

**AN INVESTIGATION INTO VIDEOTELECONFERENCING (VTC) ADOPTION IN HIGHER
EDUCATION IN KENYA: A CASE OF THE UNIVERSITY OF NAIROBI**

BY

MOGIKOYO NANCY K.

UNIVERSITY OF NAIROBI
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**A MANAGEMENT RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE
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DECLARATION

I, the undersigned, declare that this research is my original work and has not been presented for a degree in this or any other University.

Signature.......... Date 20th November 2009.....

Mogikoyo Nancy K.

This research project has been submitted for examination with my approval as the appointed University Supervisor.

Signed ..... Date 23/11/2009.....

Mr. J.T. Kariuki, (Supervisor)

Lecturer, Department of Management Science,

School of Business, University of Nairobi

DEDICATION

I dedicate this research project to my family:

To My Late Father, Henry Joseph Mogikoyo and My Mother, Mrs. Celina Mogikoyo,

I drew the Spirit of Hard work and Importance of education from you,

Thank you for taking me to School.

And to My Late Uncle, Zebedeo Pius Omwando,

Thank you for always being there for me.

To My Dear Husband and Friend,

Dr. Geoffrey Marika Ong'enge

Thank you for your constant love and support.

To My Parents in-law,

Mr. Kenneth Ong'enge and Rev. (Mrs.) Naomi Ong'enge

For encouraging me to excel, thank you.

To My Brothers, Brothers-in-law and Sister, Eric, Abraham, Aston, Dennis, David and Lilian,

And to My Son, Kenry who has brought so much joy in my life

May this inspire you to excel in the academia world.

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ABSTRACT

This study was an investigation of the attitudes and readiness of academic staff and students towards use of videoconferencing in learning. A case study of the University of Nairobi was carried out using questionnaires. The questionnaires were administered randomly to members of academic staff and students of the University of Nairobi from the School of Business and the School of Education.

The objective of this study was to determine the perception and readiness of academic staff and students towards this 'new technology' in order to assess the possibility of success if videoconferencing is used in presenting lectures at Institutions of Higher Education in Kenya.

There were 165 questionnaires that were administered. 80% of these questionnaires (132 questionnaires) were received and used in the analysis, 22 (13.4%) were from academic staff and 66.6% were from students but 20% of the questionnaires issued were not returned by the respondents.

The results obtained from the analysis indicated that out of the 132 respondents, only 128 (97%) responded on the section that covered attitudes, 3% of the questionnaires could not be analyzed for attitudes since the respondents had left that section of the questionnaire blank.

Out of the 128 respondents, 74.2% had positive attitudes towards Videoteleconferencing (VTC), 25.8% had neutral attitude, and none (0%) had a negative attitude towards VTC. This study can be used by Institutions of Higher Education in Kenya to give insight of the reception videoconferencing technology will be given by academic staff and students if it is introduced in teaching.

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LIST OF ACRONYMS

AVU	African Virtual University
CBIS	Computer based Information System
CBT	Computer Based Training
CD-ROM	Compact Disk – Read Only Memory
GOK	Government of Kenya
IBT	Internet Based Training
ICT	Information Communication Technology
IM	Instant Messaging
IS	Information Systems
ISDN	Integrated Services Digital Network
IT	Information Technology
LAN	Local Area Network
NASA	National Aeronautics and Space Administration
PC	Personal Computer
PTE	Primary Teacher Education
SMIS	Student Management Information Systems
SOB	School of Business
SOE	School of Education
TCP/IP	Transport Control Protocol/Internet Protocol
UNDP	United Nations Development Programme
UoN	University of Nairobi
VLE	Virtual Learning Environment
VTC	Videoteleconferencing
WAN	Wide Area Network

CHAPTER ONE

INTRODUCTION

This chapter contains the background regarding the use of Information and Communication Technology and Information Systems by organizations and gives an overview of Higher Education in Kenya. It further highlights the background of the case organization, the problem statement, the objectives of the study and the significance of the study.

1.1 Background of the Study

Globalization and technological change are changing the face of organizations all over the world. Information and Communication Technologies (ICTs) are instruments of change and they are being adopted by organizations to meet their strategic objectives. ICTs are increasingly being integrated into Information Systems (ISs) leading to the growth in the use of Computer-based Information Systems (CBISs). CBISs have become a vital component for successful organizations (O'Brien, 2000). Institutions of learning are also frantically restructuring their old instructional methods to incorporate the use of ICTs and ISs so as to improve the learning experience and to gain the advantages of using computers, information systems and the Internet (Tinio, 2002).

O'Brien (2000) defines Information and Communication Technologies as a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information. These technologies include computers, the Internet, networks, broad-casting technologies (radio and television), cellular phones and telephony. Information Systems are defined as a set of people, procedures and resources that collects, transforms and disseminates information in an organization (O'Brien, 2000). ISs can be manual or computer-based. Beynon (2002) defines a Computer-based Information System as a system that uses the resources of people, hardware, software, procedures and communication technology to perform input, processing, output, storage, and control activities that convert data into information.

CBISs play a major role in support of the strategic objectives of an organization. Organizations are using ISs to develop products, services and capabilities that give a firm a strategic advantage to overcome the competitive forces they face in the global market. The CBISs organizations use to support their strategic objectives are referred to as Strategic Information Systems (O'Brien, 2000).

The direct benefits that organizations get from using CBISs and ICTs are efficiency in operations, easy data access which facilitates faster decision making, sharing of data, faster communications via e-mail, less costs of communication (using Voice over Internet Protocol (VOIP), organizations are able to cut their telephone, postal and courier costs), achievement of paperless offices, product/service customization to suit customer needs among other benefits (Cadle et al, 2008).

In education, CBISs can be applied to achieve the same benefits. Digital Information technologies bring the capability to bridge space and distance constraints, and breadth and reach constraints. This has been made possible by the convergence of Information and Communication technologies and this consequent development of what is commonly known as Information and Communication Technology (ICT).

1.1.1 Role of ICTs in Learning Services

ICTs can expand access to education because they can be used anytime and anywhere. ICTs have the ability to transcend time and space to make possible synchronous learning, a concept that involves an instructor teaching via the Internet or using two-way live broadcasts to students in a classroom (Obringer, 2001). Access by remote means has been made possible through the World Wide Web (WWW), making a wealth of learning materials in almost every subject and in a variety of subjects accessible from anywhere, at anytime of the day and by an unlimited number of people. Resource persons such as mentors, experts, researchers, professionals, business leaders and peers from all over the world can now be accessed easily and with no constraints that are associated with reliance by teachers and learners on printed books and other materials in physical media (Tinio, 2002).

ICTs also provide the means for enhancing quality of education. Learner motivation and engagement is increased through use of videos, television and multimedia computer software that combine text, sound and colorful moving images providing a content that will engage the student in the learning process. Acquisition and transmission of basic skills and understanding of the basic concepts involved can be facilitated by ICTs through use of knowledge databases (Wolf, 2007).

In her research, (Tinio, 2002) says, ICTs and ISs have greatly facilitated the acquisition of knowledge, offering developing countries opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for businesses and the poor. One of the greatest hardships endured by the poor and by many others who live in the

poorest countries is their sense of isolation. The new communication technologies promise to reduce that sense of isolation and to open access to knowledge in ways unimaginable not long ago.

