

**FACTORS INFLUENCING THE USE OF ICT BY DISTANCE LEARNERS:  
THE CASE OF MASTER IN DISTANCE EDUCATION UNIVERSITY OF  
NAIROBI, KENYA**

**BY**

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**A RESEARCH PROJECT REPORT SUBMITTED FOR THE PARTIAL  
FULFILLMENT OF REQUIREMENT OF THE AWARD OF MASTER IN  
DISTANCE EDUCATION DEGREE OF THE UNIVERSITY OF NAIROBI**

## DECLARATION

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

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This research project report has been submitted for supervision with my approval as University supervisor.

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## DEDICATION

I dedicate this work to my loving sons, Meshack in Daystar University, John in Baricho High School and Shadrack in the Effort junior academy to be a motivation for them to work towards higher levels of Education more than this. I do also dedicate it to my dear husband, Joseph Mbonge who has unceasingly encouraged me and has been patient with me all through. Thanks and may God bless you all.

I would also like to dedicate this research project to my late big brothers Dr. Muange Peter Kattubah, Noah Kattemboh and my late small sister Jane Ndunge. You all encouraged me.

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## ABSTRACT

Distance Education students are far placed from their tutors during their learning process. Therefore the Information communication and technologies are indispensable to be able to have smooth running in their learning process. The research project therefore looks in to the factors influencing the use of ICTs by the master in distance education students in the University of Nairobi during their learning process. It also looks in to how they access these ICT and how they afford it since they are busy students and members of various institutions which need to be financially attended to. The document also looks at the skills that the MDE students need and how they influence them to use ICT in their learning process. The study also verifies how infrastructure influences their learning process from where they are and if the ICT equipment are available for them during their learning process. Survey method has been used to collect data where the questionnaire has been the main data collection instrument. Simple random sampling method was used. The study focused on the 74 MDE students University of Nairobi of intake April 2008 to April 2011. The findings revealed that both learners and lecturers in the department embrace ICT. While 70% agreed that they use email to obtain feedback from their lecturers, 35% receive their assignments through emails. A proportion of 27% reported that the feedback was timely. Besides wishing for assignments to be promptly returned with helpful feedback, another important form of support that students like to receive is a selection of supplementary reference materials. Only 14% of the students reported that they had reasonable access to such materials during their study. Lecturers on the other hand reported that the university has not provided the department of distance learning with adequate ICT personnel and this has hindered the delivery of feedback as well as the distribution of course materials to the learners. I do therefore recommend that the University is obliged to provide adequate ICT personnel to support the students effectively. The department will also ensure that the students admitted are familiar with ICT to avoid a lot of inconveniences. This will help the students to receive feedback timely and also get supplementary materials through the internet and others send by their lecturers.

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## LIST OF ABBREVIATIONS AND ACRONYMS

<b>ATICS</b>	African Tertiary Institutions Connectivity Survey
<b>D.E</b>	Distance Education
<b>H.E.P</b>	Hydro Electric Power
<b>ICT</b>	Information communication Technology
<b>KENET</b>	Kenya Networks
<b>KICTS</b>	Kenya Information Communication Technologies
<b>MASSA</b>	Management science students association
<b>MDE</b>	Master in Distance Education
<b>NGO</b>	Non Governmental Organization
<b>NICE</b>	Network Information and Control Exchange
<b>PCs</b>	Personal computers
<b>PPP</b>	Purchasing Power Parity
<b>TKL</b>	Telecom Kenya Limited
<b>UON</b>	University Of Nairobi
<b>VTC</b>	Video Teleconferencing

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the study

ICT literacy rate has become the key tool that has revolutionized how we set the world and how we live in it. It gives one the capability to identify, search effectively and present specific information to build knowledge and develop critical and creative thinking related in to a field of study. (Mac-Ikemenjima, 2005) This revolution is not widely spread and needs to be strengthened to reach a larger percentage.

According to Rahman (2006) the main role of ICT intermediaries is defined as an organization providing effective support to local communities in the use and adaptation of technology. Teaching approaches and pedagogy used in the HEI's are changing from the traditional or bridge model of master- learner or teacher centered approach to a learner centered approach of teaching where the learner controls his or her learning. (Reinhart, 2008)

ICT in D.E programmes in Africa has not been encouraging and has been the topic of a good deal of debate globally (Ololube, 2006) In Asia and Africa, assessments of Distance learning projects at junior secondary level using a combination of print, taped and broadcast technologies has been less conclusive while in primary level there is little evidence that ICT based models have thrived. In higher education there is evidence that education has been opened to those who have been constrained from attending conventional Universities. For instance 11 mega universities the biggest and most well established open and distance institutions in the world have an annual enrolment of more than 100,000 students and together they serve approximately 2.8million people. These universities include; open universities of the UK, Indra Gandhi National University of India, The China T.V university system, the universitas Terbuka of Indonesia and the University of South Africa. (Potashnik & Capper, 1998).

Globally there has been the emergence of National and regional school networks that facilitate the sharing of content and information. Countries like; Australia, France, Finland, Japan, Canada, Ghana, South Africa and Zimbabwe have national school nets.(Perraton & Creed,2000) For instance Kenya promulgated National ICT policy in January 2006. It aimed at the improvement of livelihoods of Kenyans by ensuring availability of accessible, efficient, reliable and affordable ICT services. According to Waema (2005) and Kariuki (2009), the national ICT policy is based on four guiding principles thus, infrastructure development, human resource development, appropriate policy and regulatory framework.

On human resource development the policy aims at the need to strengthen and streamline ICT training through; Promoting ICT in education in primary, secondary, tertiary and community by developing ICT curricular and ensure that teachers and trainers possess the requisite skill and Set up a framework for evaluating and certifying ICT training programmes. (Kenya ministry of information and communication, 2006).

### **1.2 Statement of the problem**

Distance learners are members of various institutions and take up various responsibilities. These are learners who learn separated from their tutors and institution contrary to the conventional learners who learn from the institution with their tutors present. Therefore the use of ICT thus telephone, the internet, CDROMS, email, computers, DVDs, CDs are indispensable for their success during their learning. The problem is though necessary there are factors that influence them as they use these ICTs during their learning process.

### **1.3 Purpose of the study**

The purpose of this study was to investigate the factors influencing the use of ICTs by distance learners, a case of master in distance education, University of Nairobi, Kenya.

#### **1.4 Objectives of the study**

The research was therefore guided by the following objectives;

1. To determine how ICT infrastructure influences the use of ICT by the distance learners of the master in distance education.
2. To assess how accessibility to ICT influences the use of ICT by the distance learners of the master in distance education.
3. To examine how ICT affordability influences the use of ICT by the distance learners of master in distance education.
4. To assess how skills in ICT influence the use of ICT by the distance learners of master in distance education.
5. To examine how availability of ICT equipment influences the use of ICT by the distance learners of master in distance education.

#### **1.5 Research questions**

The questions that the research looked into were as follows;

1. How has ICT infrastructure influenced the use of ICT by distance education learners in the master in distance education?
2. How much has accessibility to ICT influenced the use of ICT by distance learners in the master in distance education?
3. To what extent has ICT affordability influenced the use of ICT by distance learners in the master in distance education?
4. To what extent has skills in ICT influenced the use of ICT by the distance learners in the master in distance education?
5. How has availability of ICT equipment influenced the use of ICT by distance learners in the master in distance education?

#### **1.6 Significance of the study**

Distance Education (D.E) is education where students (learners) are physically separated from their tutors by physical distance and so technology is used to bridge this instructional gap. As Michael Moore(2005) defines it “ Distance Education as planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques,

special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements.

The university of Nairobi is investing a lot of money in ICT infrastructure therefore the findings will bring out some of the factors that influence the use of ICT in distance education. The curriculum developers will be enlightened by this study that ICT syllabi for primary, secondary and tertiary institutions needs to be put in place. The government will also be made aware that there is need to implement the ICT policy in order to put it in use in the education sector. The school of Distance education and external studies will also discover that most students learning through distance and also taking this course need ICT support.

### **1.7 Limitations of the study**

The following limitations were anticipated in this study. The researcher is a working adult so time was a limiting factor on timely collection of questionnaires. Resources were also limiting factors since the researcher needed to travel severally to the centre to meet these students and probably call them on phone to verify when they were in session. To solve this, the researcher liaised with the coordinator of the school to be able to meet the students when they were on session.

### **1.8 Delimitations**

This study was carried out at the University of Nairobi basing it to the master in distance education students intakes 2008 April to 2011 April their 3 lecturers and 1 administrator. This reduced the population to a manageable size.

### **1.9 Basic assumptions**

MDE students are familiar with ICT and use it during their learning process. ODL is only feasible through ICT therefore students have the required skills for its use. MDE students experience no problems related to infrastructure and so accessibility to ICT is not a problem. ICT learning equipment are available in the University for the MDE students to use during their learning process.

Data was collected from the targeted population objectively.

## **1.10 Definition of significant terms**

**Access-** ability to experience or make use of something without any obstacles ability to use ICT hardware and software for instance networks and a good receptive waves.

**Affordability-** ability to purchase the ICT equipment without unacceptable difficulty. This includes the airtime for broadband and internet access.

**Distance Education-** an approach of learning that frees learners from constraints of time and place while offering flexible learning opportunities.

**ICT-**Information Communication and Technologies. These are computers, interactive televisions, iPods', ipads, playback devices, radios mobile phones.

**ICT use-** manipulations of the ICTs to create, access, store, transmit and manipulate information.

**Infrastructure-** this is the bandwidth. Thus range of radio frequencies telecommunications transmissions and reception. It is also online communication capacity.

**Learning process-** the continuity in learning to complete a course.

**Skills-** the know how after training or experience.

### **1.11 Organization of the Study**

The study entailed the background of the study where factors influencing ICT use were discussed globally, in Africa and in Kenya. The statement of the problem brought out the problem under investigation and also the purpose of the study was stated. The objectives of the study were mentioned from which the research questions were retrieved. The significance of the study was explained to show who the study benefits and how. Time and resources were seen to be the limiting factors. The study was based on the Master in Distance learning students of the University of Nairobi of intake 2008 April to 2011 April intake group. The researchers expectations were also mentioned as the basic assumptions and also the significant terms were defined to bring out the meaning of the terms in the study clearly.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter seeks to review the literature related to the effective usage of ICT. It reviews literature that shows how important ICT is to distance education. It also shows how distance learning has been influenced by accessibility to ICT, poor ICT infrastructure, ICT equipment unavailability and ICT affordability and digital divide and lack of ICT skills has affected usage of ICT especially by Distance learners.

#### **2.2 Importance of ICT in Distance Education**

In the first few decades there has been major transformations occurring in the education sector, as well as in the other areas that are important for enabling people to develop new capabilities necessary for the knowledge or information society. (Mansell et al 2001). These changes are partly due to the development of ICT's as well as the forms of interactive learning that it facilitates. (Happell, 2000). Thus (Haddad and Draxler, 2002.) calls for a new paradigm of schooling. Refer to table 2.1 in Appendix II

Edooley (2000) advises Universities to revise policies that are primarily focused on research agendas and establish the institutional capacity to support the development of Distance Education courses or programmes if the universities are to utilize ICT technologies effectively. (Marris, 1975) argues that people seek to consolidate skills and attachments whose secure possession provides the assurance to master something new. ICT usage is beneficial since it fosters collaborative learning and flexible learning opportunities independent from time and place and that it offers opportunities arising from cross cultural use. (Keller, 2005)

Hawkrige (1990) pointed out four different rationales that drive policies related to integration of ICT and the use of computers in education. The economic rationale which says that the development of skills in ICT is necessary to meet the need for a skilled workforce as learning is related to future jobs and careers; the social rationale

which builds on the belief that all pupils should know about and be familiar with computers in order to become responsible and well informed citizens; the educational rationale sees ICT as a supportive tool to improve teaching and learning and finally a catalytic rationale which expects ICT to accelerate educational innovation. Pajova (2002) affirms that without information literacy, developing nations may continue to underutilize the technology that is provided resulting in a waste of resources with potentially serious repercussions for their development.

