenced by the fact that the respondents agreed that ICT had the ability to involve multiple senses of learners (81.2%), increase instructional appeal by attracting attention (79.3%) and illustrate many learning

concepts (76%). There is sufficient evidence to support that technology has great potential to increase learners motivation through its unique instructional capabilities such as helping students visualize data or problems and also support innovative instructional approaches such as collaborative learning and problem-based learning (Moallem, 2003; Roblyer et al., 2004; Newby et al., 2010 & Smaldino et al., 2011).

This study established that the perception of ICT integration in instruction was positively influencing the quality of instruction based on lecturers responses. Several studies have reported positive influences of ICT on students' learning. Hirschbuhl and Bishop (2000) pointed out that the Internet, PowerPoint and interactive computer-based multimedia were transforming schools and colleges and the way students learned. This view was further supported by ELNORD (2006) and Punie, et al. (2006), who observed that ICT was having a positive impact on education and training. Cox (1997) had earlier observed that habitual use of ICT across the curriculum was having a beneficial motivational influence on students' learning. The perception of the influence of ICT in instruction is very dependent on how it is being used. Many students and lecturers viewed ICT as a valuable tool for instruction.

Means were used to compute quality of instruction index. The quality of instruction index was computed by first assigning value 1 for disagree response, 2 for neutral and value 3 for agree response. This was because the questionnaire items under quality of instruction were on a Likert scale and had to be collapsed as follows: agree and strongly agree were collapsed to agree response, while disagree and strongly disagree were collapsed to disagree response. The scores for each individual respondent were summed up and divided by 15 to get individual mean. Fifteen (15) were the total number of items under lecturers' perceptions on the influence of ICT on quality of instruction. To get the mean score for 209 respondents, the sum of individual index on quality of instruction was divided by 209. The range of scores was 1 to 3. A decision rule was determined as a basis of judgment on the degree of influence of ICT integration on quality of instruction. The decision rule was that if the mean score was greater than 1.5, then ICT integration was influencing quality of instruction from lecturers' perspective, otherwise, lecturers regarded ICT integration not to influence quality of instruction. A quality of instruction index was eventually computed and a mean index for 209 items was 2.32 ± 0.52 . Therefore, a mean

score of 2.32 indicated that lecturers perceived ICT integration to influence quality of instruction.

4.5.4 Correlation between ICT Integration Index in Instruction and Quality of Instruction as Perceived by Lecturers

A Pearson Product-moment Correlation Coefficient was computed to determine whether there was a relationship between ICT Integration index in instruction and quality of instruction index from the lecturers' perspective. The results were as displayed on Table 21:

Table 21:

Pearson Product-moment Correlation Coefficient on ICT Integration in Instruction and Quality of Instruction

			Quality of instruction Index.
ICT Integration Index	Pearson Product-moment Correlation		0.207*
	Coefficient		
	Sig. (2-tailed)		0.003
	N		203

*** Correlation is significant at the 0.05 level (2-tailed)**

From the lecturers' Perspective, the results revealed that the relationship between ICT Integration and quality of Instruction was also significant ($r = 0.207$, $n = 203$, $p = 0.003$)

4.6 Influence of ICT Integration on Quality of Students' Records Management

The third objective of the study investigated how integration of ICT in students' records management was influencing quality of students' records management. To achieve the objective of the study, responses were captured at two levels as follows:

- i) Influence of ICT integration on quality of Students' Records Management from the students' perspective.
- ii) Influence of ICT integration on quality of Students' Records Management from the lecturers' perspective.

4.6.1 Influence of ICT Integration on Quality of Students' Records Management from Students' Perspective

Students were asked to give their views on how the availability of ICT in their universities for students' records management had influenced their ability to access their records. Their responses were indicated as shown on Table 22:

Table 22:

Influence of ICT Integration on Quality of Students' Records Management from students' perspective

Influence of ICT integration in students' records management	N	Responses (%)		
		Agree	Neutral	Disagree
• Easily keep track of my grades	226	80	5.8	14.2
• Keep track of my fees at any moment	228	86	3.9	10.1
• Easily register for new semester units	228	75	7.0	18
• Get an accurate exam result's transcript	225	60	16	24

Source: Field data

Table 22 shows that students were able to use the ICT resources available to track their records easily, such as grades (80%), fees status (86%), transcripts (60.%) and registration for new semester units (75.%). It appears that ICT had more influence on administrative services such as admissions, registration, and fees payment than on the fundamentals of classroom teaching and learning. Alruchevan (2012) argues that even if ICT had not revolutionized the classroom yet, it was changing the learning experience of students by providing easier access to information. Balasubramanian et al., (2009) and UNESCO (2009) point out that for the students, use of ICT has resulted into increased flexibility in registering for classes, accessing course-outlines and online content. From the open ended part of this question, students pointed out that they were able to register for new semester units while they were away from their universities. The fact that students were able to use ICT to access their records away from their universities showed that ICT had brought about an element of convenience.

Means were used to compute quality of students' records management index. The quality of students' records management index was computed by first assigning value 1 for disagree response, 2 for neutral and value 3 for agree response. This was because the questionnaire items under quality of students' records management were on a Likert scale and had to be collapsed as follows: agree and strongly agree were collapsed to agree response, while disagree and strongly disagree were collapsed to disagree response. The scores for each individual respondent were summed up and divided by 4 to get individual mean. Four (4) were the total number of items under students perceptions on the influence of ICT on quality of students' records management. To get the mean score for 228 respondents, the sum of individual index on quality of students' records management was divided by 228. The range of scores was 1 to 3. A decision rule was determined as a basis of judgment on the degree of influence of ICT integration on quality of students' records management. The decision rule was that if the mean score was greater than 1.5, then ICT integration was influencing quality of students' records management from students' perspective, otherwise, students regarded ICT integration not to influence quality of students' records management. A quality of students' records management index was eventually computed and a mean index for 228 items was 2.57 ± 0.60 . Therefore, a mean score of 2.57 indicated that students perceived ICT integration to influence quality of students' records management.