Despite Tinio's findings, the reality of the digital divide, defined as the gap between those who have access to and control of technology and those who do not have access to technology, means that the introduction and integration of ICTs are at different levels in different communities and towns. This is a challenge to expansion of distance education and failure to overcome the digital gap, will mean a further widening of the knowledge gap and the deepening of existing economic and social inequalities. Lack of enough instructors is also hindering access to education especially in developing countries and the few instructors that are there may not all have the required computer skills to use in integrating ICT in education (Teemu, 2008). Due to these reasons, the benefits of using ICTs in education and the potential for ICTs to increase access to and enhance the quality of education are yet to be realized in developing countries.

Radio and television, although now given less attention, are older forms of ICTs that have a long history as instructional tools in distance education. Radio and television have for over forty years been used for open and distance learning (Tinio, 2002). Open and distance learning is defined as a way of providing learning opportunities that is characterized by the separation of teacher and learner in time or place, or both (Survillian, 2002). Print media has remained the most accessible and most dominant delivery mechanism of open and distance learning in both developed and developing countries (Downes, 2002). However, print media has some disadvantages because it is passive in nature. Students can easily miss the key ideas and lose interest in the course, secondly the instructor has no opportunity to clarify meanings and check if the learner has understood the material at an instant and lastly it takes time for the learner to communicate to ask for clarification from the instructor (Kearsley, 1985).

The use of computers and the Internet has expanded open and distance learning. The use of computers and the Internet in education is popularly referred to as Electronic Learning or E-Learning. Rosenberg (2000) defines E-Learning as education via the Internet, network, or standalone computer. The four levels of E-learning are knowledge databases, online support, asynchronous learning and synchronous learning.

Synchronous learning mainly covers teleconferencing and Videoteleconferencing. These technologies make use of telephones, computers and the Internet for delivery, interaction and

facilitation of learning. Wolf (2007) defines a teleconference as the live exchange and mass articulation of information among persons remote from one another but linked by a telecommunications system, usually over the phone line. A videoconference also known as a Videoteleconference is defined as a set of interactive telecommunication technologies which allow two or more locations to interact via two-way video and audio transmissions simultaneously (Wolf, 2007).

Videoteleconferencing can be used in institutions of higher education in several ways, a faculty member can conduct a lecture while away for a week at a conference, a guest lecturer can be brought into a class from another institution without loss of time due to travel, a faculty member can participate in a thesis defense at another institution, administrators on tight schedules can collaborate on a budget preparation from different parts of a campus and a researcher can collaborate with colleagues at other institutions (Wolf, 2007).

This research project involved investigating the perceptions, attitudes and readiness of academic staff and students towards the use of VTC in teaching and learning. All new ICTs and ISs bring a range of associated changes with them, which involve people and change in the organizational structure. These changes affect the people in the organization who are key to the success of any ICT and CBIS implementation. Therefore, no matter how well designed a new system is or how well planned the implementation, only with proper consideration of the 'human issues' will the system succeed (Cadle et al, 2004).

1.2 Higher Education in Kenya

Education in Kenya has been based on an 8-4-4 system since 1985. The 8-4-4 system means eight years of primary education, followed by four years of secondary school and four years of university. There is also a private school sector which follows the British O-level and A-level system. In Kenya, about 85 percent of all children attend primary school, 24 percent of the children attend secondary school, and 2 percent attend higher education institutions. This leaves a large population without higher education (Juma, 2006).

There has been a growing population of Kenyans in various towns seeking opportunities for higher education. This has led to the expansion of educational opportunity through the development of distance education programmes by several universities. In Kenya, institutions of open and distance learning tend to be institutes or faculties or units within universities. The University of

Nairobi and Kenyatta University are examples of two public Universities in Kenya that have distance learning programs.

The University of Nairobi established the Board of Adult Education in 1966, this promoted adult education. It later established the Faculty of External Studies in 1986 to provide learning opportunities for those Kenyans who cannot secure places in the existing internal faculties of the public universities. UoN runs Bachelors and Masters Programmes through its extra-mural centers that are located in Nairobi, Kisumu, Mombasa, Nakuru, Nyeri and Kakamega (Mbwesa, 2005).

At Kenyatta University, The School of Continuing Education which offers distance learning runs mainly education programmes. It offers Bachelor of Education for Primary Teacher Education (PTE) and Master of Education for Secondary School Teachers. The programmes were started in August 1998 to upgrade primary and secondary school teachers in the country and to generate income for the university in the light of sharply declining funding by the government (Juma, 2006).

The African Virtual University (AVU) is a distance learning programme whose main mission is to bridge the digital divide and knowledge gap between Africa and the rest of the world by increasing access to global educational resources throughout Africa. AVU started in 1997. At AVU, courses are transmitted via satellite from universities in Canada, Europe and the USA. This is achieved through satellite technology and the Internet (Juma, 2006).

UoN and Kenyatta University have been delivering their distance education programmes through print based distance education and institution-based mode of study during the school holidays. With the emergence of the Internet, E-learning has also been introduced in both Universities. Currently, both Universities are considering introducing Videoteleconferencing to enable their students in remote towns receive lectures at the same time as the students in Nairobi.

1.3 Background of Case Organization

The case organization was The University of Nairobi. The University of Nairobi was selected since it is the oldest and largest University in Kenya. It also has campuses and distance learning programs running in various towns in Kenya.

Most of the learning in UoN takes place in physical classrooms. This learning is based on same-time and same-place delivery methods. However, to improve the learning experiences, the University has been adopting innovative ways that befit a modern university in a digital revolution.

Top among these include the gradual shift from the traditional paper photocopies and dictation as methods of disseminating knowledge, to modern lecture room experience where power-point and multimedia presentations, backed with high resolution digital projection equipment is a norm. Many lecturers have adopted use of laptops and projectors when lecturing.

To expand education to students in remote towns, UoN introduced open and distance learning and it has developed course content manuals for these students. UoN has also taken steps towards introducing E-learning programs. Some of the teaching staff have been trained on E-learning and have developed learning content into modules that are being hosted onto the UoN E-learning site (Wedusoft ELE (<http://elearning.uonbi.ac.ke/>)). There have been calls for all the lecturers to prepare content for E-learning. However, this online learning system is not being used as intended; users (academic staff and students) need to be adequately sensitized on the use of this e-learning software. UoN is considering introducing VTC in its teaching to cater for students in remote towns.

Availability of computers is necessary for any form of electronic learning as it is the medium through which one gets to the World Wide Web. The University of Nairobi aims at achieving a student computer ratio of 1:10 and a staff computer ratio of 1:1 in its strategic targets (ICT strategic plan 2008-2013). UoN has established performance targets each year for the various Campuses. All the Campuses in the University have a Local Area Network (LAN) and Internet Connection. The staff offices and the student laboratories are connected to the Internet but most of the lecture rooms and lecture theatres do not have the Internet connection.

ICT is regarded as a necessary element for the success of a learning institution. In ranking world Universities by Internet Lab, the Universities that incorporated ICT in their learning operations ranked best (Clemon et al, 1991). Cybermetrics Lab used web indicators in July 2008 in ranking of world universities. UoN ranked position 25 in Africa and position 1 in Kenya (Ranking Web of World Universities, 2008). This further shows how use of ICTs and ISs in education is considered important around the world.