Cunningham (2007) asserts that ICT has become an indispensable tool for democratic society, the information economy and quality education. And as such it is impossible for any country to participate fully in the globalized economy and develop the potentials of its citizens without technological literacy. From the economic perspective, the shift from industrial to the information economy has essentially completely changed the structure of work. Heinich et al (1996) and Smaldino et al (2008) insist that ICT in education can be used; to aid management and administration activities, as an object of instruction and learning purposes.

Kozma (1991, 1994) indicates that taking in to consideration the processing capabilities of ICT tools, it must be argued that; ICT may enable learners to elaborate their mental models and correct their misconceptions with the use of a macro world; ICT can enable learners to connect their symbolic learning in school to real world situations and ICT can also enable learners to share ideas across different cultures. Bransford et al (1999) claims that a number of features of ICT tools are consistent with principles of the science of learning and hold promise for improving teaching and learning. It is argued that ICT serves as a valuable tool for the development of individuals as well as countries across the world. As the President Thabo Mbeki of South Africa at the opening of the Biennial meeting of the association for development of education in Africa said, "we must use, we must encourage the use of information technology in education, so as to link far flung places and institutions of learning to bridge the gap between urban and rural areas, to enable African children to advance scientifically so as to compete on an equal footing with the rest of the world" (Mbeki cited in ADEA,2000) this is how important ICT is.

### **2.3 ICT Infrastructure**

Isaacs, (2002) specifies the main obstacles that face the African schools (and tertiary institutions too) with respect to internet access. These are lack of infrastructure in particular, high telephone and internet costs, limited expertise and ICT skills levels and lack of an enabling policy environment. The level of technology is very low compared to developed countries. Traditional print based D.E assisted by radio and T.V is not new to many parts of Africa. Print remains to be the predominant delivery tool for Distance Education in Africa as the incorporation of the more moderate ICTs in the process is constrained by lack of infrastructure and affordable connectivity in many parts of the continent (Farrel and Shafika, 2007).

The state of ICT infrastructure in the African Universities can be summed up to be too little, too expensive and poorly managed (World Bank institute survey, 2007). In an article from Ghana,(ICT and Global Education,2008) it is commented that the African continent is known to be confronted with several difficulties including high levels of poverty, illiteracy, political instabilities, low per capita income and poor infrastructure among others. It is also quoted that Africa has the least internet penetration (5.3%) compared to that of North America of 73.1%, Oceania and Australia (57.0%) and Europe (47.7%). Initiatives are identified that are barred by lack of robust telecommunications, infrastructure with sufficient reliable bandwidth for internet connections, high costs, lack of financial resources, inadequate ICT equipment and low levels of computing technology and literacy skills as well as cultural and behavioral attitudes. (International Commission on Education for the 21<sup>st</sup> century, 1998) this is also reflected in table 2.3 the information age.

The Kenya ICT policy lays the framework for e-learning considered crucial to its development and utilization. The need is to provide affordable infrastructure to facilitate dissemination of knowledge and skill through e-learning platforms and to promote the development of content, to address educational needs of primary, secondary and tertiary institutions. The e-learning framework further seeks to facilitate sharing of e-learning resource between institutions and to exploit the e-learning opportunities to offer Kenyan Education programmes for export. (Kenya

ministry of information and communication, 2006). The realization of these intentions is expressed in the National ICT strategy for Education and training policy document for ICT in Education (Kenya MOE, 2006).

Some of these strategies are; equipping educational institutions with digital equipment to stimulate integration of ICT in Education. Support initiatives that provide digital equipment to educational institutions. This was aimed to provide 80% infrastructure to secondary schools and to primary 10%. The strategy also aimed at improvement of access and equity in supporting infrastructural development in remote areas, implement policy provisions that are favorable to special needs group and make budgetary provisions for adequate supply of ICT equipment and facilities. (Kenya, MOE, 2006).

An ICT unit has been established at the ministry's head office to ensure that systematic efforts are being made towards strengthening adoption and use of ICT in the Education sector in general. (Wambui and Barasa, 2007) The Kenya ICT trust fund is helping to implement this strategy. It is a registered consortium in the form of an NGO in Kenya that mobilized partners from public, private and civil society sectors. It mobilized funds for purpose of setting up computer laboratories in all Kenya secondary schools in 4-5 years. (CCK, 2005) The Microsoft partners in learning has reported having a five day training course to 5000 secondary school teachers and also helped organize and direct over \$80,000 contribution from trust fund members and donated computers.(Microsoft,2006). The world internet penetration rates are reflected in table 2.2 as in December 2007.Glen Farrell also reflects the ICT rate in Kenya. Refer to table 2.3 which shows the information age and also check Table 2.4 How ICT is in Kenya all in appendix ii.

## **2.4 Access to ICT**

Ideally one wishes for equal opportunity to participate. But access for different actors- both users and producers- is weighted by their resources. Hence, initial differences are often produced; reinforced and even magnified--- A formidable challenge, therefore, continues to face planners of international education: how to define the problem and

provide assistance for development. (Hernes, 2002) It should also be noted that although ICT occupies a place that has become more and more important in the daily lives of a large number of persons, the influence of ICTs on societies does not manifest itself in a uniform manner.(Karsanti,2006) However, the major constraint of most African countries is limited access to new technology due to high costs of establishing, using and maintaining the necessary infrastructure, lack of adequate local expertise and low computer literacy rate among user groups(Neil,2003). It is increasing apparently that the information revolution has changed the way in which the world learns, conducts business or governs a compelling divide which is emerging between the digital 'haves' and 'have-nots' (Castells,1999,2001)

Access to a reliable supply of electricity is a general problem but is particularly severe in rural areas because of difficulty of connecting to national electrical grids. (Farrel and Shafika, 2007) Three e-readiness studies were carried out in Kenya during the period 2001-2005. An assessment study conducted by the government led IT sector working group and Netcom information systems revealed the following status in 2002. That the areas showing least progress are in the introduction of ICT into schools and the establishment of e-government systems. Both have shown progress since 2002 with the expansion of school networking and e-government projects.

Major deficiencies were noted in the areas of infrastructure availability and affordability. This situation does not seem to have changed much and the fieldwork visit of 2004 revealed much the same problem as shown in this 2002 e-readiness. Internet availability, as judged by the growth in the ISP sector since 2002, seems to have stagnated when assessed in 2004 and it is unlikely that the e-readiness score would be as high if the survey was carried out now. The stagnation can be attributed to the difficult climate in which ISPs have been functioning during the Telco monopoly which provided the only international gateway in the country. The higher values for ICT employment and development skills for the ICT sector were borne out in 2004 field visits, although the relevance and appropriateness of ICT skills development for the industry needs closer scrutiny. (James, T et al, 2004)

African Universities are seriously constrained in the use of ICT by lack of computer stations and lack of access to affordable high speed internet connectivity. Indeed the 2006 African Tertiary Institutions Connectivity Survey (ATICS) summed up the situation as too little, too expensive and poorly managed. The survey goes on to say that the average African University has a bandwidth capacity equivalent to a broadband residential connection available in Europe (and) pays 50 times more for their bandwidth than their Educational counterparts in the rest of the world.(Gakio,2006) For instance in the University of Nairobi policy guidelines (2010) the University network was only designed and implemented in such a way as to serve those located at the University campuses and to a lesser extent, those located elsewhere. It also states that all communication rooms and cabinets shall be locked at all times. This shows that the students especially those who learn through distance cannot access even within their short face to face sessions.

The urban areas have reasonable access to all types of services with high rates of penetration. This is also the source of most revenues. To take service to the rural areas, the government offered TKL (Telecom Kenya Limited) a monopoly in key market segments to enable it to use resources from monopoly market segments to deliver services to rural areas. The monopoly dividend did not pay off. There is no expansion to the rural areas and the situation is not likely to change. Already TKL reports under utilization of its exchanges in the rural areas by up to 40% resulting from low income of rural population. (KICTS, 2005)

A recent worldwide study based on the data obtained from 14 institutions involved in D.E conducted by Euler and Berg (1998) shows that; Printed materials, augmented by audio and video materials are the dominant forms of learning materials used in D.E. However there are noticeable differences in the use of audio and multimedia learning materials when comparing industrialized countries with developing countries. The use of audio based learning materials in developing countries exceeds their use in industrialized countries by 22%. However industrialized countries use computer based multimedia resources 329% more than in developing countries.

Mail and public telephone network are the main communication channels used in distance education. Due to the lower “Tele-densities” in developing countries, the use of this channel is 32% less when compared to industrialized countries. Interestingly radio and direct broadcast television are respectively 383% and 78% higher in developing countries when compared to levels in industrialized countries. This suggests that developing societies can use more advanced technologies to overcome existing barriers and historical infrastructure problems associated with previous generations of technology.

Euler and Berg (1998), compares the rate of use of learning materials in both developing and industrialized countries. (Table 2.5, appendix ii) They also compare the various communication channels in Distance Education in both developing and industrialized countries. (Table 2.6, appendix ii) According to Hafkin and Taggard (2001), a location of technological facilities constrain women’s’ access to ICT. In developing countries, most of the technological facilities are concentrated in the urban areas. There is lack of adequate infrastructure such as telephone facilities, satellite facilities, electricity and more especially communication centers in the rural areas. This therefore indicates that male/female attitudes towards ICT would depend on the geographical location (rural or urban).

There is inadequate connectivity and network infrastructure although a small number of schools have direct access to high speed connectivity through an internet service provider (ISP). Generally there is limited penetration of the national physical telecommunication infrastructure in to the rural and low income areas. Consequently there is limited access to dedicated phone lines and high speed connectivity for email and the internet even where access to high speed connectivity is possible, high costs remain a barrier to access (Farrel, 2007).

In addition to providing information technology and internet for its students, Kikambala School is the only one in Africa that links up all schools in the country via internet to share information on education, technology and health standards. The add-on project was supported by the sun n sun beach resort, a private organization in

Mombasa, where a wireless wire with a radius of 50km has been set up to facilitate the sharing of information. As a result teachers in rural isolated schools can now exchange information with colleagues from other schools and access various educational materials to prepare their lessons. Students from these interconnected schools consider themselves very lucky for having access to computers and the internet and believe they can do 'everything' with it (Marete, 2006).

Glen Farell (2007) brings out the challenges and successes of implementing ICT in Education. He mentions the factors that would enable and hinder the implementation. These are the factors;

Policy framework and implementation plans are enabled since Kenya has a sophisticated ICT in Education strategy and implementation plan. It is embedded in the national ICT policy and was developed through a consultative process with stakeholders. The plan has costing estimates; timelines with measurable outcomes specified lead agencies support is widespread. Advocacy leadership is another factor that Farrel mentions as enabled since the minister of Education and the permanent secretary demonstrate a very strong commitment to the importance of ICT in education.

Gender equity is another factor which is enabled by the equity of access stressed in policy and implementation documents. Usage in schools is reported to be equitable. This factor is seen to be constrained by female participation which is noted to be equal at primary levels and decline in secondary and drop significantly in tertiary levels.

Infrastructure and access is constrained by lack of National infrastructure which seriously constrains the use of ICT in schools particularly in the rural areas. The lack of reliable and affordable access to the internet is a further serious constraint. Institutional connectivity in higher education is because of KENET. However the lack of bandwidth access seriously constrains ICT use by faculty and students and currently the cost of bandwidth precludes a solution. Murray (2005) study concluded that, "the real problem is not the absence of programs in African Universities but the inability of students to gain access to these programs".