4.6.2 Correlation between ICT Integration in Students' Records Management and Quality of Students' Records Management from the Students' Perspectives

A Pearson Product-moment Correlation Coefficient was computed to determine whether there is a relationship between ICT Integration index in students' records management and quality of students' records management index from students' perspective. The results were as displayed on Table 23:

Table 23:

Pearson Product-moment Correlation Coefficient on ICT Integration and Quality of Students' Records Management

			Quality of Students' Records Management Index
ICT Integration Index	Pearson Product-moment Correlation Coefficient		0.64*
	Sig. (2-tailed)		0.000
	N		228

* Correlation is significant at the 0.05 level (2-tailed)

From the Students' Perspective, the results revealed that the relationship between ICT Integration and Quality of students' records management was significant ($r = 0.64$, $n = 228$, $p = 0.000$)

4.6.3 Influence of ICT Integration on Quality of Students' Records Management from the Lecturers' Perspective

The second aspect of this objective investigated how ICT integration in students' records management was influencing the quality of students' records management from the perceptions of the lecturers. Their responses were as presented in Table 24:

Table 24:

Lecturers Perceptions on the Influence of ICT Integration on Quality of Students' Records Management

Influence of ICT Integration on Students' Records Management	Responses (%)			
	N	Agree	Neutral	Disagree
• Easy recording of students' assignments	195	81.6	5.8	6.6
• Process examination grades with speed	194	83.5	3.9	8.2
• Easy entry of students' attendance	196	79.6	7.0	10.2

Source: Field data

From Table 24, it was clear that ICT use in students' records management was transforming management of students' records. Judging by the responses, use of ICT in records management enabled lecturers to easily record students' assignments (81.6%), process examination grades with speed (83.5%) and easily record students' attendance (79.6%). This is in agreement with Boggs' (2010) observation that electronic management systems make it easy to track, update and manage learners records. Balasubramanian et al., (2009) and UNESCO (2009) point out that ICT can aid in processing voluminous records quickly, produce reliable and consistent records as well as make it easy to search and produce records quickly their performance and results. In a study on Internet based database management systems for project control, Li, Moselhi and Alkass, (2006) pointed out that an Internet based database management system can provide a real-time data sharing environment and accordingly support the generation of timely progress reports.

Means were used to compute quality of students' records management index. The quality of students' records management index was computed by first assigning value 1 for disagree response, 2 for neutral and value 3 for agree response. This was because the questionnaire items under quality of students' records management were on a Likert scale and had to be collapsed as follows: agree and strongly agree were collapsed to agree response, while disagree and strongly disagree were collapsed to disagree response. The scores for each individual respondent were summed up and divided by 3 to get individual mean. Three (3) were the total number of items under lecturers' perceptions on the influence of ICT on quality of students' records management. To get the mean score for 198 respondents, the sum of individual index on quality of students' records management was divided by 198. The range of scores was 1 to 3. A decision rule was determined as a basis of judgment on the degree of influence of ICT integration on quality of students' records management. The decision rule was that if the mean score was greater than 1.5, then ICT integration was influencing quality of students' records management from lecturers' perspective, otherwise, lecturers regarded ICT integration not to influence quality of students' records management. A quality of students' records management index was eventually computed and a mean index for 198 items was 2.63 ± 0.52 . Therefore, a mean score of 2.63 indicated that lecturers perceived ICT integration to influence quality of students' records management.

4.6.4 Correlation between ICT Integration Index and Quality of Students' Records Management Index from Lecturers' Perspective

A Pearson Product-moment Correlation Coefficient was computed to determine whether there was a relationship between ICT Integration index in students' records management and quality of students' records management index from the lecturers' perspective. The results were as displayed on Table 25:

Table 25:

Pearson Product-moment Correlation Coefficient on ICT Integration Index and Quality of Students' Records Management Index

			Quality of Students' Records Management Index
ICT Integration Index	Pearson Product-moment Correlation Coefficient		0.399*
	Sig. (2-tailed)		0.000
	N		189

*** Correlation is significant at the 0.05 level (2-tailed)**

From the lecturers' Perspective, the results revealed that the relationship between ICT integration and quality of students' records management was significant ($r = 0.399$, $n = 189$, $p = 0.000$).

4.7 Influence of ICT Integration on Quality of Intra-university Communication

The fourth objective of this study was to investigate how ICT integration in intra-university communication was influencing the quality of intra-university communication. To achieve the objective of the study, responses were captured at two levels as follows:

- Influence of ICT integration on quality of intra-university communication from the students' perspective.
- Influence of ICT integration on quality of intra-university communication from the lecturers' perspective.

4.7.1 Influence of ICT Integration on Quality of Intra-university Communication from the Students' Perspective

Students were asked to give their opinions on how ICT integration in the university influenced the quality of intra-university communication. The results were as presented on Table 26:

Table 26:

Students' perception on the Influence of ICT Integration on Quality of Intra-university Communication

Perceptions on the Influence of ICT integration on intra-university communication	N	Responses %		
		Agree	Neutral	Disagree
• Getting information quickly	229	83.9	10.0	6.1
• Does not provide information more conveniently	229	20	13.6	66.4
• Get information more reliably	228	78.9	15.4	5.7
• Receive announcements & notices anywhere and anytime	227	67.9	10.0	15
• Find information easily and rapidly	227	81.9	13.6	6.6

Source: Field data

From Table 26, use of ICT in intra-university communication enabled students to get information quickly (83.9%), reliably (78.9%), anytime and anywhere (67.9%). Sixty six point four percent (66.4%) of the students felt that use of ICT in university communication provided information to them more conveniently. Several studies have pointed out that physical location was no longer a hindrance to communication and therefore this brought about the element of convenience (Hellström, 2010; Ruppel & Vecchione, 2012). Ruppel and Vecchione (2012) indicate that the convenience made possible with mobile phones has contributed to college students' desire for immediate services. The same authors argue that academic research communication, for example, is made easier for students when reference services are offered at the point of need. This makes the information given relevant to the students. From the open ended part of this question, students commented that use of ICT in intra-university communication was very

efficient in relaying information and made them aware of any updates from the university administration more easily and conveniently.