The University of Nairobi, therefore in pursuit of its vision 'to be a World Class University committed to Scholarly excellence' is globally expected to adopt innovative ways that befit a modern university in this era of digital revolution. Top among these include the gradual shift from the traditional paper photocopies and dictation as methods of disseminating knowledge, to modern lecture room experience where power-point and multimedia presentations, backed with high resolution digital projection. UoN also plans to begin fully fledged E-Learning programs and

introduce Videoconferencing to be able to compete globally. UoN is facing competition from existing Universities like Kenyatta University, USIU and new Universities like Kenya Methodist University. In addition to that, the University of Nairobi has challenges associated with distance learning in reaching its students and potential students in remote towns. The University incurs high costs to provide education in these towns since lecturers have to travel from one town to another to teach students. This is costly, time consuming and disrupts lecturers' personal lives.

There are some solutions to the above challenges that the University of Nairobi is experiencing in its objective of providing higher education to all Kenyans. UoN can build full campuses in all towns and employ full time lecturers or it could use ICTs and CBIS to provide distance education by introducing synchronous learning (teleconferencing and Videoteleconferencing).

1.4 Problem Statement

Fixed traditional facilities are over-stretched; customers or students have peculiar circumstances that make it difficult to bring them to a room. Space and time based constraints enhanced by changing circumstances especially the new need for life long learning and the need to earn a living at the same time are challenges that face students and academic institutions.

The need to overcome these constraints and meet the growing demand for, means understanding the impediments to application of ICT enabled learning systems has become essential for ability to meet higher education market needs. The research comes to bring about this understanding by answering the following questions:-

- i. What are the perceptions and attitudes of academic staff and students at Institutions of Higher Education in Kenya towards the use of Videoteleconferencing in teaching and learning?
- ii. What is their level of readiness in terms of knowledge, skills and possession of required ICT equipment to use Videoteleconferencing technology in teaching and learning?

1.5 Objectives of the study

The objectives of this study are:-

- i. To determine the perception of academic staff and students at Institutions of Higher Education in Kenya, in regard to the use of Videoteleconferencing technology in their teaching and learning. Their acceptance or rejection of this new learning technology will

greatly determine the success or failure of Videoteleconferencing initiatives in higher education.

- ii. To determine the readiness of academic staff and students at Institutions of Higher Education in Kenya, in regard to the use of Videoteleconferencing in their teaching and learning.

1.6 Significance of the Study

The study can provide insight to the decision makers in academic institutions in Kenya as well as the Government of Kenya (GOK) on the options they have; whether to integrate Videoteleconferencing facilities into their learning platform or to continue with the traditional classroom method of teaching.

The results of this study can give lecturers and students a view of their attitudes and the extent of their readiness for Videoteleconferencing technology.

The results of the study can be used by the administration of the academic institutions as input for implementing Videoteleconferencing by identifying the necessary infrastructure required for successful implementation of the technology and hence enable appropriate decisions, planning and budgeting to be made in preparedness for Videoteleconferencing implementation.

CHAPTER TWO

LITERATURE REVIEW

This chapter covers different forms of learning and the history of Videoteleconferencing (VTC). It also looks into the VTC-Readiness factors (human readiness and institution readiness) necessary for successful implementation of VTC, as studied in various literatures.

2.1 Forms of Learning

Learning is the acquisition, retention and application of knowledge, skills, attitudes and ways of thinking (Kolensik, 1970). There are three forms of learning that have been identified from literature review. These are traditional classroom learning, distance learning and blended learning.

Traditional classroom learning takes place in an identifiable classroom space, usually in a school or in an institution of learning. It is the form of learning that is used in primary and secondary schools in Kenya and it is still being used by most colleges and universities (Moore et al, 2005). Secondly, there is open and distance learning which is a way of providing learning opportunities that is characterized by the separation of teacher and learner in time or place, or both time and place. The media used is print or electronic and therefore the two forms of distance learning are print learning whereby materials are sent to the students through mail or by fax and electronic learning (E-learning) which is education via electronic media like the Internet, network, or standalone computer. Lastly, there is blended learning which combines traditional classroom practice with e-learning solutions (Omwenga, 2003).

E-Learning falls into four categories, from the very basic to advanced these are, knowledge databases which offer explanations and guidance on use of software, second is online support for instance online forums, chat rooms, e-mail, or live instant-messaging, third is asynchronous learning where the students have reference materials in place of a live instructor. It is CD-ROM-based, network-based, intranet-based or Internet-based and may include access to instructors through online bulletin boards, online discussion groups and e-mail and last is synchronous learning which involves time with a live instructor teaching via the Internet (Obringer, 2001).

This study focuses on synchronous learning, which mainly covers teleconferencing and Videoteleconferencing. These technologies make use of telephones, computers, the Internet and some specialized equipment for delivery, interaction and facilitation of learning.

2.2 History of Videoteleconferencing

This part gives an overview of how VTC has evolved over the years using different mediums, from closed circuit cable, followed by use of radio-frequencies, which was followed by the use of telephony network and lastly is the use of the Internet.

Simple analogue videoconferences were established as early as the invention of the television. Such VTC systems consisted of two closed-circuit television systems connected via cable. During the first manned space flights, NASA (National Aeronautics and Space Administration) used two radio-frequency links, one in each direction. TV channels routinely use radiofrequencies kind of Videoteleconferencing when reporting from distant locations.

Videoteleconferencing was first demonstrated in 1968. This technique was very expensive and could not be used for applications such as telemedicine, distance education, business meetings or in any long-distance applications. Attempts at using normal telephony networks to transmit slow-scan video failed mostly due to the poor picture quality and lack of efficient video compression techniques.

In the 1980s digital telephony transmission networks became possible, such as ISDN (Integrated Services Digital Network) that had a minimum bit rate of 128 kilobits per second for compressed video and audio transmission. The first dedicated VTC systems such as those manufactured by pioneering VTC firms like PictureTel, started to appear in the market as ISDN networks were expanding throughout the world. Videoteleconferencing systems throughout the 1990s rapidly evolved from highly expensive proprietary equipment, software and network requirements to standards based technology that is readily available to the general public at a reasonable cost.

The 1990s saw the advancement and development of Videoteleconferencing systems due to many factors, including technical advances in Internet Protocol (IP) and also more efficient video compression technologies were developed. This led to the IP-based Videoteleconferencing which is used today. IP-based Videoteleconferencing have led to the development of free desktop or PC-based Videoteleconferencing such as NetMeeting, MSN Messenger, Yahoo Messenger, Sight Speed, and Skype among others (Wolf, 2007).

By 2003, high-speed Internet access became widely available all over the world at a very reasonable cost. At the same time, the cost of video captures and display technology reduced. The general public could afford web cameras, the cost of PCs became minimal and broadband Internet access became available all over the world at a reasonable cost. All of these factors, including the availability of free software from leading Instant Messaging (IM) service providers have combined to make Videoteleconferencing even more accessible for the consumer market.

Institutions of Higher education around the world like Massachusetts Institute of Technology (MIT) among others started to embrace the benefits of Videoteleconferencing in 2003. Schools around the world began to integrate VTC into their distance learning programs to enhance the classes with more interactive classroom-like environments. Administrators and teachers realized the immense benefits of real-time interaction between instructors and students (Wolf, 2007).