Collaborative mechanisms are other factors which are seen to be enabled since Kenya is well served. The Kenya ICT trust fund is a model to be copied in terms of PPP (Purchasing Power Parity) to garner resources for ICT in education. The KIE is another institutional mechanism that facilitates collaboration and in the NGO sector, the NICE (Network Information and Control Exchange) umbrella provides a mechanism for coordination of differing and effective initiatives. Human resource capacity is another enabled factor that Farrel (2007) mentions. He says that remedial initiatives are being taken though they will take time to develop. The strategic plan places a great deal of emphasis on the need for training. This factor could also be constrained by the current deficit of human resource capacity as it is recognized in the ICT plans by the ministry. Skills also set in the school system are very low. The need for training of school system is very low. The need for school managers and teachers is widely recognized and is being addressed though huge and might take time. This constraint is much more pronounced especially in the primary level. In higher education the constraint is less acute with professors; however very few students have been able to master information management skills because of lack of access to infrastructure. (Farrel, 2007)

Fiscal resources are another factor that enables this implementation since there seems to be the existence of a strategic framework which appears to be bringing forth both donors and the private sector to participate in the ICT Trust Foundation. Learning content is another enabling factor since digital content is underway for the school curricular and in a collaborative manner among some of the universities.(Avior Project) this factor is constrained since currently there is not much content available there is lack of access to that which is available. There is need to develop content in local language as well as English. Procurement regulations are constrained since the duties and levies currently levied on ICT products are making them too expensive. Attitude is another enabling factor since there is a strong belief that the incorporation of ICTs is essential at all education levels. This is shared from the political to the student level although there is a perception that D.E is second best. (ibid)

Sustainability is another enabling factor since the ministry recognizes that the adoption of ICT needs to be based on an understanding of the total cost of ownership. The strategies for sustainability are being developed at local levels through community involvement and service provision. This factor is constrained by the experience of projects failing once project funding is over giving rise to some cynicism. (ibid)

## **2.5 Affordability of ICT in Kenya**

As most of the developing countries, Kenya shows a high disparity in wealth distribution. Kenya's Gini coefficient has been fluctuating over the first two decades with an improvement from 0.57 in 2004 (Farrel,2007; UN Habitat,2008) Kenya's human development index was 0.532 in 2006, which ranked Kenya the 144<sup>th</sup> out of 179 countries.(UNDP,2008). In 2007, the country's ranking dropped to 152<sup>nd</sup> of 177 countries (Farrel, G 2007). Pasha centers that originated from the Kenya government recognized that ICT has been centered mainly in the urban centers, resulting in glaring disparities between urban and rural areas in the distribution of ICT facilities (Kenya ICT board, 2009).

The average African University has bandwidth capacity equivalent to broadband residential connection available in Europe and pays 50 times more for their bandwidth than their counterparts in the rest of the world (World Bank institute survey). It may seem that the initial purchase of hardware and software is the costliest part of the process, the bulk of the total cost of ownership is spread overtime, with annual maintenance and support costs(known as variable costs or recurrent costs) constituting between 30% to 50% of the total costs of hardware and software. Cost analysis tends to be bound by institutional budget. The costs students incur in acquiring and operating equipment is not generally taken into account- yet from the would be students point of view; these costs can have a major impact on income, race/ethnicity, and educational attainment. (Massy, 1995).

Local centers, may, of course mitigate student costs by providing access to machines, but they cost a fair amount of rent, equipment, furniture and staffing set up- and generally accommodate very few students at any one time. This is not to mass access which is why African virtual University is such a limited project. Internet cafés cost money to use and are not necessarily ideal environments for study. In any case, a country like Uganda, anything that uses a telephone line is extremely expensive. (Rumble, 2001)

And as Potashnik and Adkins (1996) have pointed out, “even in countries which do not believe in the cost effectiveness of information technology as a tool for mass education, it is important that they begin acquiring experience acquiring this technology for educational purposes. Otherwise educators in developing countries will be marginalized in the international dialogue on education.”

## **2.6 Skills in ICT as reflected in Kenya**

Doyle (1992) defines information literacy as the ability to access, evaluate and use information from a variety of sources. Bruce(2003) from an educational perspective defines information literacy as the ability to access, evaluate, organize and use information in order to learn, problem solve make decisions in formal and informal learning contexts, at work, at home and in educational settings. Ralph (1999) as cited in Bruce (2003) considers information literacy as “a key to lifelong learning” which includes computer literacy, information technology literacy, library skills, information skills and learning to learn. Warschauer (2004) recognizes information literacy as part of the electronic literacy spectrum, which includes computer literacy which is the ability to operate a computer.

There is no doubt that the spread of ICT tools has made information more easily available. (Arunachalam, 2002; postman, 1990) However, in order to make the best use of that information, people need to be information literate. ICT tools facilitate the storage, reception and transmission of information, extending its reach, but the process of processing that information requires information literacy skills (Walsham, 2001).

Electronic databases are nothing more than another source of information – no more and no less than an encyclopedia; it is the user's ability that makes the difference when accessing them. That is why developing ICT skills without enhancing information literacy is of little help; they both should be developed in conjunction with each other (Catts and Lau, 2008). Ultimately, it is information literacy that informs people's practices when accessing technological tools (McMahon and Bruce, 2002)

Ayoo and Otike (2002) take a very critical stance and maintain that the formulation of an information policy in Kenya is hampered by the lack of information skills mainly among top policy makers which results in making the wrong choices of ICT's. Information policy should be supported by providing education; running literacy programmes and training with the participation of all information stakeholders: the government as information generating agents, the information professionals as information processors and disseminators and citizens as the information consumers (Kamar, 2006)

Solomon et al, 2003 asserts that the digital generation uses today's technologies to maintain social networks and bridge and build new ones in the web-based social networking sites of their age, via their instant messages. (Harwood, P and Asal, 2007) From the computer society in Kenya (2003) the estimates of computer related qualifications in Kenya are reflected. (See table 2.7 in appendix II)

More positive attitudes towards the computer were associated with higher level of computer experience (Dyck and Smith, 1995; Teo, 2008) A study conducted in four African countries identified that while in principles girls are given the same opportunity as boys of access to the computer, gender equity does not exist in practice (Derbyshire, 2003). Studies had established that females tend to be less interested in computer and use them less often in their spare time (Schaumberg, 2001). The three computer related occupation (computer scientists, computer engineers and system analysts and computer science and engineering) are the top career choices for boys (Derbyshire, 2003).

Female have also more negative attitude towards computer (Bebetsos and Antoniou, 2008) thus they are often less computer literate than males (Kadel, 2005; Schaumberg, 2001; Townsend, 1997) and this may result in different ways of using the computer (Jackson, Ervin, Gardener and Schmitter, 2001)

Sefyrin (2005) study showed that competence in ICT could be seen as a question of interest in ICT, where men are more interested in ICT than women. The study thus confirmed the view of gender and competence as actively constructed in a social process. This is because understandings of the terms were negotiated among individuals who understood themselves and their behaviors.

## **2.7 ICT equipment and availability**

The fastest growing and most popular ICT in Kenya is mobile phones. At present there are three mobile service providers who have enabled various mobile services (e.g. mobile banking). The reliance on mobile communication and services was well reflected during the election chaos in January 2008 where people used pre-paid cards as a currency by trading them for food and medicine (Zephoria, 2008). In fact, the number of mobile subscribers increased from 9.3million in 2007 to 12.8million in 2008 (Oparanya, 2009). Annan (United Nations, 2003) asserted that, 'while education unlocks the door to development, increasingly it is information technologies that can unlock the door to education.'

The country of Kenya experiences many of the problems typical of sub-Saharan Africa enumerated by Langmia (2006) is that it is lagging behind in information superhighway technology in terms of infrastructural developments, the growth of the fixed telephone network throughout Kenya has been below expectations; according to the central bureau statistics (2006) the fixed line teledensity was 1.02% (number of fixed lines per one hundred population) during the year 2003 but this has really deteriorated since then due to the steady population increase in the absence of infrastructural developments. Most of these fixed lines subscribers are concentrated in urban areas which account for 94% of the fixed lines while 6% are in rural areas (central bureau of statistics, 2006)

In contrast cellular services have expanded rapidly from under 15,000 customers in 1999 to over 2.8 million in 2004 (export processing zones authority, 2005). By April 2004, there were estimated one million internet users and over one thousand cyber cafes' throughout the country (ibid).

However despite the current successes the initiative faces many hurdles, including inadequacies in infrastructure, access to electricity, security of housing facilities and internet connectivity. Other obstacles that have been listed include a lack of ready market for products, mishandling of gadgets and political instability, as well as difficulties in accessing market prices and sharing information on experience and best practices. The inability of the groups to organize and function efficiently and equitably to maximize shared benefits from their livelihood activities is a further recognized hindrance (Albrini, 2008)

In a research project (Kenya school Net, 2003) conducted in November 2002 was based on the findings of a questionnaire to which 69 secondary schools responded coming from all provinces and 46 districts. The research reported that only 46.4% of the sampled schools had computers although they did appear to be high level of awareness of the benefits of computers in schools (Makau, 1990).

It was suggested that e-mail was yet to be recognized as a tool for collaboration among teachers as only one school had a website and only two reported having networked their computers to the internet-(ibid). It went on to assert that in those schools access to the internet was severely limited and when available was only for administrative use (ibid).

The school Net research found that almost 40% of schools had less than 10 computers and therefore inadequate numbers for teaching and learning. More than 20% had less than 5 computers indicating that the computers were largely for administrative purposes. The research found out that some schools were using very old equipment and that heavy reliance on the donation of computers as opposed to sourcing locally

reduced the capacity of the school to determine the makes of computer they used (ibid).

In a research study based on the experience of managers and computer teachers in eight schools in Uasin Gishu district, western Kenya, (Ndiku, 2003) focused on the problems encountered in the implementation of educational ICT projects. The research identified the following as the most important factors inhibiting the success of computer deployment projects: insufficient numbers of computers and peripheral devices; teachers' lack of knowledge; inadequate software for instruction and inadequate technical assistance (ibid).

Computer teachers themselves were found to have the additional problems of integrating computer usage in to school curriculum and frustrations with outdated computers which were not relevant to current needs (ibid).

The available open source software which might be seen as best choice for software, meets the challenge of few expertise to develop e-learning platforms for students and lecturers to use. (Lungo and Kaasabol, 2007)

There are options in implementing e-learning using mobile phones, CDs, DVDs, audio tapes for delivery of learning materials. In using phones, it has been noted that there are more hidden costs to the students, and thus makes higher distance and open learning more expensive. Similarly, not all places are connected to the mobile phone technologies. Using offline technologies meets challenges of equipment to read the materials stored in the CDs, DVDs, Audiotapes and other types of memories one uses to store documents for later retrieval. Taking in to consideration to people with disabilities, both acquisition and skill training on use of equipment are challenges to students and lecturers, especially those with visual impairment. Where the technology is available literacy use to ICT equipment such as computers and mobile phones to access information might be another hindering block to implementing e-learning in open and distance learning in developing countries (Gunawardana, 2005).