Means were used to compute quality of intra-university communication index. The quality of intra-university communication index was computed by first assigning value 1 for disagree response, 2 for neutral and value 3 for agree response. This was because the questionnaire items under quality of intra-university communication were on a Likert scale and had to be collapsed as follows: agree and strongly agree were collapsed to agree response, while disagree and strongly disagree were collapsed to disagree response. The scores for each individual respondent were summed up and divided by 5 to get individual mean. Five (5) were the total number of items under students' perceptions on the influence of ICT on quality of intra-university communication. To get the mean score for 229 respondents, the sum of individual index on quality of intra-university communication was divided by 229. The range of scores was 1 to 3. A decision rule was determined as a basis of judgment on the degree of influence of ICT integration on quality of intra-university communication. The decision rule was that if the mean score was greater than 1.5, then ICT integration was influencing quality of intra-university communication from students' perspective, otherwise, students regarded ICT integration not to influence quality of intra-university communication. A quality of intra-university communication index was eventually computed and a mean index for 229 items was 2.64 ± 0.44 . Therefore, a mean score of 2.64 indicated that students perceived ICT integration to influence quality of intra-university communication.

4.7.2 Correlation between ICT Integration Index and Quality of Intra-university Communication Index from Students' perspective

A Pearson Product-moment Correlation Coefficient was computed to determine whether there was a relationship between ICT Integration index in intra-university communication and quality of intra-university communication index from the students' perspective. The results were as displayed on Table 27:

Table 27:

Pearson Product-moment Correlation Coefficient on ICT Integration Index and Quality of Intra-university Communication Index

		Quality of intra-university communication Index
ICT Integration Index	Pearson Product-moment Correlation Coefficient	-0.030
	Sig. (2-tailed)	0.654
	N	229

*** Correlation is significant at the 0.05 level (2-tailed)**

From the Students' Perspective, the results revealed that the relationship between ICT Integration and Quality of intra-university was not significant ($r = -0.03$, $n = 229$, $p = 0.654$).

4.7.3 Influence of ICT Integration on Quality of Intra-University Communication from the Lecturers' Perspective

The second aspect of this objective investigated whether ICT Integration by lecturers in intra-university communication was perceived to influence the quality of intra-university communication in their various universities. Their responses were as displayed on Table 28:

Table 28:

Lecturers' Perception on the Influence of ICT Integration on Quality of Intra-university Communication

Influence of ICT Integration in Intra-university Communication	Responses (%)			
	N	Agree	Neutral	Disagree
Get information quickly	205	90.7	6.4	2.9
Does not provide information more conveniently	205	37	11.3	51.7
Get information more reliably	204	87.3	10.2	2.5
Receives announcements & notices anywhere and anytime	206	87.9	8.2	3.9
Find information easily and rapidly	206	90.3	6.3	3.4

Source: Field data

From Table 28, lecturers agreed that use of ICT in internal communication enabled them to get information quickly (90.7%), reliably (87.3%), anywhere and anytime (87.9%). This is in agreement with Sheehan (2001) who pointed out that ICT resources such as e-mail have demonstrated superiority over traditional methods of communication in terms of response speed and cost efficiency. Similarly, Flaherty, et al., (1998) had argued that ICT resources such as e-mail provided an easier and more immediate means of response than traditional communication methods. In a study entitled "Text reference service: delivery, characteristics, and best practices", Luo (2011) reports that most participants used SMS to communicate because they needed information immediately. He observed that ICT mode of communication had features most users appreciate such as speed and convenience.

Means were used to compute quality of intra-university communication index. The quality of intra-university communication index was computed by first assigning value 1 for disagree response, 2 for neutral and value 3 for agree response. This was because the questionnaire items under quality of intra-university communication were on a Likert scale and had to be collapsed as follows: agree and strongly agree were collapsed to agree response, while disagree and strongly disagree were collapsed to disagree response. The scores for each individual respondent were summed up and divided by 5 to get individual mean. Five (5) were the total number of items under lecturers' perceptions on the influence of ICT on quality of intra-university communication. To get the mean score for 208 respondents, the sum of individual index on quality of intra-university communication was divided by 208. The range of scores was 1 to 3. A decision rule was determined as a basis of judgment on the degree of influence of ICT integration on quality of intra-university communication. The decision rule was that if the mean score was greater than 1.5, then ICT integration was influencing quality of intra-university communication from lecturers' perspective, otherwise, lecturers regarded ICT integration not to influence quality of intra-university communication. A quality of intra-university communication index was eventually computed and a mean index for 208 items was 2.62 ± 0.39 . Therefore, a mean score of 2.62 indicated that lecturers perceived ICT integration to influence quality of intra-university communication.

4.7.4 Correlations between ICT Integration Index and Quality of Intra-university Communication Index from Lecturers' perspective

A Pearson Product-moment Correlation Coefficient was computed to determine whether there was a relationship between ICT Integration index in intra-university communication and quality of intra-university communication index from the lecturers' perspective. The results were as displayed on Table 29:

Table 29:

Pearson Correlation Coefficient on ICT Integration Index and Quality of Intra-university Communication Index

			Quality of intra-university communication index
ICT Integration Index	Pearson Product-moment Coefficient	Correlation	0.195 *
	Sig. (2-tailed)		0.009
	N		180

*** Correlation is significant at the 0.05 level (2-tailed)**

From the lecturers' Perspective, the results revealed that the relationship between ICT integration and quality of intra-university was significant ($r = 0.195$, $n = 180$, $p = 0.009$)

4.8 Differences in Integration of ICT in Instruction, Students' Records Management and Intra-university Communication between Public and Private Universities.

The fifth objective of the study investigated whether there was a statistically significant difference in integration of ICT in instruction, students' records management and intra-university communication between public and private universities. To achieve this, the responses were captured at two levels as follows:

- Differences in ICT integration in instruction, students' records management and intra-university communication between public and private universities from the students' perspectives.

- ii) Differences in ICT integration in instruction, students' records management and intra-university communication between public and private universities from the lecturers perspectives.