The impact of VTC in education include instructors from all over the world can be brought to classes anywhere in the world, students from diverse backgrounds can share information and ideas, students can visit a zoo or a museum in other parts of the world to learn or to perform laboratory experiments. These "virtual trips" brings opportunities to students, especially those in geographically isolated locations or the economically disadvantaged, among other ways (Wolf, 2007).

Institutions of Higher Education in Kenya for instance The University of Nairobi and Kenyatta University are considering introducing VTC in their distance learning programs.

2.3 Review of literature on VTC-Readiness Factors

For an institution to be ready to implement VTC, it first must be e-ready. E-readiness is defined as the readiness of a community to participate in a net-worked world (Kariuki, 2007). The requirements of an e-ready society covers human readiness (mental readiness and skill readiness of the people involved), Information Security, ICT availability and utilization which involves access to the Internet, web servers, World Wide Web (WWW), Local Area Network (LAN), Wide Area Network (WAN), Personal Computers(PCs), Bandwidth(BW) and telephone lines.

E-readiness is determined by assessing the individuals' and institutions' computer availability, access to and utilization of the Internet, human readiness in terms of skill and mental readiness. Watkins et al (2003) defines E-Learning readiness as the mental, skills and physical preparedness of people for an e-learning experience. VTC is a type of E-learning and for the purpose of this

study VTC readiness shall be defined as the human and institutions preparedness for Videoteleconferencing.

Muganda (2006) conducted a study on E-learning implementation at the University of Nairobi. This study focused on the perceptions of academic staff towards e-learning. She found out that the factors that determine e-learning readiness were computer and Internet availability, computer literacy, motivation of users and technical support. Omwenga (2003) carried out a research on computer-mediated learning and developed a system (Wedusoft) to be used for online education. He found out that the factors that determine e-learning readiness were computer availability and literacy, internet availability and an e-learning culture in the institutions. Gachau (2003) also conducted a research on e-learning readiness in tertiary institutions in Kenya, a case of Kenya Polytechnic. Her study investigated e-learning readiness factors and the competencies required for an 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.

The above studies mainly focused on online learning, none of them specifically looked at Videoteleconferencing (VTC) as a form of Electronic learning. Muganda (2006) investigated the attitudes of academic staff towards electronic-learning but did not address the students' attitudes. Therefore, this research investigated both staff and students attitudes towards VTC. Attitudes play an important role in predicting behavior, (Tull et al, 1993). The knowledge of how both the academic staff and students perceive VTC and their readiness to embrace these technologies will help determine if the VTC initiatives would succeed or fail. This is because a positive attitude towards VTC will lead to acceptance whereas a negative attitude will lead to rejection of integrating VTC technology in education.

The VTC-readiness factors identified in the various literatures have been broken down into two broad categories, Human Readiness and Institution Readiness. This is presented in figure 2.1.

Human readiness is gauged by skills, attitudes and perception of the people to be involved in Videoteleconferencing whereas Institution readiness is gauged by factors such as infrastructure, technology, content readiness, availability of human resources and availability of finances.

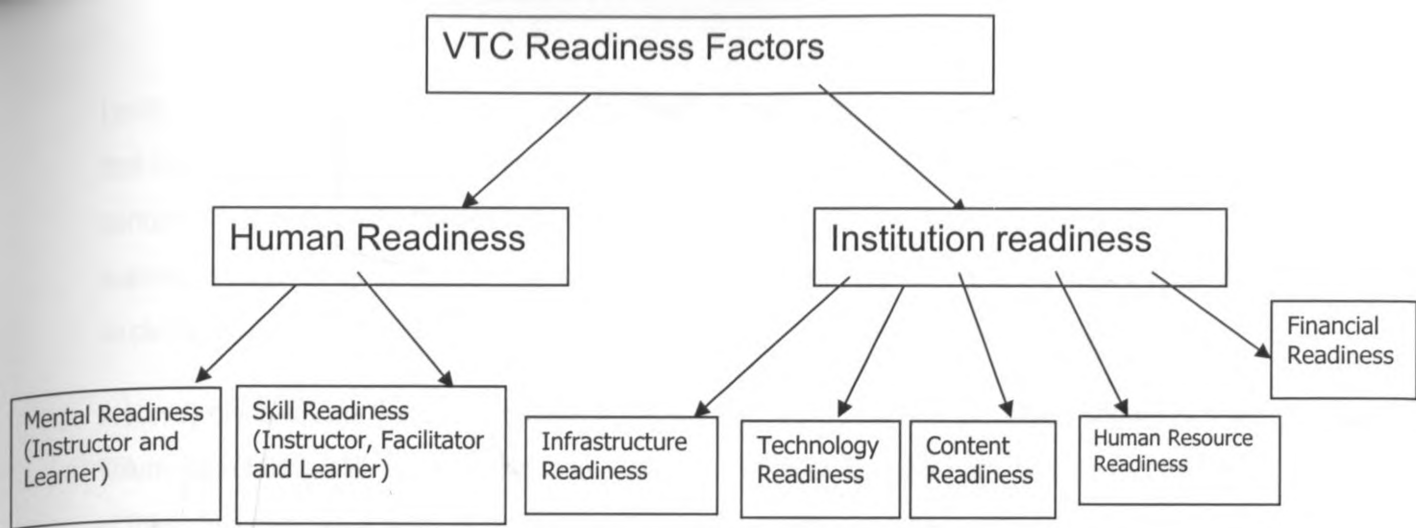


Figure 2.1 VTC-Readiness Factors

2.3.1 Human Readiness

In looking at human readiness, mental readiness and skills are gauged. Mental readiness is gauged by peoples' attitudes. Implementation of Videoteleconferencing requires not only laying down of the necessary infrastructure but also ensuring users' readiness to adopt the technology so as to avoid failure that is due to 'human issues'.

2.3.1.1 Instructor and Learner Perception (Mental Readiness)

Mueller (2006) describes attitude and/or perception as the sum total of a man's inclinations, feelings, prejudice, bias, preconceived notions, ideas, threats and convictions about a specified topic or an object. Tull et al (1993), states that attitudes affect people's behavior. This behavior could be verbal or non-verbal. They further describe attitudes as being made up of three components, the cognitive component which deals with the beliefs or ideas a person has about an object, second is the affective component which deals with a person's feelings of like or dislike towards the object and last is the behavioral component which deals with the behavioral intentions or action tendencies a person has towards an object as a result of affective tendencies.

Tull et al (1993), state that the importance of studying attitudes is that attitudes play an important role in predicting behavior. First, a positive attitude perseveres at activities they believe are possible therefore, if the staff and students at Institutions of Higher Education in Kenya have a positive attitude towards VTC, they shall persevere as hurdles related to VTC implementation are corrected. Secondly, if the academic staffs are convinced they have the ability to complete a task.

Lastly, due to their positions in authority, teachers, parents and instructors have known for years that the student who is encouraged to perform will outperform those who are taught they cannot perform (Kolesnik, 1970), therefore if students are convinced by the lecturers that VTC mode of learning is as good as traditional classroom method, students may not resist use of VTC and the students will perform well.