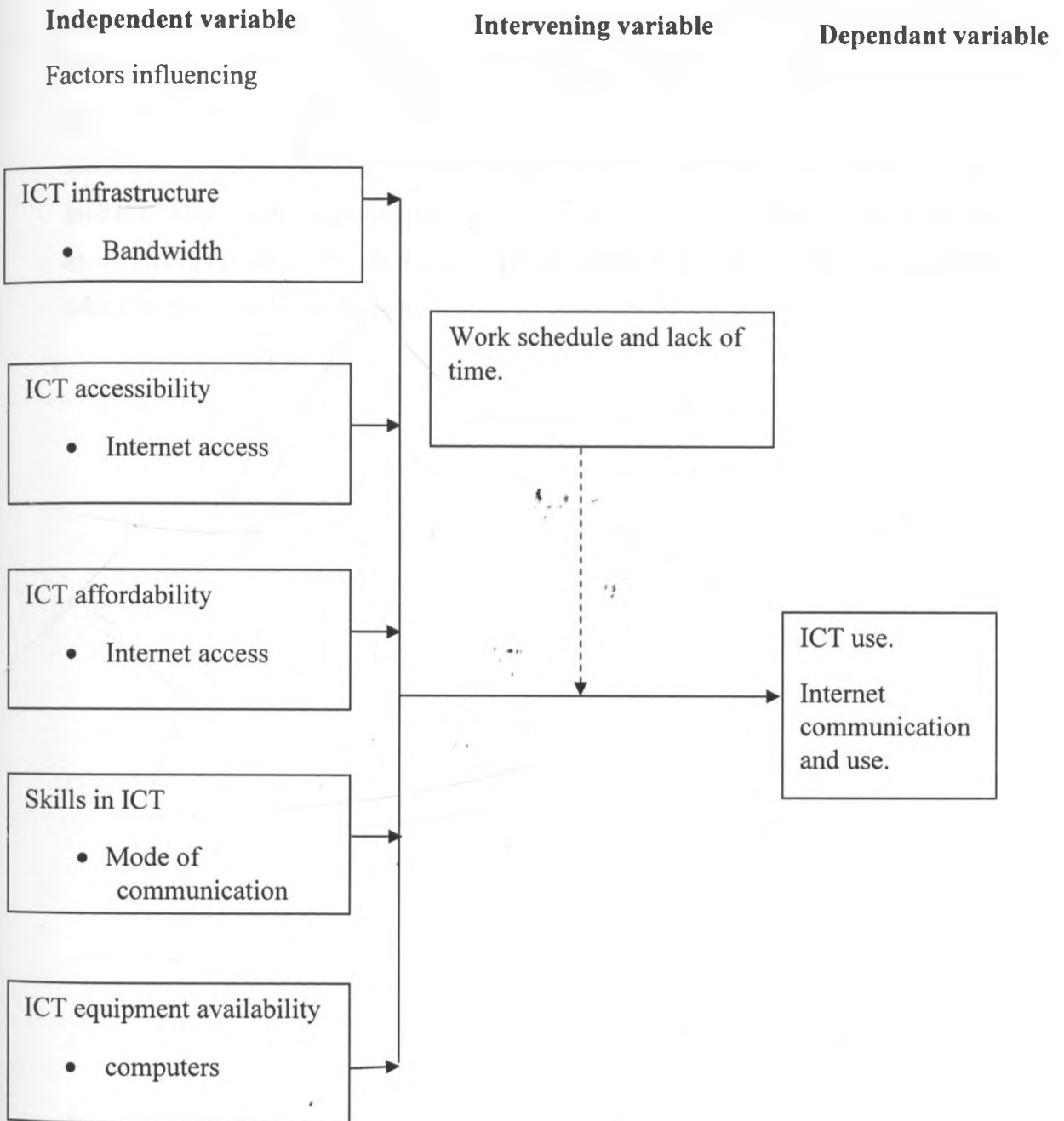
Gachau (2003) conducted a research on e-learning readiness in tertiary institutions in Kenya, a case study of Kenya polytechnic. Her study investigated e-learning environment. Her key findings of the factors that determine e-learning readiness were computer and internet availability, computer literacy, motivation of users and management support. Most institutions of higher education especially public institutions may not be able to attract and retain qualified technical experts due to limited resources (Watkins et al, 2003).

In conclusion ICT usage is important and necessary for distance learners during their learning process. This will only be possible if infrastructure is streamlined and well distributed in all areas especially in the sub-Saharan Africa. This will enable the learners to access learning materials from all over the world. Necessary skill acquisition is important for their learning. Distance learners therefore need to work towards their information literacy which will also motivate them in the usage of ICT equipment in the most appropriate manner. This equipment therefore should be made adequate by making them affordable and up to date for the distance learners. The ISP should lower costs for bandwidth that can be used by students and institutions in a cost effective way. This will make access to the networks reachable for learners. This will make distance learning an easy and interesting method of teaching and learning.

## **2.8 Summary**

ICT has been discussed as indispensable in the success of distance learning with the availability of effective infrastructure and access which have not been uniformly distributed. Affordability of ICT hardware and software is a constraint in effective use of ICTs although skills are also necessary in their use. ICT equipment availability is necessary but has been constrained by inadequate skills and illiteracy, costs, internet penetration rates and infrastructure.

**Figure 1: Conceptual Framework**



Distance learning is viable through ICT. The factors that influence the use of ICT in the learning process of the Master in Distance learning students are the ICT infrastructure thus the bandwidth, ICT accessibility, ICT affordability thus costs, their ICT skills and ICT equipment like computers, video teleconference equipment, playback systems, CDRoms. Their work schedule and lack of time becomes a great hindrance to their learning process using the ICT. This then has influenced their interest. The university policy which does not demand the ICT knowledge from them as they take up the course is the moderating variable also makes them loose interest which is the extraneous variable.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter presents the methodology that was used to conduct the study. It is organized in to the following sections: the research design, sampling design, data collection method, data analysis method and the operational definition of variables.

#### **3.2 Research design**

The research method that was used is the descriptive survey method of research. Mugenda and Mugenda quotes Gay (1983) who says that “A survey is an attempt to collect data from members of a population in order to determine the current status of that population with respect to one or mbre variables” This is because it is more efficient and economical. The survey method was used since the respondents are Masters Students who are on the ground in this particular matter of investigation and all the objectives target them. Other questionnaires to be developed are for the lecturers as they are the ones who interact with these students. The administrator’s questionnaire was also developed to ensure the objectives on ICT equipment availability in the college were fully answered. As Guba and Lincoln (1994) assert that research can be conducted only through interaction between and among investigators and respondents.

#### **3.3 Target population**

The target population was the Masters in Distance Education students in the University of Nairobi in the year 2008 April intake up to 2011 April in take. The population consisted of 74 students who come for face to face sessions in Nairobi and return to their various places of work and 3 lecturers and one administrator.

The learners target population is indicated on table 3.1

**Table 3.1: Distribution of total population of Master in Distance Education students admitted from year 2008 April-2011 April**

<b>Year</b>	<b>Month</b>	<b>Male Students</b>	<b>Female Students</b>	<b>Totals</b>	<b>Percentage</b>
<b>2008</b>	<b>April</b>	5	2	7	9.46
	<b>August</b>	1	4	5	6.76
	<b>December</b>	2	3	5	6.76
<b>2009</b>	<b>April</b>	4	5	9	12.16
	<b>August</b>	3	1	4	5.41
	<b>April</b>	6	7	13	17.57
<b>2010</b>	<b>August</b>	4	3	7	9.46
	<b>December</b>	7	10	17	22.97
<b>2011</b>	<b>April</b>	4	3	7	9.46
<b>Totals</b>		<b>36</b>	<b>38</b>	<b>74</b>	<b>100</b>

Source: Department of Distance Studies, University of Nairobi (2011)

### **3.4 Sampling procedure and design**

The target population intended was the Masters students in the Masters in Distance Education (MDE) program in the University of Nairobi. These are the masters students who are studying the course Master in Distance Education through the distance method. The sampling method that was used is the simple random sampling technique from a sampling frame where each second student was picked. This is because the masters distance learners education group is a unique group taking a course that is only offered in the University of Nairobi. The total sample of respondents target is 42 students as indicated in table 3.2. According to Mugenda and Mugenda (2003), a sample size of 10% and 20% of a population is representative enough and therefore the 56.76% is more than enough. The 2008 April intake group to the April 2011 intake group were given questionnaires to fill as they came to do their CATs and were collected immediately.

### 3.5 Sample size

The following is the sampled number of students both male and female in the Master in Distance Education program from the year 2008 April intake to the 2011 April intake.

**Table 3.2: Sampled population of the Master in Distance Education students**

Year	Male Students	Female Students	Totals	Percentage
2008	5	5	10	23.81
2009	4	4	8	19.05
2010	9	11	20	47.62
2011	2	2	4	9.52
<b>Totals</b>	<b>20</b>	<b>22</b>	<b>42</b>	<b>100</b>

This was got by picking every second student then the total number was divided by the total population and percentage got. Thus,  $42/74 \times 100$ , the total percentage sampled is 56.76% of the total population. The department of distance studies has only five full time lecturers the rest are part time lecturers. There is only one administrator who also got a questionnaire to fill.

### 3.6 Data collection method

The researcher used the survey method to collect data. The reason for using this method was because most distance learners are located in far place and so can only be reached while on face to face session. The researcher distributed the questionnaires during face to face sessions and as they sat their CATs and exams.

### 3.7 Data collection instrument

Questionnaires were used as the data collection instruments.

The questionnaires contained open ended questions that enabled the respondents to write and respond to what they knew exhaustively. Questions were based on the variables. Appendix III has a questionnaire intended to be used for students, Appendix IV has a questionnaire for lecturers and appendix V has a questionnaire for the administrator.

### 3.8 Validity of data collection instruments

Validity of a data collection instrument is the accuracy and meaningfulness of inferences, which are based on the research results. (Mugenda and Mugenda, 2003).

After designing the questionnaires, validity which was content validity was ensured by presenting them to experts in ICT and my supervisor who determined what the instrument measured and if the items represented the concepts under study. This was done by sending some questionnaires to the ICT lecturer and the supervisor through mail. Other questionnaires were; one for the one and only administrator, and three lecturers to be send through email. The responses were used to correct the questionnaires presented before presenting them again to the sampled population.

### 3.9 Reliability of data collection instrument

Reliability of a data collection instrument is the measure of the degree to which a research yields consistent results or data after repeated trials. It is influenced by random error. (Mugenda and Mugenda, 2003)

The split half technique was used to test the reliability of the data collection instrument where the questionnaire were divided into two groups by having all odd numbered items grouped together and all even numbered grouped together then correlated using the spearman Brown prophecy formulae thus;

$$\text{Reliability of scores on total test} = \frac{2 \times \text{reliability for } \frac{1}{2} \text{ test}}{1 + \text{reliability for } \frac{1}{2} \text{ test}}$$

This helped me to eliminate the chance error.

$$\text{Correlation coefficient will then be calculated as } r = \frac{\sum xy}{(\sum x^2 \sum y^2)^{1/2}}$$

Where x is the odd numbered scores

and y is the even numbered scores

$\sum x^2$  = sum of the mean of x subtracted from each x score squared.

$\sum y^2$  = sum of the mean of y subtracted from each y score squared.

$\sum xy$  = is the cross products of the mean subtracted from that score.

### **3.10 Data analysis techniques**

This was done simultaneously as the researcher collected data. The researcher looked through the instruments and organized the responses. The researcher was required to categorize the responses. The researcher used inferential and descriptive analysis. Coding was then done to translate question responses into specific categories. The statistical package for social sciences (SPSS) was used to analyze the coded items. Data was presented in frequency tables, charts, and graphs. Qualitative data was arranged thematically and presented in narrative form.

**Table 3.3: Operationalization Table**

<b>objective</b>	<b>variable</b>	<b>indicators</b>	<b>Measurement level</b>	<b>Data collection method</b>	<b>Data analysis</b>
To determine how ICT infrastructure influences the use of ICT by the MDE students in their learning process	ICT infrastructure	Bandwidth	Ratio and nominal	survey	Inferential
To assess how accessibility to ICT influences the use of ICT by the MDE students in their learning process.	ICT accessibility	Internet access	Ratio and nominal	survey	inferential
To examine how ICT affordability influences the use of ICT by the MDE students in their learning process.	ICT affordability	Internet access	Ratio and nominal	survey	inferential
To assess how skills in ICT influence the use of ICT by the MDE students in their learning process.	Skills in ICT	Mode of communication	Ratio	survey	Descriptive and inferential
To examine how ICT equipment availability influences the use of ICT by the MDE students in their learning process.	ICT equipment availability	Computers Telephones, mobile phones internet and playback devices.	Ratio	survey	Inferential and descriptive.