4.8.1 Differences in ICT Integration in Instruction, Students' Records Management and Intra-university Communication between Public and Private Universities from the Students' Perspectives

For the purpose of analysis, the elements to be measured were displayed in the same Table and the researcher used an independent t-test to find out whether the differences in the mean scores of ICT integration in instruction, students' records management and intra-university communication between private and public university students were statistically different. The t-test results were as shown on Table 30:

Table 30:

Independent Samples t-test of ICT Integration in Instruction, Students' Records Management and Intra-university communication between Private and Public Universities

Scale	University Category	N	Mean	SD	df	t	p-value (2 tailed)
Instruction	Public	207	2.61	0.76	229	2.43	0.016*
	Private	24	3.01	0.66			
Students' Records Management	Public	207	1.38	0.56	229	0.32	0.76
	Private	24	1.34	0.52			
Intra-university communication	Public	207	2.99	0.82	229	1.93	0.055
	Private	24	2.65	0.84			

* Correlation is significant at the 0.05 level (2-tailed)

From Table 30, there was a statistically significant difference between the mean scores for ICT integration in instruction in private universities ($M= 3.01$, $SD = 0.66$) and those of public universities ($M= 2.61$, $SD = 0.76$) conditions; $t(229) = 2.43$, $p= 0.016$. Therefore the null hypothesis was rejected. These results suggest that there was more ICT integration in instruction in private universities than in public universities. It was reported earlier in Table 11 that the computer-student ratio in private universities was higher than in public universities, with Strathmore University having a computer-student ratio of 1:1. This consequently means that comparatively, private universities had more ICT facilities than public universities hence the significant difference in ICT integration.

The Table further indicates no statistically significant difference in ICT integration in students' records management in the scores for private universities ($M= 1.34$, $SD= 0.52$) and public universities ($M= 1.38$, $SD= 0.56$) conditions; $t(229) = 0.32$, $p = 0.76$. Thus the null hypothesis was accepted. These results imply that there was no significant difference in ICT integration in students' records management between public and private universities.

Table 30 also shows that there was no statistically significant difference in ICT integration in intra-university communication in the scores for private universities ($M= 2.65$, $SD = 0.84$) and public universities ($M= 2.99$, $SD = 0.82$) conditions; $t(229) = 1.93$, $p = 0.055$. Thus the null hypothesis was accepted. These results imply that there was no statistically significant difference in ICT integration in intra-university communication between public and private universities.

4.8.2 Differences in ICT Integration in Instruction, Students' Records Management and Intra-university Communication between Public and Private Universities from the Perception of Lecturers

For the purpose of analysis, the elements to be measured were displayed on the same Table and the researcher used independent t-test to find out whether the differences in ICT integration in instruction, students' records management and intra-university communication between private and public universities from the perception of lecturers was statistically significant. The t-test results are as shown on Table 31:

Table 31:

Independent Samples t-test of ICT Integration in Instruction, Students' Records Management and Intra-university communication between Private and Public Universities

Scale	University Category	N	Mean	SD	df	T	p-value (2 tailed)
Instruction	Public	180	2.13	1.07	209	3.02	0.003*
	Private	31	2.72	0.54			
Students' Records Management	Public	167	3.18	1.02	196	0.37	0.72
	Private	31	3.25	0.75			
Intra-university communication	Public	158	4.53	1.08	187	0.11	0.91
	Private	31	4.51	0.82			

* Correlation is significant at the 0.05 level (2-tailed)

From Table 31, there was a statistically significant difference between the scores for ICT integration in instruction in private universities ($M = 2.72$, $SD = 0.54$) and those of public universities ($M = 2.13$, $SD = 1.07$) conditions; $t(209) = 3.02$, $p = 0.003$. Thus the null hypothesis was rejected. These results suggest that there was more ICT integration in instruction in private universities than in public universities from the perception of the lecturers. The study established that there was a statistically significant difference in ICT integration in instruction between private and public universities. Different authors have reported similar results in ICT integration in instruction in institutions of higher learning. In a study to investigate the use of ICT in public and private institutions of higher learning in Malaysia, Dawam et al., (2009) reported that private university lecturers displayed a higher level of ICT proficiency as compared to public university lecturers. This resulted into a considerable difference in ICT integration in terms of use by these academics for instruction. In another study titled "Situation and Variation of ICT use among Khartoum State Universities' Staff Members", Osman (2011) reported a significant variation in ICTs integration in terms of use between the staff of public and private universities. However, the variation was found statistically significant according to the university discipline, experience,

training and type of university for both computer and Internet use. A research conducted on application of ICT in the management of public and private universities in Nigeria, Okorie et al., (2005) observed that private universities provided and applied ICT facilities more than public universities.

The Table further indicates no statistically significant difference in ICT integration in students' records management in the scores for private universities ($M= 3.25$, $SD= 0.75$) and public universities ($M= 3.18$, $SD= 1.02$) conditions; $t(196) = 0.37$, $p = 0.72$. Thus the null hypothesis was accepted. These results imply that there was no significant difference in ICT integration in students' records management between public and private universities.

Table 30 also shows that there was no statistically significant difference in ICT integration in intra-university communication in the scores for private universities ($M= 4.51$, $SD = 0.82$) and public universities ($M= 4.53$, $SD = 0.08$) conditions; $t(187) = 0.11$, $p = 0.091$. Thus the null hypothesis was accepted. These results imply that there was no statistically significant difference in ICT integration in intra-university communication between public and private universities.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

The purpose of this study was to investigate the influence of ICT integration on the quality of instruction, students' records management and intra-university communication in Kenyan universities from the perception of students and lecturers. This was to be achieved by seeking to understand the extent of ICT integration in instruction, students' records management and intra-university communication in Kenyan public and private universities. The chapter presents the summary of major findings, conclusions, recommendations and areas for further research.

5.1 Summary

The study found that the public and private universities that participated in the study had made available ICT resources to students and lecturers for use in teaching and learning, students' records management and intra-university communication. The ICT resources identified as made available for teaching and learning by the universities, were for example, personal computers, LCD projection systems, E-learning management systems and Internet connectivity. All the sampled universities had the recommended minimum bandwidth threshold of 1Mbps per 1000 students or more. However, students and lecturers in both categories of universities seemed to be less aware of online resources for teaching and learning such as video-conferencing, news groups, wikis and video podcasts.

On the use of ICT resources made available by the universities, the study established that students and lecturers were using ICT resources such as personal computers and projection systems for teaching and learning. However, there was a serious under-utilization of online ICT resources such as Web 2.0 technologies which included blogs, wikis and podcasts in instruction by both students and lecturers. The study further found that students were accessing their records online and therefore making good use of student records management resources. Lecturers on the other hand were increasingly using ICT resources in maintaining students' records such as students' grades and class attendance. On the use of ICT resources for intra-university communication, the study established that students and lecturers were using the mobile phone, e-

mail and bulk SMS as tools for communication amongst themselves and the university administration.