A survey of institutions that embraced electronic learning technologies in the 1990's showed a high failure rate of 64% (Hill, 2000 and Norman, 1992). The reasons for failure are, first the fact that use of these technologies is seen as challenging thousands of years of face-to-face classroom learning thus creating resistance (Kearsley, 1985), secondly applications are developed having the use of technology in mind but ignoring the capabilities and willingness of the intended users and lastly users did not have the skills they needed to put electronic learning technologies into practice. Another example is Air Canada which introduced electronic learning for its maintenance workers only to discover that some of them had never seen a computer (Survillian, 2002) and some of the who had skills did not see the value of the CBISs or the 'new technology' and rejected it.

In the mentioned cases, failure was due to lack of preparing staff for the CBISs. These are issues of E-Readiness and Institutions of Higher Education in Kenya should look into human readiness as they make plans to introduce Videoteleconferencing.

2.3.1.2 Instructor, Facilitator and Learner Skill Readiness

Kearsley (1985) notes that purchasing and installing ICT equipment does not translate to quality education. Facilitators should be well trained and ready to give a hand to the instructors in management of the Videoteleconferencing equipment.

The instructors should be competent and ready in regard to skills required. Kearsley (1985) and Rosenberg (2000) noted that instructors who use electronic learning should possess certain competencies different from those of a classroom teacher. These include ability to converse and coordinate a remote class and discussion, innovative development of questions that can motivate remote learners who have no physical contact with the instructor, technical skills to use computer hardware and applications like PowerPoint presentations, word processing, spreadsheets, database management, and graphics software. The instructors also need the ability to post and retrieve information from the Internet (Omwenga, 2003).

The learners need to be psychologically prepared to be taught by a remote instructor, they should have computer and Internet skills to carry out their assignments, email them to the instructor and to retrieve information posted by the instructor on the Internet. During the VTC lecture, the learner should also be disciplined and motivated to avoid interrupting learning and to manage his/her learning without the physical presence of the instructor.

2.3.2 Institution readiness

This refers to the availability of, infrastructure (space, computers and the Internet), the technology, content, human resources (technical support and facilitators) and finances to set up and run this technology.

2.3.2.1 Infrastructure and Technology Readiness

Videoteleconferencing just like any other form of e-learning is made possible through technological systems. The required technology and corresponding software applications should be existing. An institution should look into the bandwidth required to sufficiently support VTC, availability and accessibility to personal computers by the users, availability of appropriate servers for archiving course content and lecture room acoustics.

An institution can assess its VTC-readiness in terms of technology by determining the availability of computers, easiness to access computers, access to Internet, whether system maintenance is adequate and availability of VTC equipment. Institutions should also determine whether the speed of the Internet connection is appropriate for the technology.

An institution should gauge the compatibility of the technology with the existing one. Most technology and hardware incorporated for education is imported from outside Africa. Thus, institutions trying to incorporate VTC in their teaching should plan how to get spare parts when needed in a case where the technology has been imported and it is not locally available. Therefore, it is safe for institutions to buy equipment from a re-known manufacturer and ensure that it is compatible with similar equipment from different manufacturers (Muganda, 2006).

Teleconferencing equipment consists of microphones, speakers and a telephone or IP network. The costs vary depending on the application. The costs of installing a two-way telephone network are modest. For complex installations like satellite connections, costs are significantly higher.

Videoteleconferencing needs are more complex. It consists of video cameras, Internet connection, and dual plasma display Videoteleconferencing system. The screen on the left is primarily used to display people during the VTC lecture and it is also the user interface when setting up the call. The screen on the right displays data but can display a second 'far site' in a multipoint call. The core technology used in a Videoteleconference (VTC) system is digital compression of audio and video streams in real time. The hardware or software that performs compression is called a codec (coder/decoder). There is also need for an archival system to be used in storage of the course contents. This will require huge hard disc space.

However, basic equipment for a Videoteleconference can involve, personal computers, a main computer control system, dedicated telephone lines, fibre connection or satellite connection, a television, computer monitor or screen for each participant or group of participants; and a video camera for each participant or group of participants. Connecting a number of locations requires more sophisticated software, facilities and equipment (Obringer, 2001).

2.3.2.2 Content Readiness

Content is the driving engine of Videoteleconferencing as information is the driving engine in any information system. Lecturers may not need to change the way they present their content for VTC. However, VTC occurs in a different place from where the lecturer is teaching and to be effective in teaching and learning, it requires special techniques of course design, instructional techniques, methods of communication, and organizational and administrative arrangements.

In this context, content readiness addresses issues relating to quality and the extent to which learning content can be presented online (Watkins et al, 2003). With the current developments in technology, virtually everything can be taught online, through Videoteleconferencing. Kearsley (1985) notes that an institution that believes its learning content cannot be delivered online wholly is therefore not ready for electronic learning. This means that all course content can be delivered online through VTC.

Factors that need to be considered in developing content are time to develop the content, cost to develop the content, training needs of lecturers to equip them with skills needed to develop the content, expert assistance and cost in developing content. In a case where content is to be purchased off the shelf, the respective lecturer should be involved in the purchase to ensure the content meets curriculum standards.

2.3.2.3 Technical Expertise, Human Resource and Training

Technical expertise is necessary in assessing if the manufacturers of the Videoteleconferencing equipment are available to organize and deploy the system. It is also necessary to assess if technical support in the usage and maintenance of the equipment will be readily provided for.

ICT support personnel are required when training lecturers and to organize and carry out maintenance of the Videoteleconferencing equipment. There are also administrative functions like facilitation of the VTC lecture in the remote site that require personnel (Watkins et al, 2003). It is important to assess if the personnel have enough knowledge to serve in these jobs. If not, it is important to ensure that they are trained and ready once the system is deployed.

Human resources and training are important factors that should be considered early during VTC initiatives. Training is required for instructors, students, facilitators and technical personnel. The skills each category of persons involved requires should be assessed and any gaps or skill deficiencies of each user dealt with. This will prevent failure that results from lack of training, lack of proper maintenance and lack of facilitators to assist the lecturer. Finances required for the training should also be set aside.

2.3.2.4 Financial Readiness

This looks at the cost of the equipment that is required for Videoteleconferencing as well as the cost of installation and maintenance. There have to be funds for purchasing the equipment, installing it, maintenance and training. If the project is being financed by an aid agency, this is probably for installation hence the institution should assess if the project can sustain itself afterwards.

To ensure that the efforts put into this mode of electronic learning do not fail, the institution should set aside a budget that ensures funds are available in advance and not looked for when they are needed (Omwenga, 2003). For instance, if there is need for repair in one site there should be funds available to do this without disrupting or canceling a lecture.

Instructors and students should invest in computers, Internet connection and secondary storage to backup content. This is required to store notes and to be able to communicate on email when sending notes and assignments. The institution may provide computers and Internet facilities but these may not be enough for everyone to use at all times.

2.4 Benefits of VideoTeleconferencing (VTC)

Videoteleconferencing can be used to bring teachers and lecturers from all over the world to classes. Schools can use this technology to pool resources and teach courses which could not be offered due to lack of enough instructors. VTC is also giving learning opportunities to people who are not able to take classes at institutions because of time constraints and travel costs (Rogan et al, 2008).