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND INTERPRETATION

#### 4.1 Introduction

Presented in this chapter are the findings of the data analysis of the study together with their interpretations. All themes discussing the same research questions were presented and analyzed together. The chapter begins with the demographic information of the respondents followed by presentations, interpretation and discussions of research findings based on the research questions.

#### 4.2 Questionnaire return rate

Return rate is the proportion of the sample that participated as intended in all the research procedures. Out of the 42 Masters' in distance education learners sampled, 40 filled and returned the research questionnaires; this was a 95% return rate. All the 3 lecturers returned the questionnaires; which was a 100% return rate. This is indicated in table 4.1.

**Table 4.1 Questionnaire return rate**

No. of students	No. of questionnaires returned	percentage
42	40	95

#### 4.3 Demographic information of the respondents

The demographic information of the distance education learners was based on their gender, age, academic qualifications, and marital status. The demographic information of the distance education learners is presented in this section. Distance education learners were asked to indicate their gender. The data is presented in Table 4.2

**Table 4.2: Gender of Distance education learners and Lecturers**

<b>Gender</b>	<b>Learners</b>		<b>Lecturers</b>	
	<b>F</b>	<b>percentage</b>	<b>F</b>	<b>percentage</b>
Male	24	60	2	66.7
Female	16	40	1	33.3
<b>Total</b>	<b>40</b>	<b>100</b>	<b>3</b>	<b>100</b>

The findings on the gender of the learners and lecturers revealed that a greater 60% proportion of the Masters in distance education learner were males while 40% were female. Data on the lecturers showed that 66.7% were male while 33.3% was female. This implies that a greater number of male students are enrolled for the masters in distance learning programme and a majority of lecturers in this programme are male. Table 4.3 gives the age brackets of the distance education learners.

**Table 4.3: Age brackets of the Distance education learners**

<b>Age</b>	<b>F</b>	<b>percentage</b>
25-40	16	40
Above 40	24	60

The findings revealed that a greater proportion of the adult education learners 40% are between the ages of 25-40 years, while 40% are above 40 years, this implies that the learners enrolled in this programme are at the peak of their respective careers and they have limited time to attend fulltime or part-time classes. Table 4.4 presents the marital status of the Master in distance education learners.

**Table 4.4: Marital status of the distance learners**

<b>Marital status</b>	<b>F</b>	<b>percentage</b>
Married	21	52.5
Single	4	10.0
Separated	10	25.0
Widowed	5	12.5
<b>Total</b>	<b>40</b>	<b>100.0</b>

The findings reveal that majority of the respondents 52.5% are married, 10% are single, 25% are separated while 12.5% are widowed. This implies that majority of the Master in distance education learners have family responsibilities. Table 4.4 gives the learners response on reasons for choosing the course.

#### **4.4 ICT and the distance learning programme**

Distance education as revealed in the findings is mostly for the adults who have family responsibilities. Therefore these learners are not able to learning through conventional learning or even the school based program. They therefore have reasons for choosing the course as the researcher sought to know.

**Table 4.5: Learners' response on choosing the course**

<b>Reason</b>	<b>F</b>	<b>percentage</b>
Employment	4	10.0
Promotion	28	70.0
Interest	8	20.0
<b>Total</b>	<b>40</b>	<b>100.0</b>

Findings table 4.5 reveals that a greater proportion of the respondents 70% chose the Master in distance education in order to get promotion; only 10% are enrolled in the programme to get employment while 20% are doing it out of interest. This implies that learners undertaking Master in distance learning education are fully employed.

The researcher sought to determine both radio and television reception in areas where the learners live. The data is presented in table 4.6

**Table 4.6: Radio and television reception**

Reception	Radio		Television	
		percentage		percentage
Very good	10	25.0	11	27.5
Good	22	55.0	20	50.0
Average	5	12.5	5	12.5
Weak	3	7.5	4	10.0
Not at all	-	-	-	-
<b>Total</b>	<b>40</b>	<b>100.0</b>	<b>40</b>	<b>100.0</b>

The findings revealed that the learners have good receptions for both radio and television, 55% of the respondents reported very good television reception while 50% reported good television reception.

Learners were asked on the reliability of postal and telecommunication services in their respective areas. Table 4.7 provides the learners responses.

**Table 4.7: Postal services and telecommunication network**

Reliability	Postal		Telecommunication	
		percentage		percentage
Very good	8	20.0	10	25.0
Good	12	30.0	15	37.5
Average	14	35.0	9	22.5
Unreliable	6	15.0	6	15.0
<b>Total</b>	<b>40</b>	<b>100.0</b>	<b>40</b>	<b>100.0</b>

Findings on the reliability of postal and telecommunication services as presented on table 4.7 show that the postal services is average as reported by majority of the respondents 35%. On the other hand 37.5% reported good telecommunication services in their respective areas.

The learners were asked on the availability of electricity in their respective areas of residence. Table 4.8 presents the findings.

**Table 4.8: Availability of electricity**

<b>Availability</b>	<b>F</b>	<b>percentage</b>
Yes	26	65.0
Partially	10	25.0
None at all	4	10.0
Total	40	100.0

The findings on table 4.8 revealed that a greater proportion of the 65% of the respondents have access to electricity, 25% access electricity partially and only 10% do not have access to electricity.

The researcher also sought to establish whether the learners own personal computers and if they are computer literate. The findings are shown on table 4.9.

**Table 4.9: Learners' Responses on computer ownership and literacy**

<b>Computers</b>	<b>Ownership</b>		<b>Literacy</b>	
	<b>f</b>	<b>percentage</b>	<b>f</b>	<b>percentage</b>
Yes	29	72.5	40	100.0
No	11	27.5	-	-
Total	40	100.0	40	100.0

Findings showed that a greater proportion of the learners 72.5% own computers and 100% of the respondents are computer literate. This information was important in establishing the level of ICT usage by the Master in distance education learners.

The respondents were asked on how frequent they use computers. Data on this is presented in table 4.10

**Table 4.10: Frequency of using the computer**

<b>Frequency</b>	<b>F</b>	<b>percentage</b>
Often	28	70.0
Rarely	10	25.0
I don't use it	2	5.0
<b>Total</b>	<b>40</b>	<b>100.0</b>

The findings on table 4.10 revealed that majority of the respondents 70% frequently use personal computers, 25% rarely use personal computers while only 5% don't use personal computers at all. This implies that Master in distance education learners embrace technology.

The respondents were asked on internet access. Table 4.11 presents the findings.

**Table 4.11: Access to the internet**

<b>Internet access</b>	<b>F</b>	<b>percentage</b>
Yes	26	65.0
Partially	10	25.0
Rarely	4	10.0
None at all	-	-
<b>Total</b>	<b>40</b>	<b>100.0</b>

Data on table 4.11 indicate that 65% of the respondents access the internet, 25% access the internet partially while only 10% rarely access the internet. This is a clear indication that the Master in distance learning students can afford internet services and therefore are able to access course materials as well as communicate with the lecturers through the internet.

The respondents were asked on the mode of receiving course materials. Table 4.12 presents the findings.

**Table 4.12: Mode of communication for receiving course materials**

<b>Mode of communication</b>	<b>F</b>	<b>percentage</b>
Post	-	-
Telephone	-	-
Email	14	35.0
Pick up at the center	26	65.0
Fax	-	-
<b>Total</b>	<b>40</b>	<b>100.0</b>

Data on table 4.12 revealed that majority 65%of the respondents receive course materials by picking them up at the center, 35% receive the course material through email. However none of the respondents indicated that they receive course materials through post, telephone or fax. This is a clear indication that the university is not effectively using ICT to send course materials to the respective Master in distance education learners.

The researcher sought to establish how frequent the learners receive feedback from the lecturers. Table 4.13 presents the findings.

**Table 4.13: Feedback**

<b>Feedback</b>	<b>F</b>	<b>percentage</b>
All the time	22	55.0
Sometimes	10	25.0
Rarely	8	2.0
None at all	-	-
<b>Total</b>	<b>40</b>	<b>100.0</b>

The data on table 4.13 revealed that 55% of the respondents receive feedback from the lecturers all the time while 25% reported that they receive feedback sometimes. However, 2% of the respondents reported that they rarely receive feedback from their lecturers. This implies that lecturers in this program are providing feedback

to the Master in distance education learners. The respondents were asked on their preferred mode of feedback. Table 4.14 presents the findings.

**Table 4.14: Preferred mode of feedback**

<b>Mode of feedback</b>	<b>F</b>	<b>percentage</b>
Post	10	25.0
Email	23	57.5
Telephone	7	17.5
Fax	-	-
<b>Total</b>	<b>40</b>	<b>100.0</b>

Data on table 4.14 indicated that a greater proportion of the respondents 57.5% prefer email as the mode of communication, however 25% reported that they prefer post while only 17.5% prefer telephone. This indicates that the Master in distance education learners have access to ICT services and therefore prefer feedback through ICT.

The Master in distance education learners were asked on the mode of receiving and sending assignments. The data on the findings is presented on table 4.15.

**Table 4.15: Mode of receiving and sending assignments**

<b>Mode</b>	<b>F</b>	<b>percentage</b>
Post	4	10.0
Email	28	70.0
Telephone	-	-
Fax	-	-
Bring or get to the centre	8	20.0
<b>Total</b>	<b>40</b>	<b>100.0</b>

The findings on table 4.15 indicated that 70% of the respondents receive and send assignments through email, 20% bring or get assignments at the center while only 10% of the respondents use postal services. This is a clear indication that Master in distance education learners have access to ICT infrastructure.

The respondents were asked on whether they have email accounts. Table 4.16 presents the findings.

**Table 4.16: Email accounts**

<b>Learners</b>	<b>F</b>	<b>percentage</b>
<b>With email accounts</b>	<b>36</b>	<b>90</b>
<b>Without email accounts</b>	<b>4</b>	<b>10</b>

The findings on table 4.16 revealed that 90% of the respondents have email accounts; however 10% of the respondents do not have email accounts. This implies that a greater proportion of Master in distance education learners have ICT skills.

The respondents who indicated that they have email accounts were asked on the frequency of using their email accounts. Table 4.17 presents the findings.

**Table 4.17: Use of email**

<b>Use of email</b>	<b>F</b>	<b>percentage</b>
Mostly	26	72.2
Sometimes	10	27.8
Rarely	-	-
None at all	-	-
<b>Total</b>	<b>36</b>	<b>100.0</b>

The findings on table 4.16 indicated that of the respondents owning email accounts, 72.2% use their email accounts mostly while 27.8% use their email accounts sometimes. This shows that ICT is used by the Master in distance education learners.

The respondents were asked on the mode of communication with lectures and colleagues. The data on the findings is presented in 4.18.

**Table 4.18: Mode of communicating with lecturers and colleague learners**

Communication	With lecturers		With colleagues	
	F	percentage	F	percentage
Post	-	-	-	-
Telephone	12	30.0	20	50.0
Email	20	50.0	14	35.0
Fax	-	-	-	-
During the session	8	20.0	6	15.0
<b>Total</b>	<b>40</b>	<b>100.0</b>	<b>40</b>	<b>100.0</b>

Findings on table 4 .18 reveal that 50% of the students prefer mostly to communicate with their lecturers through email while with their fellow students telephone is more convenient. The telephone is not usually used by students to communicate with lecturers. Since only 30% use it. This indicates that ICT is convenient for the students to communicate with both fellow students and lecturers.