Regarding the perceptions on the influence of ICT integration on quality of instruction, the study found that ICT integration in instruction was perceived as positively influencing the quality of instruction based on students' and lecturers' responses. The students observed that ICTs facilitated individualised instruction which enabled them learn at their own pace. They also argued that ICTs provided a variety of learning experiences by linking them to various information sources. Lecturers on their part felt that when they used ICT for instruction, content presentation was always made much easier and also appreciated the role ICT played in providing them with access to a variety of information in different formats. Pearson Product-moment Correlation Coefficient calculated between ICT integration in instruction and quality of instruction showed a positive relationship between these variables among both students and lecturers.

Concerning the influence of ICT integration on the quality of students' records management, the study found out that ICT integration in students' records management was perceived as positively influencing the quality of students' records management based on students' and lecturers' responses. Students admitted that they were able to keep track of their records easily such as fees status, exam transcripts and register for new semester units online. Lecturers too easily entered students' grades, processed examination results faster and recorded students' attendance easily. The Pearson Product-moment Correlation Coefficient calculated between ICT integration in students' records management and the quality of students' records management in case of both students and lecturers, was found to be positive.

Integration of ICTs in intra-university communication had different responses from the two categories of respondents. The Pearson Product-moment Correlation Coefficient calculated between ICT integration in intra-university communication and quality of intra-university communication based on data from the students, was found to be negative, but not significant. However, the study found out that lecturers perceived ICT integration in intra-university communication as influencing the quality of intra-university communication. The Pearson

Product-moment Correlation Coefficient showed a positive relationship when calculated between ICT integration in intra-university communication and quality of intra-university communication from lecturers' perspective.

With respect to the difference of ICT integration on the quality of instruction, students' records management and intra-university communication between public and private universities, the t-test results indicated the following:

- Concerning ICT integration in instruction, this study established that there was a statistically significant difference in ICT integration in favour of private universities from the perceptions of students. This also applied from the perceptions of lecturers.
- With regard to the difference in ICT integration in students' records management between public and private universities, the results showed that there was no statistically significant difference in ICT integration in students' records management between public and private universities from the perception of both students and lecturers.
- Concerning ICT integration in intra-university communication the t-test results showed that there was no statistically significant difference in ICT integration in intra-university communication between public and private universities from the perception of students and lecturers.

5.2 Conclusions

Kenyan public and private universities have invested heavily in ICT. They are buying computers, increasing bandwidth and connectivity as well as enhancing their other infrastructure to harness ICT potential. ICT resources are being used considerably well in students' records management and intra-university communication. However, there seems to be an underutilization of the online ICT resources especially in instruction. Not all ICT resources that have been made available were being used in instruction. This can imply that universities may be spending a lot of money in providing the ICT resources but not training students and lecturers on how to use them in instruction.

ICT integration in students' records management is perceived by both students and lecturers as impacting positively on the quality of management of students' records. It appears that ICT integration had more perceived influence on administrative services such as admissions, registration and fees payment than on the fundamentals of classroom teaching and learning. There is need for more focus on the classroom use of these resources as well.

ICT integration in intra-university communication has influenced the quality of intra-university communication in the institutions from the perceptions of the lecturers. However, the students were not convinced that ICT integration in intra-university communication had influenced the quality of communication.

On ICT integration in instruction, there was a statistically significant difference in ICT integration in favour of private university students. This applied also in the case of the lecturers in private universities. Regarding ICT integration in students' records management, there was no difference in ICT integration in students' records management between public and private universities as perceived by students and lecturers. On ICT integration in intra-university communication, there was no difference in ICT integration in intra-university communication between public and private universities as perceived by both students and lecturers.

5.3 Recommendations:

- With regard to the influence of ICT integration on quality of instruction, universities should set aside resources for training of students and lecturers on the use of ICT and especially Web 2.0 technologies like wikis, blogs and pod casts in instruction. The universities should evaluate their curricula to integrate the use of ICTs in teaching and learning while at the same time develop policies that promote, recognize and award those who integrate ICTs in their teaching.
- On the influence of ICT integration in students' records management, it appears from this study that universities in Nairobi metropolitan have done well in making ICT resources available to students for accessing their records; and also to the lecturers for students records management. This success has not been achieved through making the ICT

resources available to students and lecturers for student's records management only, but also policy requirements that compel all lecturers to use such ICT resources for students' records management. This should be replicated in other universities in Kenya for improved service provision, more accurate information delivery and effective communication within the universities.

- On the influence of ICT integration on quality of intra-university communication, ICT resources for intra-university communication had not influenced the quality of intra-university communication from the students' perspective. This implies that the students were not satisfied with the way internal communication was conducted by the administrators. Therefore the universities should make these resources available to train students on how to use the modern tools for internal communication such as the university websites and internal e-mail system.
- On the difference in ICT integration in instruction, private university students and lecturers used ICTs more than their public university counterparts. This probably is because these universities had better ICT facilities and may have offered training to both their students and lecturers. Public universities should increase the ICT resources available for use in the universities and also train their students and lecturers in their use. The universities should also facilitate greater access to ICT and its related components to students and lecturers.

5.3.1 Recommendations for Further Research

Universities in Nairobi Metropolitan were using ICT resources more in management of students' records and intra-university communication than in teaching and learning processes. It would be interesting to investigate the prevalence and likely causes of this phenomenon.

Students were aware of how ICT integration was likely to influence learning. Equipped with this knowledge, they may have responded to the questions on the influence of ICT integration on instruction with a bias on what ICT was capable of doing and not what was actually happening on the ground. It would be interesting to investigate this potential bias.

There were major differences in percentages between ICT resource availability and ICT use. Students and lecturers were aware of the availability of ICT resources but the usage was quite low and particularly the usage of online ICT resources. It would be of interest to investigate further why this was so.

It would be interesting to investigate the influence of the mobile technologies such as the mobile phone, tablets and i-pads on instruction, student's records management and intra-university communication in Kenyan universities. The results of such a study would be a useful input for institutional-level policy formulation on ICT.

Many institutions have established various support structures and policies for ICT use. However, that does not automatically translate into use. It would also be interesting to investigate the measures universities are putting into place to translate these structures and policies in ICT into use.

It would also be interesting to get more verifiable data on ICT integration in instruction, students' records management and intra-university communication. As indicated earlier, there are high chances of bias in favour of ICT in these types of perception-based studies. There is need for more experimental studies as well to help settle some of these ICT-related questions.