VTC reduces the cost of education through economies of scale because education reaches a wider population with the same fixed costs. The costs apportioned among the many beneficiaries turn out to be less than classroom teaching costs where only a limited number of students can fit. Operational cost is also reduced saving the institutions travel costs and travel time for lecturers. VTC saves on costs associated with purchase of ICT equipment like laptops and projectors and also saves on duplication of teaching efforts, lectures do not need to repeat the same lecture in different locations since all students attend the same lecture at the same time.

Education becomes cheaper to students and their parents because accommodation costs are cut down, students do not have to stay in campus or commute to attend lectures since they can choose to attend the lectures from home (Getter, 2008).

There is flexibility with the use of VTC because students can attend classes from their offices or homes. This flexibility also enables the institutions of higher education to expand enrollment and reach more students at the students' convenience. With VTC, the learner is empowered, lecture sessions can be recorded and the learner can determine the rate and time of learning. Therefore, the learner is able to balance work and other aspects of life. Anyone can get access to education anywhere anytime, 365days, 24 hrs a day (Omwenga, 2003; Tinio, 2002).

VTC improves the quality of teaching. It uses both audio and visual senses in acquisition of knowledge. The use of graphics and animation in Videoteleconferencing makes illustrations look real in actual life situation. Studies have shown that a person acquires only 15-20% of information through the auditory sense and 60-80% through visual sense. In a case where both are used, retention becomes very high (Obringer, 2001).

Equality of all students is promoted with the use of VTC. VTC smoothes status and flattens hierarchies. It reduces discriminatory communication patterns based on physical and social cues such as gender, race, socio-economic status and physical features. Such discrimination is possible

in the traditional classroom setup whereby an instructor can favour a certain student, in some society's men and women are not allowed to interact and most lecturers are men, there is discrimination based on gender in such societies. Generally, electronic learning equalizes students (Tinio, 2002).

The speed of computers in processing data and communication as well as network speeds have proved a great advantage to the education sector. This speed allows information to be distributed to VTC students over a wide geographical area at an instant during lectures (McLuhan, 2008).

2.5 Challenges faced in VTC Implementation

Learning through Videoteleconferencing represents a departure from thousands of years of face to face classroom learning situation. The instructor has to learn new job skills, new technology and new methods of developing content. On the other hand, the learner has to adapt to a form of learning whereby the instructor is not physically present. The additional time and effort necessary for the effective use of the technology may cause resistance by both the instructor and learner (Survillian, 2002).

Resistance by instructors can also be due to the perception that fewer instructors will be required therefore leading to loss of jobs and the perception that ICT poses a threat to their professional role and image. Lack of training of instructors on the use of the new technology may lead to failure; this can also cause resistance to develop amongst instructors. Instructor education is important to equip educators with the necessary skills for using ICTs effectively in the classroom and to help instructors overcome their resistance to 'these new technologies' hence developing positive attitudes towards them (Omwenga, 2003).

Implementation of VTC involves various costs that may hinder an institution from implementing the technology. The initial costs of VTC equipment is very high running to millions of shillings, there are costs of purchasing more computers and setting up laboratories, there is the cost of employing technical staff and facilitators to assist lecturers, there is system maintenance costs. VTC also requires expensive equipment as well as good Internet speeds. However, there should not be a compromise on the quality of equipment for cheaper equipment since lack of proper infrastructure will lead to failure of Videoteleconferencing implementation (Leinonen, 2008).

Kenya is a developing country and therefore the public sector lacks enough resources to attract and retain technical expertise and human resources. Most IT experts are in the private sector

where there is attractive pay. Most institutions of higher education may not be able to attract and retain qualified technical experts due to limited resources (Watkins et al, 2003).

In Videoteleconferencing just like in any other form of e-learning, e-readiness is low if information (learning content) has not been developed in electronic format. Institutions of higher learning will have to spend time developing content before eventually adopting the technology (Watkins et al, 2003). However, they may choose to purchase off the shelf content since multimedia material on courses is available in the market. This can lead to conflict with curriculum and resistance if content is imposed on instructors without them being involved in selection or development of the content. Instructors should be involved in choosing or developing content so as to ensure that the content meets their needs as well as being inline with the curriculum (Omwenga, 2003).

VTC can lead to social problems. Lecturers and students who spend a lot of their time with computers may become individualistic and find it a problem to relate with other people. They may become aggressive and impatient with other people (O'Brien, 2002). The time that would have been used for leisure is likely to be used for learning; this may result to health issues like stress and eventually poor teaching by lecturers or low retention for learners. Other health issues related to computer usage include Carpal Tunnel Syndrome (CTS) which can cause numbness and pain in the wrist because of repeated striking of computer keyboard. Exposure to light rays emitted by the monitor can cause defects in vision (Laudon, 1996).

Decision makers in educational institutions may lack, information on the value of the new technology in education and teaching, information on the kind of hardware and software required to implement this technology and information on the associated costs (Omwenga, 2003). This may lead to lack of implementation or failure due to lack of proper planning by the decision makers.

With the ever rising growth of the number of people who access the Internet, there are virus issues and unauthorized access to institutional computer databases which can lead to destroying or corrupting of data. There is also unauthorized copying of intellectual property placed on the Internet, this denies the owner's potential profits resulting from cross selling. Piracy may kill the innovativeness of scholars or refusal to go online in a bid to protect intellectual property from piracy (Stallings, 2005).

2.6 The Future of VideoTeleconferencing (VTC)

Trends in technology, social and economic life indicate that VTC will grow in the future. The growing worldwide Internet usage is one such indication (McLuhan, 2008).

Plans to lay an undersea fiber-optic cable off eastern Africa will open up the Internet at very low cost. With regard to the fibre-optic cable, Dr. Bitange Ndemo, Permanent Secretary at the Ministry of Information and Technology, Kenya said, "These young people in schools who knew only their immediate surroundings will have the whole world opened up to them" (Mynott , 2007). Fibre optic transmits Internet at broadband speeds and it is a reliable media, this will lead to growth in usage of Videoteleconferencing in education.

Open systems with unrestricted connectivity using Internet networking technologies as their technology platform, are today's primary telecommunications technology drivers. Web browser suites, HTML Web page editors, Internet and intranet servers and network management software, TCP/IP Internet networking products, and network security fire walls are a few examples of the technologies that are being applied in Internet and intranet applications, especially those for e-commerce, e-learning and collaboration (Lelei, 2006).

Trends in technological innovations will also expand integration of VTC in learning. The development of smaller portable computers and eventual development of wallet size computers will encourage people to engage in electronic learning. The convenience of using the small ICT devices when traveling makes access to education convenient.

The integration of networks in mobile phones (web enabled phones), allows for mobile learning. Mobile learning extends the anytime, any place advantage of ICT. Web enabled phones have enabled access to the Internet hence the learner can access their emails and download assignments, get daily tips on topics of research interest, get feedback on quizzes and give greater access to tutors (Sharpes, 2007).

Given the benefits sited in literature and the possible challenges that may lead to failure of Videoteleconferencing initiatives, this research seeks to look at the academic staff and the students' attitudes, perception and skills to determine their readiness for Videoteleconferencing technology.

The procedures that were used to collect and analyze data in this research are discussed in greater detail in the research methodology.

CHAPTER THREE

RESEARCH METHODOLOGY

This part describes the procedures that were used in the study to collect data and analyze the data collected. This section covers the following major areas, research design, population and sample size, data collection instruments and data analysis techniques.