#### **4.5 Lecturers' responses on the use of ICT in distance learning**

Of the lecturers sampled, 67.7% cited that it is interesting to interact with students undertaking distance learning since they find the programme very convenient to them as well as the students. The lecturers reported that the university has not fully supported the department by employing adequate ICT staff. Lack of ICT in the department is a major problem for the use of ICT in distance learning. The university has not fully integrated ICT in department of distance learning. They also reported that some lecturers are not adequately prepared on how and when to use ICT tools to achieve particular purposes and therefore the university should provide refresher courses in ICT for the lecturers.

Managing the change is one of the biggest problems facing the university as far as using ICT in delivering distance education is concerned, as lecturers do not want to accept change easily. They feel that change management issues must be addressed as new work practices, new ways of processing and performing tasks are introduced.

In general a number of students enrolled in distance learning education programme are non ICT proficient, and therefore there is resistance to change through ICT among them. Some of the lecturers reported that the strategy of adding technology to the already existing activities in institutes and in the classroom, without changing habitual teaching practices, does not produce good results in student learning. The reason for this is due to the fact that the vast majority of lecturers are not proficient users of technology, especially computer technology. Some further cited that most lecturers consider the two main obstacles to using technology in pedagogical practices to be a lack of resources and training.

Findings that male students have taken up the course more than female are similar to Koch in Jenson(1999) who asserts that men have a great tendency to dominate available computer resources which is not being corrected, female have significantly lower experience levels than their male counterparts. Research has over the years shown that males dominate in the use of computers compared to women. (Geissler and Horidge, 1993)

Findings that the learners are at their peak of their employment and that they are adults is also revealed by Aslanian(1988) that Distance Education as a form of non-traditional education, serves mainly adults who possess unique needs, motivations, goals and self concepts. In a qualitative study with 1,000 students Aslanian(1988) developed a profile of an adult distance learner. He found that in general, the students who are married(61%) female (58%) part time students (80%) employed full time (71%) and paying for their own schooling(60%). Of the adults 75% were between the ages of 25-44 years of age.

Findings on infrastructure, accessibility, affordability and skills or literacy are that infrastructure and accessibility is not a problem they too can afford ICTs and are able to use ICTs in communication. This is also evident in commonwealth of learning international(2001) that essential services and infrastructure like electricity, telecommunications and postal services must be developed to levels that could support the declared scale of open and distance education in order to increase administrative networks and develop proper link between faculty and students.

Most students said that they do receive feedback all the time from their lecturers. This has been supported by Yusuf (2008) that ICT provides opportunities for distance education students and academic and non- academic staff to communicate with one another more effectively during formal and informal teaching and learning.

## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter summarizes the findings of the study and presents conclusions, recommendations and suggestions for further research.

#### **5.2 Summary of findings**

The purpose of this study was to investigate the factors that influence the use of ICTs by distance learners as they go on with their learning process in the masters programme (MDE) offered by the school of continuing and distance Education University of Nairobi (UON). Five research questions were formulated to guide the study.

Research Question One sought to determine how has ICT infrastructure influenced the use of ICT by master in distance education learners in their learning process, research question two aimed at assessing how the accessibility to ICT has influenced the use of ICT by master in distance education learners in their learning process, research question three was aimed to examine the extent to which ICT affordability has influenced the use of ICT by master in distance education learners in their learning process. Research question four sought to establish the extent to which skills in ICT has influenced the use of ICT by the master in distance education learners in their learning process. Finally, research question five sought to determine how the availability of ICT equipment has influenced the use of ICT by master in distance education learners in their learning process.

The findings revealed that:

60% of the respondents were male learners whereas female participants composed 40.0% of the population. The respondents were mainly in the workforce (instructors at postsecondary institutions, city/local employees, and high school teachers). Majority of learners enrolled for Master in distance education were between the ages of 25 and

40. Of the participants, 70% described their work as regular teachers or Para-educators and working toward teaching credentials to get promotion, 24% worked in management positions, about 5% held supervisory positions, 6% worked in a manufacturing setting, 7% service industry, 2% described their jobs as being non-supervisory. While 80% of the respondents indicated that they were motivated to learn through distance because it is convenient and it provides opportunity to study while working, 20% reported that distance education is flexible and allows them to study at their own pace.

While 70% agreed that they use email to obtain feedback from their lecturers, 35% receive their assignments through emails. A proportion of 27% reported that the feedback was timely. Besides wishing for assignments to be promptly returned with helpful feedback, another important form of support that students like to receive is a selection of supplementary reference materials. Only 14% of the students reported that they had reasonable access to such materials during their study. Less than half of the respondents- 43% reported that they had opportunities to interact with other students during the program.

Types of ICT were explored as means to improve the distance education learning in these respects. Eighty-one percent of the student sample agreed that the program should make use of ICTs; and 78% felt that the Internet should be used to facilitate interaction and support, even though only 35% reported that they had easy access to a computer. More than 80% have access to radio and TV programs as well as prerecorded audio and videotapes are helpful to them, while 69% wanted supplementary materials on CD-ROMs.

Ninety-five percent of the respondents responded positively to the idea of using regional centers for student support services. The findings of the study confirmed the need for additional reference material and for prompt feedback on student work, as means to improve the students' assignment work. It is apparent that successful use of discussion forums requires a learning culture nurtured by systematic preparation.

Other deterring factors were no doubt limited access to the Internet and the slow speeds of available internet bandwidth.

Email was effectively used by students to communicate with their lecturers and to send in assignments as attachments. The lecturers reported that many students make use of the Internet for surfing for resources and downloading them. By contrast, very few students used the fax and telephone facilities at the regional study centers. For some learners, phone calls are usually more convenient made from home and in the evenings. Learners would also prefer to use email rather than fax to submit their assignments except in the case of a few students in very remote locations with no access to computer or word-processing facilities. Submitting work by fax tends to be cumbersome and unreliable, especially when the documents are several pages in length. The preferred choice of many remote students continues to be the postal service, unless little time is left before a submission date.

The results suggest that students found the ICT-based learning support of some value overall, and that it improved the quality of their learning experience. It also emerged, however, that there are significant barriers to be overcome in seeking full integration of ICT into the distance learning programme. For example, in terms of improving their ability to obtain support, students said that the ICT system enabled easier assignment submission, and made it easier to obtain tutor feedback. This is clearly due, in part at least, to technical difficulties, notably lack of Internet access and technical support, and low bandwidth. As a further reason, some students also cited the complexity of using online methods generally.

### **5.3 Discussions of findings**

The universities offering Master in Distance education should ensure timely interaction among students and faculty for the benefits of the learners. With large scale programs, strategies to get each learner interacting in the very early days of a course are essential to the learners' successful experience. Care must be taken to design a strategy that facilitates ongoing interaction between faculty and student that does not overwhelm the faculty with large numbers of messages from students.

The institution that is providing education in distance learning mode should look at all the challenges learners face in using ICT as they pursue distance learning and take necessary precautions with a proper action plan along with timeframe in order to improve the effectiveness of the programme.

Majority of respondents are male as the researcher found out this is supported by Koffi Annan, the UN secretary general in the world summit on the information society, Geneva, 10<sup>th</sup> December 2003, that “the so called digital divide is actually several gaps in one. There is a technological divide, great gaps in infrastructure, content divide and there is also a gender divide, with women and girls enjoying less access to information technology than men and boys. This can be true of rich and poor countries alike”. The use of ICT has been seen to be convenient for interaction.

Yusuf (2006) insists that successful distance Education cannot be assured without the use of effective communication and technological tools. Effective learner support is required for the success of the learners in Master in distance Education since obviously, electricity, internet, computers, telecommunications and postal services must be developed to levels that can support the declared scale of open and distance education. (COL International, 2001; Yusuf, 2006)

Learners need their learning materials improved. As Howell et al say that ICT competency involves, but is not restricted to the use of an online catalogue to identify and locate resources for a specific information need, key word search strategies, to refine operational situations, browser and search engine to locate and retrieve appropriate information and the effective use of other ICT instructional materials that aid teaching and learning situations. (Howell, Williams and Lindsay, 2003)

#### **5.4 Conclusions**

Based on the findings, it was concluded that;

Distance learning is a more flexible education system than any other conventional education system. Due to this, the student enrollment is very high and at same time expectations from learners is also high. As learners are more in scale and remote to

the institution, most of the activities are being performed remotely through the online services that are provided by the institution. Since learners undertaking Master in distance learning education are remote to the institution in many ways and they get services through one of its operational modes (regional centers). It is a difficult to have proper network connectivity among various operational modes to provide/access services due to non availability of technical manpower.

As technology is frequently changing time to time, it is a difficult task to have updated manpower in line with the changing technology who can effectively manage ICT for the distance learning programme. It is even very difficult to have such manpower in the higher learning institutions. It is true that ICT is playing a vital role in open distance learning but at same time there are many issues and challenges that are to be addressed for smooth functioning of various online services that are to be implemented for its learners and other public. In this paper, the required ICT infrastructure and various issues and challenges in usage and setting up of ICT infrastructure in open distance learning are addressed.

### **5.5 Recommendations**

**Curriculum and instruction:** The universities offering the Master in distance education should have Institutional commitment in review and approval processes to ensure the appropriateness of the technology being used to meet the program's objectives. The institutions should endeavor to facilitate appropriate articulation and reciprocity agreements for students. Institutions offering distance learning programs must be able and willing to matriculate fully qualified students and appropriate technical support for students and faculty should be provided.

**Evaluation and assessment:** Using the institutions' existing program evaluation process, the universities should evaluate each course and program's educational effectiveness, including assessments of student learning outcomes, student retention, and student and faculty satisfaction. The universities should provide for assessment and documentation of students' achievement in Master in distance education and at completion of the program.

Integrating ICT in education is not an easy task, as it requires a wide range of support including higher management, and lecturers. Therefore it is necessary to properly convince them for their support, and for this task a leader is required. Leadership is necessary before, during and after project, an ICT initiative in an institution of higher learning. Before the ICT initiative is implemented, leadership is needed in order to explain the model, the concept and create awareness; during the implementation of the ICT initiative, leadership is needed to manage change and support the project; and after the project, it is needed to pledge the required adaptability and flexibility of the initiative.

### **5.6 Suggestions for Further Research**

Taking the limitations and delimitations of the study the following areas were suggested for further study;

- a) More study is needed to verify the use of ICT in developing rigorous curriculum for distance education learners and attaining the teaching goals.
- b) A study to establish the relationship between availability of online distance learning resources and the performance of the students enrolled for Master in distance education in university examinations.
- c) A study to determine the relationship between emerging technologies and the enrolment of students in Master in Distance learning education programme in Kenyan universities.
- d) A study to determine factors influencing students to enroll for Master in distance education programmes in Kenyan public universities.

## REFERENCES

ADEA (Association for the Development of Education in Africa) 2002. *February Distance Learning in sub-Saharan Africa: A literature survey on policy and practice*. Working Group on Distance Education and open learning. Retrieved January 1<sup>st</sup> 2007 <http://www.adeanet.org/wgdeol/wgdeol/publications/open%20learning%201.pdf>

Albrini, A (2006). *Teachers attitude towards information and communication Technologies: The use of Syrian EF4 Teachers Computer Education*. 47(4):373-398

Annan, K (2001) "*Launching information and communication Technology(ICT) task force, secretary general appeals for support from private sector*" <http://www.inicctaskforce.org/welcome> accessed 11th Dec.2006.

Arunachalam, S (2002). Reaching the unreached! How can we use information and communication Technologies to empower the rural poor in the developing world through enhanced access to relevant information? *Journal of information science*, 28, 6,513-522

Aslanian,C and Brickell,H.M(1988). *Americans in transition: Life changes as a reason for learning*. Newyork: Newyork Entrance Examination Board.