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APPENDICES

APPENDIX A: QUESTIONNAIRE FOR STUDENTS

Instructions

The purpose of this study is to investigate the perception of the influence of ICT integration in Kenyan Universities on quality of instruction, students' records management and intra-university communication (Internal communication). Please answer all questions to the best of your ability. There are no wrong or right answers. **What matters is your personal opinion.** The survey should take approximately 15 minutes. Thank you for taking your time to complete this questionnaire.

BIODATA

University (Public/Private) _____ Academic Year _____
Faculty _____ Department _____
Gender ☐ Female ☐ Male Year of birth _____
Religious Affiliation (Specify e.g. Catholic) _____

SECTION A: AVAILABILITY AND USE OF ICT FACILITIES IN THE UNIVERSITY FOR STUDENTS

Please place a tick or a mark on the square boxes if you are aware of the availability of the following ICT resources for learning at your university or through your university Internet network.

1) Are you aware of the availability of the following ICT resources for learning at your University or through your university Internet network?

- i. Personal Computers
- ii. Projectors (LCD)
- iii. E- learning management system
- iv) E-Journals
- v) Interactive CD or DVD
- vi) Video cameras

Yes	No
Yes	No
Yes	No
Yes	No
Yes	No
Yes	No

vii) Face book /Twitter

Yes	No
-----	----

viii) Online experts

Yes	No
-----	----

ix) Search engines

Yes	No
-----	----

x) Video conferencing

Yes	No
-----	----

xi) News groups

Yes	No
-----	----

xii) Blogs

Yes	No
-----	----

xiii) Wikis

Yes	No
-----	----

xiv) Video podcasts

Others (Please specify).

- 2) Select by ticking the extent to which you agree with the statement below corresponding to each ICT resource. (SD stands for strongly disagree, D for disagree, N for neutral, A for agree and SA for strongly agree)

I always use the following ICT resource for learning:

i) Personal Computers

SD	D	N	A	SA
----	---	---	---	----

ii) Projectors (LCD)

SD	D	N	A	SA
----	---	---	---	----

iii) E- learning management system

SD	D	N	A	SA
----	---	---	---	----

iv) E-Journals

SD	D	N	A	SA
----	---	---	---	----

v) Interactive CD or DVD

SD	D	N	A	SA
----	---	---	---	----

vi) Video cameras

SD	D	N	A	SA
----	---	---	---	----

vii) Face book /Twitter

SD	D	N	A	SA
----	---	---	---	----

viii) Online experts

SD

D

N

A

SA

ix) Search engines

SD

D

N

A

SA

x) Video conferencing

SD

D

N

A

SA

xi) News groups

SD

D

N

A

SA

xii) Blogs

SD

D

N

A

SA

xiii) Wikis

SD

D

N

A

SA

xiv) Video podcasts

SD

D

N

A

SA

- 3) The following questions focus on whether students were aware of the availability of their personal records from the university database systems. Please check / tick the box that corresponds to your opinion.

I am aware of the availability of the following records in the university database system:

a) Fees balance records

Yes

No

b) Exam transcripts

Yes

No

c) Exam results

Yes

No

Others (Please specify)

- 4) The following questions focus on how the use of ICT has helped you in tracking your records as a student. Please check / tick the box that corresponds to your opinion.

I am able to access the following through intra-university network/Internet

- | | | |
|----------------------|------------------------------|-----------------------------|
| i. Fees balances | ☐ Yes | ☐ No |
| ii. Exam transcripts | ☐ Yes | ☐ No |
| iii. Exam results | ☐ Yes | ☐ No |

Others (Please specify)

5) Are you aware of the availability of the following ICT resources for Intra-university communication at your University?

- | | | |
|-----------------|------------------------------|-----------------------------|
| i) Mobile phone | ☐ Yes | ☐ No |
| ii) Email | ☐ Yes | ☐ No |
| iii) Bulk SMS | ☐ Yes | ☐ No |

Others (Please specify)

6) Select by ticking the rate to which you agree with the statement below corresponding to each ICT resource. The following ICT resources are always used for internal -university communication at our university

- | | | | | | |
|------------------|-----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|
| iv) Mobile phone | ☐ SD | ☐ D | ☐ N | ☐ A | ☐ SA |
| v) Email | ☐ SD | ☐ D | ☐ N | ☐ A | ☐ SA |
| vi) Bulk SMS | ☐ SD | ☐ D | ☐ N | ☐ A | ☐ SA |

Others (Please specify)

SECTION B (i) The following questions focus on how the use of ICT in your university has helped you in the learning process. Please tick the extent to which you agree with each statement. (SD stands for strongly disagree, D for disagree, N for neutral, A for agree and SA for strongly agree)

1. The use of ICT:

i. Helps visualize learning experiences

SD	D	N	A	SA
----	---	---	---	----

ii. Illustrates phenomena that might be dangerous to view directly in real life

SD	D	N	A	SA
----	---	---	---	----

iii. Enables me to access a variety of learning experiences

SD	D	N	A	SA
----	---	---	---	----

iv. Rarely brings about a dynamic presentation that captures my attention in class.

SD	D	N	A	SA
----	---	---	---	----

vi. Makes content presentation easier to understand

SD	D	N	A	SA
----	---	---	---	----

vii. Caters for my learning needs

SD	D	N	A	SA
----	---	---	---	----

viii. Rarely improves learning effectiveness by highlighting concepts through the use of visuals.