3.1 Research Design

The research design constitutes the blueprint for the collection, measurement and analysis of data (Cooper et al, 1995). This study involved use of both primary and secondary data.

The research was a case study of the University of Nairobi. A case study approach allows for in-depth exploration of issues. The case was at the country level, therefore at the data collection level it became a survey. Cooper et al (1995) says a survey is suitable for gathering information on opinions, attitudes, perception, expectations and intentions.

The study involved collecting data from the University of Nairobi (UoN) academic staff and students on their perceptions and readiness towards the use of Videoteleconferencing technology in education. Their readiness was assessed in terms attitudes, computer and Internet skills and extent of use of ICT equipment.

Secondary data collected from literature gave an insight of what is required in terms of infrastructure and technology for an institution to be ready for implementation of Videoteleconferencing.

3.2 Population and Sample Size

The target population was academic staff and students at Institutions of Higher Education in Kenya. The University of Nairobi was chosen since it is the oldest and largest University in Kenya. It is located in Nairobi town. A sample was taken from the University of Nairobi's Schools' that have been offering learning programs away from Nairobi town. These are the School of Business (SOB) and the School of Education (SOE). The School of Business has affiliate campuses in Kisumu and Mombasa whereas School of Education has extramural centers in several towns such as Nairobi, Mombasa, Nakuru, Kisumu, Nyeri among others.

Samples of the population of study were taken from campuses within Nairobi and from Mombasa Campus. This was done to ensure fair representation of each subgroup in the Schools. The questionnaires were distributed in the Campuses as presented in table 3.1. In Nairobi, the School of Business offers its programs in Lower Kabete Campus, Main Campus and Chiromo Campus. The School of Education offers its programs in Kikuyu Campus and Main Campus. The remote Campus that was chosen for both Schools was Mombasa town Campus.

The respondents from the two schools were obtained using the convenience sampling technique. The questionnaires were given to academic staff and students who were available and ready to fill the questionnaire at the time of the study. A sample size of one hundred and sixty five (165) respondents was taken. The respective sample sizes were calculated from the total lecturers' population at the respective schools and the student population using stratified proportionate sampling technique. The sample selection is as shown in table 3.1.

Table 3.1 Population Sample

Population	Population Size	Sample
Academic staff, School of Business	60	12
Academic staff, School of Education	67	13
Students, School of Business, Nairobi	4000	90
Students, School of Education, Nairobi	1000	25
Students, School of Business, Mombasa	400	15
Students, School of Education, Mombasa	300	10
Total	5827	165

3.3 Data Collection Instruments

The main instrument for primary data collection was a questionnaire (see Appendix IV). The questionnaires were used to obtain information from the University of Nairobi staff and students. The questionnaire was divided into three parts.

Part A had closed and open-ended demographic questions to classify respondents.

Part B had closed-ended questions that attempted to capture data for establishing the readiness of the University's academic staff and students towards implementation of Videoteleconferencing with regard to computer access, computer skills, and Internet skills.

Part C had questions on a five point likert scale. These questions were used to establish the perceptions and attitudes of academic staff and students towards Videoteleconferencing.

3.4 Data Analysis Techniques

Part A of the questionnaire was concerned with demographic information. The data analysis technique used in this part was descriptive analysis (frequencies and percentages).

In Part B, the concern was on the readiness of academic staff and students. The data analysis techniques used were descriptive analysis (frequencies, mean and standard deviation), cross-tabulation and chi-square tests.

Part C of the questionnaire was concerned with responses to questions involving the academic staff and the students' attitudes towards Videoteleconferencing. This section was analyzed through descriptive analysis, factor analysis, cross-tabulation and chi-square tests.

Demographic information of the respondents was cross tabulated against various factors such as attitudes, computer skills and Internet skills. The cross tabulation was in order to get the relative frequencies of occurrences of joint phenomena. Chi-square tests were performed to establish if there was any significant difference in the readiness factors identified such as attitudes, computer skills and Internet skills of respondents' based on demographic data.

The computer software's used to aid in the analysis of the survey data were Statistical Package for Social Software (SPSS) and Microsoft Excel.

CHAPTER FOUR

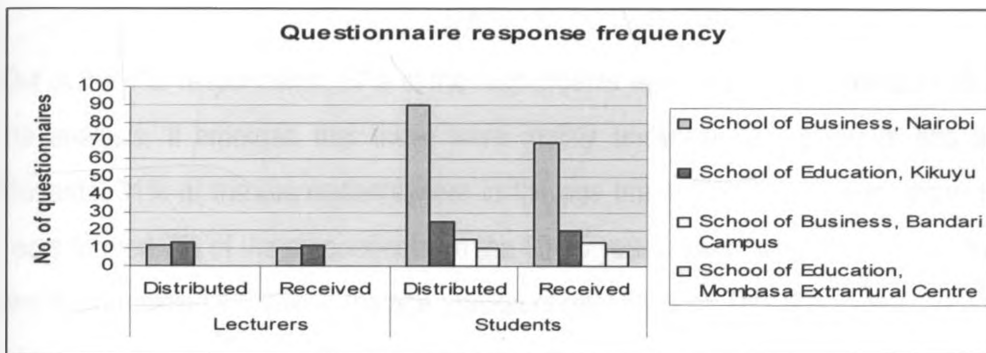
DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents the results of this research study. The objective of this analysis was to determine the key factors that explain the attitudes of the respondents towards videoconferencing technology and the readiness of the respondents to adopt it.

A total of 165 questionnaires were distributed out of which 132 were received back for analysis, 33 questionnaires were not returned by the respondents. The questionnaires received represent 80% of what was distributed. All the questionnaires received were used in the analysis and resulted in the findings presented in this chapter. The result of the response frequency is presented in figure 4.1 below.

Figure 4.1 Questionnaire Response frequency



Source: Survey data, 2008

4.2 Demographic characteristics of the respondents

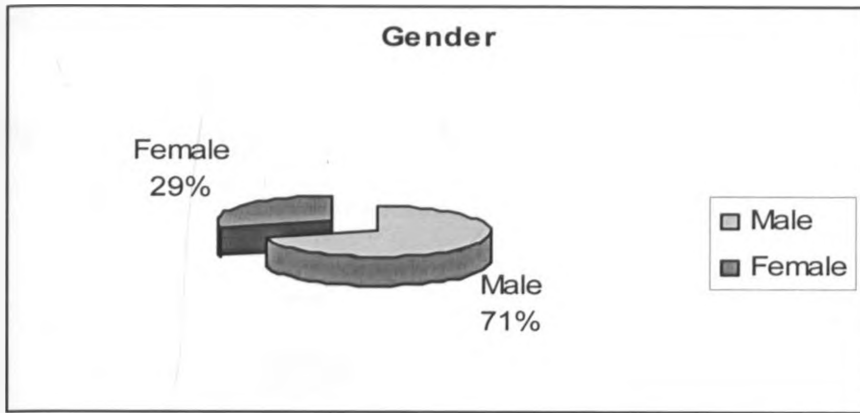
This section presents distribution of respondents by gender, age, school, level of education and position in the institution (staff or student).

4.2.1 Distribution of Respondents by Gender

The questionnaire distribution was not selective of the gender. However, it emerged that most of the respondents were male; they constituted 71% of the total respondents whereas females

constituted 29%. This is mainly because the University population consists of more men than women. The distribution of respondents by gender is presented in figure 4.2.