Ayoo, P and Otike, J (2002). *Factors hampering the formulation of a national information policy in Kenya*, Library review, 51,7,350-357.

Bebetsos, E and Antoniou, P (2008). *University students differences on attitudes towards computer use. Comparison with students towards physical activity*. Interactive Educational multimedia, 17, 20-28. Retrieved 3<sup>rd</sup> February, 2009 from [http://greav.ub.edu/iem.index.php?journal=iem&page=article&op=view&path\[\]=130&path\[\]=198](http://greav.ub.edu/iem.index.php?journal=iem&page=article&op=view&path[]=130&path[]=198)

Benzie, D (1995). *Using computers to support young learners*. Inj, D. Tinsley and T.J.Van weert (Eds), world conference on computers in Education: WCCE: as liberating the learner(p35-42). London: Chapman hall.

Bransford, J.D & Brown, A.L (1999). *How people learn: Brain, mind, Experience and school committee on development in the science of learning*, National research council, National Academic press.

Bruce, C (producer) (2003). *Seven faces of information literacy: Towards inviting students in New experiences*.  
<http://crm.hct.ac.ae/events/archieve/2003/speakers/bruce.pdf>

Castells, M (1996). *The Information Age.<sup>4</sup> Economy society and culture*, vol.1. The rise of the network society. (2<sup>nd</sup> edition. Vol.1) Oxford: Black wells

Castells, M (2001) *Information Technology and Global Development*. In Muller, J. Cloete, N & Bidet's (eds). *Challenges of globalization. South African Debates with Manuel Castells*. Maskew Miller. Longman

Catts, R and Lau, J (2008). *Towards information literacy indicators*. Paris: UNESCO.

Central Bureau of Statistics (2006). *Ministry of planning and Natural Resources*, Republic of Kenya, <http://www.cbs.go.ke> accessed on 5<sup>th</sup> December, 2006

Common Wealth of learning International (2001). *Building capacity to Deliver Distance Education in Nigerias Federal University System*. Report prepared for the World Bank retrieved April, 26, 2006 from <http://siteresources.worldbank.org/NIGERIAEXTN/Resources/capacity-depdf>

Communications commission of Kenya (2005). *Kenya ICT Trust Fund*. Retrieved from

<http://www.cck.go.ke/html/child.asp?title=&contcatid=12&childtitle=wsis+PROCES&childcontid=135&pg=3>

Cunningham, C (2007). *Linking STEM and Communication Technology Research: A research agenda for technology and gender equality paper presented at the annual meeting of the NCAD 3<sup>rd</sup> Annual convention, TBA, Chicago IL, retrieved 15<sup>th</sup> January 2010* <http://www.aalacademic.com/meta/p193877>.

Derbyshire, H (2003). *Gender issues in the use of computers in Education in Africa*. Retrieved 25<sup>th</sup> January 2008 from <http://imfundo.digitalbrain.com/imfundo/web/learn/documents/gender%20Report.pdf>

Doyle, C (1992). *Outcome measures of information literacy within the National Education Goals of 1990: Final Report of the National Forum on information Literacy*. Washington, DC: U.S Department of Education.

Dyck, J.L and Smither, J.A (1995). *Older adults acquisition of word processing*. The contribution of cognitive abilities and computer anxiety. *Computer in Human Behavior*, 12(1), 107-199.

Edooley, K (2000). *How the perspectives of administrators, Faculty and Support units impacts on the rate of Distance Education adoption*. Online journal of distance learning Administration. Vol.3 No.4 winter 2000. University of West Georgia, Distance and Distributed Education center.

Farrel, G (2007). *Survey of ICT and education in Africa: Kenya country Report*. Nairobi, Kenya.

Gachau, A (2003). *A survey of e-learning readiness in tertiary institutions; A case study of the Kenya polytechnic*. Unpublished MBA project, UoN.

Gakio, K (2006) "*African Tertiary Institutions connectivity survey (ATICS) 2006 report*"

Goolsbee, A and Guryan, J (2002). *The impact of internet subsidies in public schools*. National bureau of economic research, working paper 9090.

Gullen, R (2001). *The digital divide: a global and National call to action*: Electronic Library, 21(3) 247-257

Gunwardana, K.D(2005) "*An empirical study of potential challenges and benefits of implementing e-learning in Srilanka*" proceedings of the second international conference on e-learning of knowledge- based society. Bangkok, Thailand.

Haddad, W.D and Draxler, A (2002). *Technologies for Education*. Paris: UNESCO and the Academy for Educational Development.

Hafkin, N and Taggart, N (2001). *Gender, Information Technology and developing countries: An analytic study*. For the office of women in Development bureau for global programs, Field support and Research. United States agency for international Development.

Happel, S (2000). *The online learning Revolution in schools and Beyond*. In Lucas, B & Greany, T (eds) *Schools in the learning Age*. London Campaign of learning.

Harwood, P and Asal, V (2007). *Educating the first Digital generation*. West Port,conn: Praeger.

Hawkridge, D (1990). *Software for schools*. British reviews in the late 1880s. O. Boyd-Berrett and E.Scanton (Eds), *Computers and learning*: Wokingham.

Heinich, R et al (1996). *Instructional Media and Technologies for learning*: (5<sup>th</sup> ed.) Englewood cliffs, N.J: Prentice Hall.

Hernes ,G (2002) “*Emerging trends in ICT and challenges to Educational planning*”. In Haddad, W. and A Drexler (eds) *Technologies for Education, potential parameters and prospects* (Washington D.C) Academy for Educational Development. Paris,UNESCO p25

Howell,S.L, Williams,P.B and Lindsay,N.K(2003). *Thirty- two trends affecting Distance Education: An informed Foundation for strategic planning*. Online Journal of Distance Learning Administration,6(3)

International commission on Education for the 21<sup>st</sup> century learning (1998) *The treasure within: United Nations Educational, Scientific and cultural Organization*, Paris

Isaacs, S (2002). *ICT in African schools: A multimedia Approach for Enhancing learning and Teaching*. Techknowlogia, January-March 4(1)32-34

Jackson, L.A et al (2001). *Gender and the internet. Women communication and men searching*. Sex roles, 44(5) 363-379. .

James, T et al (2004). *ICT investment opportunities in East Africa: country specific market Analysis Kenya*.

Jensen, M (2000). *Making the connection: Africa and the internet. Current history*. A journal of contemporary world affairs 99;(637) p215-220

Jensen, M (2002). *The African internet- A status report*.

Jensen, M and Sarroco, R (2002). *Internet from the horn of Africa: Ethiopia case study*. Switzerland: International Telecommunications Union.

Kadel, R (2005, Feb). *How teacher attitude affects Technology*. Learning and leading with technology. 3a(5), 34-47

Kamar, N (2006). *Factors hindering effective management and of government information in Kenya*. Paper presented at WSIS Follow- up conference on access to information and knowledge for Development.

Karsenti, S (2008). *Pan African Research Agenda on pedagogical integration of ICTs*. IDRC.

Katz, R.N (2001) "*infrastructure: A Drive for change*" EDUCAUSE Review ICT

Kenya ICT Board(2009) pasha centres <http://www.ict.go.ke/>

Kenya Ministry of Education (2006). *National information and communication technology ICT strategy for Education and training*. Retrieved from [www.education.org.ke/ICTstrategy.htm](http://www.education.org.ke/ICTstrategy.htm)

Kenya Ministry of information and communication (2006). *National Information and Communications Technology Policy*. Retrieved from <http://www.cck.go.ke/userfiles/file/nationalictpolicy.pdf>

Kenya school net (2003). *Preparing a work force the evolving information Economy: A survey on ICT access and use in Kenya Secondary schools*, Summit strategies limited, Nairobi

Keller. C (2005). *Virtual Learning environments media and Technology*.

Kozma, R.B (1994). *Will media influence learning? Reframing the debate*. Education technology.res. dev; 42(2):7-19.

Kozma, R.B(1991) *Learning with Media Rev.Educ.Res.*,61:179-211

Lundell, P and Howell, C (2000). *Computers in schools. A national survey of information and communication Technology in South African schools*. Cape town: Education policy unit (EPU) University of Western Cape.

Lungo, J.H& Kasaabol, J.J (2007). "*Experiences of open source software in institutions: cases from Tanzania and Norway*". Proceedings of the 9<sup>th</sup> international conference on social implications of computers in developing countries, Sao Paulo, Brazil.

Mac-Ikemenjima, D (2005). *e-Education in Nigeria: Challenges and prospects*. Paper presentation at the 8<sup>th</sup> UNICT Task force meeting April 13-15, 2005, Dublin, Ireland

Macmahon, C & Bruce. C (2002). *Information Literacy needs of Local staff in cross cultural development projects*: journal of international development, 14,113-127

Makau, B (1990). *Computers in Kenya's secondary schools*, IDRC: Ontario

Mansell, R and When, U (1998). *Knowledge Societies: Information Technology for sustainable Development prepared for the United Nations Commission on science and Technology for development*. Oxford; oxford University press.

Marete, G (2006) *Doing IT: A first for Kenyan school offering NEPAD E-classes*. Africa News <http://afrikanews.org>

Marris, P (1975). *Loss and change*. New York: Anchor press/ double day.

Massy, W. F and Zamsky, R (1995). *Using Information Technology to enhance academic productivity, wingspread*. Enhancing academic productivity conference. <http://www.educase.edu/nlii/keydocs/massy.html>

Microsoft Corporation (2006). *A Blue print for success: Kenyan partnership leads National Drive to Harness the power of ICT in Education*. Retrieved from

<http://download.microsoft.com/download/8/8/f/88fo4e62-16aa-4d9f-b8eb-7f857bddb650/11477-casestudy-KENYA.pdf>

Murray, Lize (2005) AVU Gap Analysis report: prepared for the Hewlett foundation odd initiative <http://www.avu.org/acep.asp>

Neil, B (2003). *Technological infrastructure and use of ICT in education in Africa: an overview*. WGDEOL. Association for the development of education in Africa, Paris

Ndiku, L (2003). *The problems encountered by school personnel in the implementation of computer use in secondary schools in Uasin Gishu district*, Unpublished Thesis. Moi University, Eldoret.

OECD/CERI (organization for economic co-operation and development) (2001). *Learning to change: ICT in schools*: OECD.

Ololube, N.P (2006b). *Appraising the relationship between ICT usage and integration and the standard of Teacher Education programs in a developing economy*. International journal of education and development using information and communication technology, 2(3) 70-85

Oparanya, W.A (Producer) (2009). *Kenya Economic Survey 2009 highlights*. <http://www.cbs.go.ke/publications/Es2009ministerpresentation.pdf>

Pajova, Z (2002). *Information Literacy: An issue which requests urgent Action in Developing Countries' and countries in transition*. Paper presented at the UNESCO, the U.S National commission in libraries and information Science and the National Forum information Literacy meeting experts. <http://www.ncis.gov/litbinter/infolitconf&meet/papers/pajova-fullpaper.pdf>

Postman, N (1990) *Informing ourselves to Death* <http://www.frostbytes.com/~jimf/informing.html>

Potashnik, M& Adkins, D (1996). *Cost analysis of information Technology projects in Technology series(3)* Washington D.C: Worldbank.URL <http://www.pitt.edu/~feregall/pdfvln3.pdf>

Potashnik, M& J. Capper (1998) "*Distance Education Growth and Diversity*," available in <http://www.worldbank.org/fandd/english/pdfs/0398/0110398.pdf> accessed on 14th August 2002

Rahman, H (2006). *Empowering marginal communities and information networking*. Hershey, pennyslavania idea group publishing.

Reinhart, C. J. (2008). *Constructing the Café University: Teaching and learning on digital frontier*. Vol. 16 1 pp13-83 Emerald Group

Rumble, G (2001). *The costs and costing of Networked learning*. Milton Keynes, MK7 6AA.U.K.