SD	D	N	A	SA
----	---	---	---	----

ix. Rarely involves me actively in the learning process

SD	D	N	A	SA
----	---	---	---	----

x. Provide learning materials that are enhanced by colour, sound, pictures and this attracts my attention in class

SD	D	N	A	SA
----	---	---	---	----

xi. Enables me to utilize individually programmed instruction thus learn at my

SD	D	N	A	SA
----	---	---	---	----

own pace

- xii. Provides learning which gives me individualized feedback

SD	D	N	A	SA
----	---	---	---	----

- xiii. Is boring and wastes a lot of my time

SD	D	N	A	SA
----	---	---	---	----

- xiv. One can repeatedly study the subject content

SD	D	N	A	SA
----	---	---	---	----

- xv. Makes it possible to learn materials which are enhanced by sound, animations

SD	D	N	A	SA
----	---	---	---	----

Please comment freely on your perception of the influence of ICT use on teaching and learning at your university

SECTION B (ii) This question seeks to obtain your views on how the use of ICT in your university for student's records management has influenced your ability to access your records and apply for the university services online. Please tick the extent to which you agree with each statement. (SD stands for strongly disagree, D for disagree, N for neutral, A for agree and SA for strongly agree)

2. The use of ICT rarely enables me to:

- i. Easily keep track of my grades

SD	D	N	A	SA
----	---	---	---	----

- ii. Keep track of my fees at any moment

SD	D	N	A	SA
----	---	---	---	----

- iii. Easily register for new semester units

SD	D	N	A	SA
----	---	---	---	----

- iv. Get an accurate exam result's transcript

SD	D	N	A	SA
----	---	---	---	----

Please comment freely on the influence of ICT use on ability to keep track of your records at your university

SECTION B (iii) This question seeks to obtain your views on how your use of ICT in your university for internal communication has influenced quality of intra-university communication. Please tick the extent to which you agree with each statement. (SD stands for strongly disagree, D for disagree, N for neutral, A for agree and SA for strongly agree)

The use of ICT:

i. Enables me to get information quickly

SD	D	N	A	SA
----	---	---	---	----

ii. Does not provide information more conveniently

SD	D	N	A	SA
----	---	---	---	----

iii. Allows me to get information more reliably

SD	D	N	A	SA
----	---	---	---	----

iv. Allows me to receive announcements and notices anywhere and anytime

SD	D	N	A	SA
----	---	---	---	----

v. Helps me find information easily and rapidly

SD	D	N	A	SA
----	---	---	---	----

Please comment freely on the influence of ICT use on communication between you and your university

Thank you for taking the time to complete this questionnaire

APPENDIX B. QUESTIONNAIRE FOR ACADEMIC STAFF

Instructions

The purpose of this study will be to investigate the perception of the influence of ICT integration in Kenyan Universities on quality of instruction, student records management and intra-university communication. Please answer all questions to the best of your ability. There are no wrong or right answers. **What matters is your personal opinion.** The survey should take approximately 15 minutes. Thank you for taking your time to complete this questionnaire.

BIODATA

University (Private/Public) _____ Department _____

Age:	Below 30 years		30-34 years	
	35-39 years		40-44 years	
	45-49 years		55-60 years	
	50-54 years		Above 60 years	

Gender

☐ Female

☐ Male

Religious affiliation (Please specify e.g. Catholic) _____

University teaching experience _____ Years

SECTION A: AVAILABILITY AND USE OF ICT FACILITIES IN THE UNIVERSITY FOR LECTURERS.

Please place a tick in the boxes if you are aware of the availability of the following ICT resources for learning at your university.

1. Are you aware of the availability of the following ICT resources for teaching and learning at your University or through your university network?

i. Personal Computers

☐ Yes

☐ No

ii. Projectors (LCD)

☐ Yes

☐ No

iii. E- learning management system

☐ Yes

☐ No

- | | | | |
|-------|-----------------------|------------------------------|-----------------------------|
| iv. | E-Journals | ☐ Yes | ☐ No |
| v. | Interactive CD or DVD | ☐ Yes | ☐ No |
| vi. | Video cameras | ☐ Yes | ☐ No |
| vii. | Face book / Twitter | ☐ Yes | ☐ No |
| viii. | Online experts | ☐ Yes | ☐ No |
| xi) | Search engines | ☐ Yes | ☐ No |
| xii) | Video conferencing | ☐ Yes | ☐ No |
| xiii) | News groups | ☐ Yes | ☐ No |
| xiv) | Blogs | ☐ Yes | ☐ No |
| xv) | Wikis | ☐ Yes | ☐ No |
| xvi) | Video podcasts | ☐ Yes | ☐ No |

Others (Please specify).

2. Select by ticking in the box which corresponds with your agreement with each of the statements below. (SD stands for strongly disagree, D for disagree, N for neutral, A for agree and SA for strongly agree)

I always use the following ICT resources in my teaching:

i) Personal Computers

SD	D	N	A	SA
----	---	---	---	----

ii) Projectors (LCD)

SD	D	N	A	SA
----	---	---	---	----

iii) Photocopiers

SD	D	N	A	SA
----	---	---	---	----

iv) E- learning management system

SD	D	N	A	SA
----	---	---	---	----

v) E-Journals

SD	D	N	A	SA
----	---	---	---	----

vii) Interactive CD or DVD

SD	D	N	A	SA
----	---	---	---	----

viii) Video cameras

SD	D	N	A	SA
----	---	---	---	----

ix) Face book/ Twitter

SD	D	N	A	SA
----	---	---	---	----

x) Online experts

SD	D	N	A	SA
----	---	---	---	----

xi) Search engines

SD	D	N	A	SA
----	---	---	---	----

xii) Video conferencing

SD	D	N	A	SA
----	---	---	---	----

xiii) News groups

SD	D	N	A	SA
----	---	---	---	----

xiv) Blogs

SD	D	N	A	SA
----	---	---	---	----

xv) Wikis

SD	D	N	A	SA
----	---	---	---	----

xvi) Video podcasts

SD	D	N	A	SA
----	---	---	---	----

3. Are you aware of the availability of the following ICT resources for student's records management at the university?

- i) Spreadsheet programs for entering students grades
- ii) Database programs for maintaining students records
- iii) Grade book templates for tracking students grades
- iv) E- Learning platforms for maintaining students records

Yes	No
Yes	No
Yes	No
Yes	No

Others (Please Specify)

4. Select by ticking the rate to which you agree with the statement below corresponding to each ICT resource. (SD stands for strongly disagree, D for disagree, N for neutral, A for agree and SA for strongly agree)

I always use the following ICT resource for Student's records management:

- i) Spreadsheet programs for entering students grades
- ii) Database programs for Maintaining students records
- iii) Grade book templates for tracking students grades
- iv) E- Learning platforms for maintaining students records

SD	D	N	A	SA
SD	D	N	A	SA
SD	D	N	A	SA
SD	D	N	A	SA

Others (Please Specify)

5. Are you aware of the following ICT resources for internal communication?

i) Bulk SMS system

Yes

No

ii) E mail broadcasts

Yes

No

iii) Mobile phone

Yes

No

Others (Please specify).