Sefyrin, J (2005). *Understandings of gender and competence in ICT*. Paper presented at the 6<sup>th</sup> international women into computing conference. University of Greenwich retrieved on 12<sup>th</sup> April 2008 from <http://www.miliumse/upload/institutioner/ITM/IKSI/publikatione/sefyrin-wic.pdf>

Schaumberg, H (2001). *Fostering girls computer through laptop learning – can mobile computers help to level out the gender difference?* <http://www.notesyscom/copies/neccol.pdf> retrieved on 17th July 2008

Solomon, G, Allen, N and Pesta, P (2003). *Toward digital equity: Bridging the divide in Education Boston: Allyn and Bacon*.

Smaldino, S. E, Lowther, D.L Russel, D.J(2008). *Instructional Technologies for learning and media for learning(9<sup>th</sup> ed)* upper saddle River, NJ: prentice Hall

Teo, T. (2002). *Pre service teachers attitude towards computer use :Singapore Survey*. Australian journal of Educational technology, 23(4) 413-424

Townsend, M (1997). *Computer black- does it exist in the comprehensive schools?* British journal of Educational Technology 28,219-221

UNESCO (2002). *Information and communication Technologies in Teacher Education: A planning guide*. Paris, UNESCO

UNESCO (2003). *Manual for pilot Testing the use of indicators to asses impact of ICT use in Education*. Retrieved February10, 2006 from <http://www.unescobkk.org/education/ict/resource>

UNESCO (2009). *World Education Report 2000*. Paris, UNESCO publishing.

UN Habitat (2008) *State . .of the world cities 2008/2009* <http://www.unhabitat.org/downloads/does/presskitswoc2008/PR%201.pdf>

United Nations ICT Taskforce (2003). *Using information and communications Technology to achieve the millennium Development Goals, working paper, UN ICT Task force secretariat*, United States: New York

Von Euler, M and Berg, D (1998). *The use of electronic Media in open and Distance Education Paris: UNESCO*

Wambui, M& Barasa, E (2007). *ICT: Dawn of a new era. Elimu News: a news letter of the MOEST (1)*

Warshauer,(2004). *Technology and social inclusion: Rethinking the Digital Divide*. London: The MTI press

Watkins, G.L.W & Tiriner, D (2003). *Assessing readiness for e-learning*. Retrieved 10<sup>th</sup> August 2008 from [http://www.ispi.org/pdf/suggested reading vol 17-04-66.pdf](http://www.ispi.org/pdf/suggested_reading_vol_17-04-66.pdf).

Walsham, S (2001). *Knowledge management*. The Benefits and Limitations of computer systems, *European Management journal*, 19, 6,599-6

World Bank (2002). *Distance Education and ICTs for learning in Africa*. Washington DC: Human Development Group, Africa Region the World Bank.

World Bank (2007). *Country brief*. Ghana World Summit on Information society (2003) Geneva

Yusuf, M.O (2006). *Problems and prospects of open and Distance Education in Nigeria*. *Turkish online journal of Distance Education*,7(1),22-29

Yusuf, M.O (2005). *ICT and Education: Analyzing the Nigeria National policy for information Technology*. *International Education Journal*,6(3) 316-321

Zephorias (2008). *Mobile phone credits as currency in Kenya*  
<http://www.zephorias.org/thoughts/archives2008/01/16mobile-phone-cr.html>

## APPENDICES

### APPENDIX I: LETTER OF TRANSMITTAL.

Winfred .M. Mbonge  
P.O BOX 205,  
EMBU.

Dear Respondent,

#### RE: REQUEST FOR RESEARCH DATA

I am a Master of Distance Education (MDE) student in the University of Nairobi. I am required to submit as part of my course work assessment a research project report on “usage of Information and communication Technology and the learning process of Master in Distance Education students in the University of Nairobi.” I therefore kindly request you to assist me in filling the attached questionnaire to the best of your ability as it applies to you.

Please be assured that the information you provide will be used solely for academic purposes and all responses will remain confidential.

Thanking you in advance.

Yours faithfully,



**Mbonge Winfred Mumo**

**L45/61332/2010**

**APPENDIX II: QUESTIONNAIRE FOR MASTER IN DISTANCE  
EDUCATION LEARNERS**

(Tick [√] where appropriate)

1. **GENDER:**            Male                Female   

2. **AGE:**                Below 40                Above 40   

3. **MARITAL STATUS:**

(i)    Married   

(ii)   single   

(iii)   Separated   

(iv)   Widowed   

4. Occupation:

.....  
.....

5. What motivated you to undertake distance learning?

.....  
.....  
.....

6. Why did you choose this course?

(i)    Employment   

(ii)   Promotion   

(iii)   Interest   

(iv)   \*Others: specify-----

**PLACE OF RESIDENCE**

7. Where do you stay (current location?)

.....  
.....  
.....

8. How far are you from the centre where there is electricity? (Estimate)

.....  
.....  
.....

9. How is the radio reception where you live?

- (i) Very good
- (ii) Good
- (iii) Average
- (iv) Weak
- (v) None at all.

10. How is the television reception in your area of residence?

- (i) Very good
- (ii) Good
- (iii) Average
- (iv) Weak
- (v) None at all.

11. How are the postal services in your area?

- (i) Very good
- (ii) Good
- (iii) Average
- (iv) Unreliable

12. How are the telephone and mobile networks in your area?

- (i) Very good
- (ii) Good
- (iii) Average
- (iv) Unreliable

13. Is there electricity in your area?

- Yes  No   
Partially  None at all.

14. Do you own a personal computer?

- Yes  No

15. Are you computer literate?

- Yes  No

(Questions 16 and 17 can only be responded to if your answer in the previous question was yes.)

16. How often do you use the computer?

- (i) Often
- (ii) Rarely
- (iii) I don't use it.

17. Do you access internet well?

- Yes  partially   
Rarely  None at all.

18. Which mode of communication do you receive your course materials?

- Post  Telephone   
Email  pick at the centre.   
Internet  Fax

Other methods (specify).....  
.....  
.....

19. How often do you get feedback?

- (i) All the time
- (ii) Mostly
- (iii) Sometimes
- (iv) Rarely
- (v) Not at all.

20. How would you prefer to get feedback?

- Mail  email  internet   
Telephone  Fax

Other methods (specify).....  
.....  
.....

21. How do you receive or send assignments?

- Post  email  internet  telephone   
Fax  Bring or get from the centre

Other methods (specify).....  
.....  
.....

22. How efficient is the method indicated above?

- Very good  Good  Fair  unreliable

23. Do you have an email address? Yes  No

24. How often do you use it?

All the time  Mostly  Sometimes  Not at all

25. How do you communicate with your lecturers?

Post  Telephone  Email  Internet

Fax  Only during the sessions

Other methods (specify).....

.....

.....

26. How do you interact with your colleague learners?

Post  Telephone  Email  internet

Fax  only when meet during the session.

Other methods (specify).....

.....

.....

27. Suggest the best mode of communication to distance learners like you.

.....

.....

.....

.....

**APPENDIX III: QUESTIONNAIRE FOR LECTURERS**

1. Gender: Male  Female

2. How long have you been in this department of distance studies? -----  
-----  
-----

3. Is it interesting to teach distance learners? Yes  No

4. How convenient is it for you? -----  
-----  
-----

5. How does the University support you as a lecturer in this new department? -----  
-----  
-----

6. What mode of communication do you use to interact with your students? -----  
-----  
-----

7. Is it convenient for both you and the students? -----  
-----  
-----

8. Do your students respond? If yes how do they respond? -----  
-----  
-----

9. Do the students ever respond through Information and communication Technologies by sending their assignments and also receive feedback through the same? Yes  No

10. From your own assessment, are your students familiar with ICT?

Yes  No

11. What is your reason for the above response?-----  
-----  
-----

12. Has the University supported you to teach through distance?

Yes  No

13. How? -----  
-----  
-----

14. What challenges do you encounter as a distance education lecturer? -----  
-----  
-----

15. What are your recommendations?-----  
-----  
-----

**APPENDIX IV: QUESTIONNAIRE FOR THE ADMINISTRATOR**

1. How long have you been an administrator in this department of distance studies? -----

-----  
-----  
-----

2. What support has been provided to the department by the University? -----

-----  
-----

3. How efficient has the support been?

- (i) Excellent
- (ii) Good
- (iii) Satisfactory
- (iv) Unsatisfactory

4. What is the reason for the above response? -----

-----  
-----

5. Does the department have sufficient resources to support the success of this mode of study? YES  NO

6. What challenges do you encounter as an administrator of the department? -----

-----  
-----

7. What are your recommendations? -----

-----  
-----

## APPENDIX V: LIST OF TABLES

**TABLE 2.1**

FROM	TO
A school building	A knowledge infrastructure (schools, labs, radio, T.V, Internet, museums.
Classrooms	Individual learners
A teacher (a provider of knowledge	A teacher(tutor and facilitator)
A set of text books and some Audiovisual aids	Multimedia materials(print, audio, video, digital)

Source: Haddad and Draxler (2002)

**TABLE 2.2: World internet penetration rates, December 2007**

Country	percentage
North America	71%
Oceania/ Austria	57.1%
Europe	43.4%
Latin America/Caribbean	22.2%
World Average	20.0
Middle East	17.4%
Asia	13.7%
Africa	4.7%

Source: <http://www.internetworldstats.com>

**Table 2.3 Information age**

Country	Daily Newspapers per 1000 people in 2000	Household with T.Vs in %	Personal computers access per 1000 in 2005	Internet users access per 1000 people in 2005	Affordability for internet per month in 2005
Benin	5	20	4	50	20.7
Cameroon	6	18	10	15	44.6
Ethiopia	0	2	3	2	23.3
Burundi	2	14	5	5	52.0
Botswana	25	-	45	34	21.3
C.A.R	2	2	34	3	147.8
Egypt	31	89	38	68	5.0
Ghana	14	26	5	18	23.6
Kenya	8	17	9	32	2.8
Nigeria	25	26	7	38	50.4
Mozambique	3	6	6	7	32.9
South Africa	25	59	85	109	63.2
Tunisia	19	92	57	95	12.4
Uganda	3	5	9	17	99.6

Source: World development indicators, 2007

**Table 2.4 ICT in Kenya**

Telephone Lines(2005)	28,800(2005)
Mobile phones	4,612,000(2006)
Internet users(31% of the population)	200,000 and 1,054,900(2000 and 2006)
Internet hosts	13,274(2006)
Television broadcasts station	8(2002)
Radio stations	24 AM : 18FM(2001)

Source: Glen Farrel (2007) Survey of ICT and Education in Africa: Kenya country report

**TABLE: 2.5 Comparative use of learning materials in Distance Education**

Mode	Developing countries %	Industrialized countries %
Documents	100%	99%
Audio	86%	67%
Video	77%	82%
Computer assisted learning	43%	50%
multimedia	7%	30%

Source: Euler and Berg (1998)

**TABLE: 2.6 Comparative communication channels in Distance Education**

Developing Countries %	Industrialized countries %
Mail and physical delivery	86% 87%
Public Service telephone network	57% 83%
Radio	29% 6%
Direct broadcast T.V	16% 9%
Terrestrial broadcast T.V	11% 13%
Integrated service digital network	7% 20%
Special links(unspecified)	2% 17%
Digital specialized Links	5% 11%
Public Data network	2% 12%
Cable	2% 11%

Source: Euler and Berg (1998)

**Table: 2.7 Estimates of computer and related qualifications in Kenya (2001)**

Level of qualification	Estimated figures
Postgraduate	350
Graduate	500
Pre-diploma/Higher diploma	2,500
Skills Literacy	1,100,000
Schools(forth form)	5,000

Source: Computer Society in Kenya, 2003