6) Select by ticking the rate to which you agree with the statement below corresponding to each ICT resource. (SD stands for strongly disagree, D for disagree, N for neutral, A for agree and SA for strongly agree)

Your university always uses the following ICT resource for intra-university communication

i) Bulk SMS system

SD

D

N

A

SA

ii) E mail broadcasts

SD

D

N

A

SA

iii) Mobile phone

SD

D

N

A

SA

C (i) Quality of instruction.

The following questions focus on how the use of ICTs has helped you in the teaching process. Please tick the extent to which you agree with each statement. (SD stands for strongly disagree, D for disagree, N for neutral, A for agree and SA for strongly agree)

1. When I use ICT for teaching:

- | | | | | | | |
|--|---|----|---|----|---|----|
| i. Content presentation is always made much easier | <table border="1"><tr><td>SD</td><td>D</td><td>N</td><td>A</td><td>SA</td></tr></table> | SD | D | N | A | SA |
| SD | D | N | A | SA | | |
| ii. Content is presented in a way that helps students learn. | <table border="1"><tr><td>SD</td><td>D</td><td>N</td><td>A</td><td>SA</td></tr></table> | SD | D | N | A | SA |
| SD | D | N | A | SA | | |
| iii. I spend more time diagnosing and correcting students problems | <table border="1"><tr><td>SD</td><td>D</td><td>N</td><td>A</td><td>SA</td></tr></table> | SD | D | N | A | SA |
| SD | D | N | A | SA | | |
| iv. I feel well prepared because of access of information in different formats | <table border="1"><tr><td>SD</td><td>D</td><td>N</td><td>A</td><td>SA</td></tr></table> | SD | D | N | A | SA |
| SD | D | N | A | SA | | |
| v. I have more time to consult more with individual Students | <table border="1"><tr><td>SD</td><td>D</td><td>N</td><td>A</td><td>SA</td></tr></table> | SD | D | N | A | SA |
| SD | D | N | A | SA | | |
| vi. I am able to teach on one-to-one basis | <table border="1"><tr><td>SD</td><td>D</td><td>N</td><td>A</td><td>SA</td></tr></table> | SD | D | N | A | SA |
| SD | D | N | A | SA | | |
| vii. I am able to involve multiple senses of learners | <table border="1"><tr><td>SD</td><td>D</td><td>N</td><td>A</td><td>SA</td></tr></table> | SD | D | N | A | SA |
| SD | D | N | A | SA | | |
| viii. I increase instruction appeal by attracting attention | <table border="1"><tr><td>SD</td><td>D</td><td>N</td><td>A</td><td>SA</td></tr></table> | SD | D | N | A | SA |
| SD | D | N | A | SA | | |
| ix. I am able to bring to class a dynamic presentation that captures students' attention | <table border="1"><tr><td>SD</td><td>D</td><td>N</td><td>A</td><td>SA</td></tr></table> | SD | D | N | A | SA |
| SD | D | N | A | SA | | |
| x. I present material in a more organized way | <table border="1"><tr><td>SD</td><td>D</td><td>N</td><td>A</td><td>SA</td></tr></table> | SD | D | N | A | SA |
| SD | D | N | A | SA | | |
| xi. I am able to illustrate many learning concepts | <table border="1"><tr><td>SD</td><td>D</td><td>N</td><td>A</td><td>SA</td></tr></table> | SD | D | N | A | SA |
| SD | D | N | A | SA | | |

Please comment freely on the influence of ICT use on teaching at your university

C (ii) Quality of Student's record management

Select by ticking in the box which corresponds with your agreement with each of the statements below. (SD stands for strongly disagree, D for disagree, N for neutral, A for agree and SA for strongly agree)

1. The use of ICT enables me to:

i) Easily record students' Assignments

SD	D	N	A	SA
----	---	---	---	----

ii) Process examination grades with speed

SD	D	N	A	SA
----	---	---	---	----

iii) Easily enter the student's attendance

SD	D	N	A	SA
----	---	---	---	----

Please comment freely on your perception of the influence of ICT use on keeping track of students' records at your university

C (iii) Quality of Intra- University Communication

This question seeks to obtain your views on how ICT use in your university has influenced the quality of internal communication. Please tick the extent to which you agree with each statement. (SD stands for strongly disagree, D for disagree, N for neutral, A for agree and SA for strongly agree)

Please tick the extent to which you agree with each statement.

3. The use of ICT :

vi. Enables me to get information quickly

SD	D	N	A	SA
----	---	---	---	----

vii. Does not provide information more conveniently

SD

D

N

A

SA

viii. Allows me to get information reliably

SD

D

N

A

SA

ix. Allows me to receive announcements and notices anywhere and anytime

SD

D

N

A

SA

x. Helps me find information easily and rapidly

SD

D

N

A

SA

Please comment freely on your perception of the influence of ICT on communication between you and your university _____

Thanks for taking your time to fill in this questionnaire

APPENDIX C: INTERVIEW GUIDE FOR SENIOR ADMINISTRATORS

The purpose of this study will be to investigate the influence of ICT integration in Kenyan Universities on quality of instruction, student records management and intra-university communication.

1) What is the average number of students per computer in the university?

2) What is the percentage of computers connected to the Internet?

3) Could you approximate Internet bandwidth per 1000 students in your university?

4) Is there a separate budget line for ICT in the university?

5) What is the total ICT cost as a percentage of the total expenditure of the institution?

APPENDIX D: RESEARCH PERMIT

REPUBLIC OF KENYA



NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349

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Website: www.ncst.go.ke

Our Ref: NCST/RCD/14/012/186

Date: 7th March, 2012

Rhoda Karimi Gitonga
Egerton University
P.O. BOX 536
Egerton

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *"Influence of ICT integration on quality of instruction, students' records Management and Intra University communication in Kenyan Universities"* I am pleased to inform you that you have been authorized to undertake research **Nairobi** for a period ending **30th August, 2012**.

You are advised to report to **The Vice Chancellors, public and private Universities** before embarking on the research project.

On completion of the research, you are expected to submit **one hard copy and one soft copy** of the research report/thesis to our office.


SAID HUSSEIN
FOR: SECRETARY/CEO

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The vice Chancellors,
Public and Private Universities
Nairobi

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