Figure 4.2 Distribution of respondents by gender

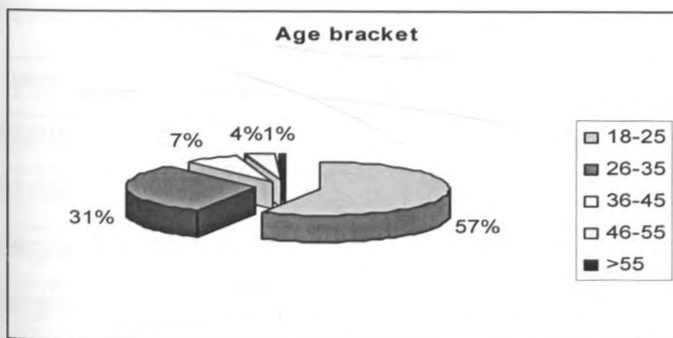


Source: Survey data, 2008

4.2.2 Distribution of Respondents by Age

Out of the 132 respondents, 57% of the respondents were in the age bracket of 18-25 years; from the analysis, it emerged that these were mainly undergraduate students and a few masters' students. 31% of the respondents were in the age bracket of 26-35 years, those between 36-45 years formed 7% of the respondents. In the 50-55 years age bracket, the respondents formed 4% and the remaining 1% was in the age bracket of over 55 year. This is presented in figure 4.3.

Figure 4.3 Distribution of respondents by age

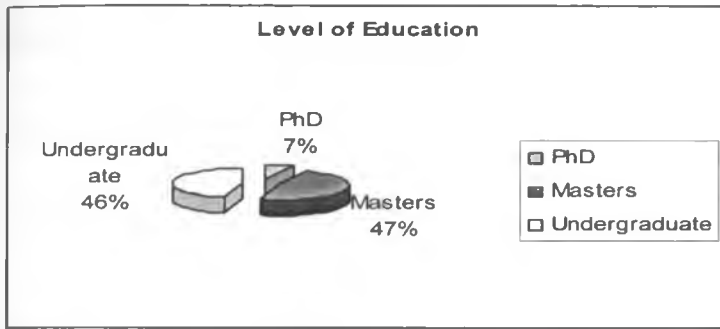


Source: Survey data, 2008

4.2.3 Distribution of Respondents by Level of Education

Respondents with PhD level of education were the least with a percentage of 7%; those with masters' level of education were the majority with a percentage of 47%, followed closely by those with undergraduate level of education who formed 46% of the respondents.

Figure 4.4 Distribution of respondents by level of education



Source: Survey data, 2008

4.2.54 Distribution of Respondents by Position in the Organisation

Students formed majority of the respondents with a percentage of 83.3% of the respondents. Academic staff formed 16.7% of the respondents. The breakdown of the respondents in various positions is shown in the table 4.6.

Table 4.2 Distribution of respondents by position in the organisation

Position	Frequency	Percentage
Professor	2	1.5%
Lecturer	20	15.2%
Graduate: Module I	24	18.2%
Graduate: Module II	29	22.0%
Undergraduate: Module I	26	19.7%
Undergraduate: Module II	31	23.4%
Total	132	100%

Source: Survey data, 2008

4.3 Analysis of Attitudes towards Videoteleconferencing (VTC)

Attitude towards Videoteleconferencing was measured on a five point likert scale. The information obtained was analysed through descriptive analysis (frequencies, means and standard deviation). A factor analysis was also undertaken to establish the factors that indicate the attitudes of the users towards Videoteleconferencing. A summation of the respondents' scores was undertaken to get the overall attitudes of users towards VTC. The overall attitudes were cross tabulated with demographic data to get the relative frequencies of joint phenomena and to determine whether attitudes had any relationship with demographic information.

4.3.1 Descriptive analysis

Frequencies, means and standard deviation of responses on attitudes towards VTC are presented in table 4.3 and table 4.4.

Responses on attitudes towards Videoteleconferencing were categorized into two, those questions that had more positive than negative responses towards VTC and those questions that had more negative than positive responses towards VTC. The categorization was based on frequencies of the response given to individual questions.

As shown in the tables, 26 out of 33 (76.5%) responses reflected positively on VTC whereas 8 out of 34 (23.5%) responses reflected negatively on VTC. This means most academic staff and students have a positive attitude towards Videoteleconferencing.

In the tables, means of responses on the questions ranged from 1.415 to 3.675. The standard deviation ranged from 0.755 to 1.323. This ranges are wide meaning that there were diverse opinions on VTC ranging from strongly agree to strongly disagree.

Table 4.3 Questions with more positive than negative responses towards VTC

	Videoteleconferencing (VTC)	Number of respondents who:-					Mean	Std Deviation
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
30.1	The use of VTC in teaching will give the University of Nairobi a better competitive advantage over the other Universities in Kenya.	88	30	9	2	1	1.446	0.758
30.2	VTC is critical in making the University of Nairobi a World class University	93	24	9	4	0	1.415	0.755
30.3	To compete globally, it is necessary for a University to incorporate VTC in	77	36	13	2	1	1.558	0.799

	Videoteleconferencing (VTC)	Number of respondents who:-					Mean	Std Deviation
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
	its teaching							
30.4	The use of VTC prepares a person to work in a networked world	65	48	13	4	0	1.662	0.783
30.5	VTC is a better mode of teaching than traditional classroom	30	37	38	18	5	2.461	1.115
30.6	The work of lecturers will be made easier with the use of VTC	39	41	31	15	3	2.240	1.081
30.7	Using VTC will enhance the capabilities of lecturers	44	40	29	9	4	2.119	1.070
30.8	The lecturers job will be enriched with the use of VTC	36	37	36	10	4	2.260	1.069
30.9	The use of multimedia and graphics in VTC enhances student understanding of what the lecturer is teaching	51	31	28	11	3	2.064	1.102
30.10	The quality of teaching may be lost with the use of VTC	33	44	22	25	6	2.438	1.194
30.11	The use of VTC will make learning ineffective since the learning material presented on the screen during a lecture may not always be clear	22	20	36	36	16	3.031	1.269
30.12	Videoteleconferencing is a tool for substituting lecturers	18	31	24	34	22	3.085	1.323
30.13	Coordination of student learning will be made difficult with the use of Videoteleconferencing.	26	25	18	35	25	3.062	1.34
30.21	The use of VTC will make teaching material more available to students	47	35	24	13	2	2.074	1.081
30.22	The amount of money spent on learning resources such as textbooks will be reduced.	42	44	18	21	2	2.189	1.118
30.23	With the use of VTC, duplication of teaching efforts by lecturers will be reduced since a lecture is taught once and it is not be repeated in different locations	25	64	23	9	5	2.246	0.985
30.24	The amount of time spent in traffic jams and travelling to class will be reduced	43	53	26	1	1	1.903	0.811
30.25	There will be less congestion in classes and lecture theatres	48	55	16	7	0	1.857	0.846
30.26	Introducing Videoteleconferencing is a waste of resources since it will not be accepted by lecturers	3	18	38	25	42	3.675	1.151
30.27	Introducing VTC is a waste of resources since it will be rejected by students	11	16	24	37	37	3.584	1.277
30.28	VTC will reduce the cost of operations at the University since less laptops will be bought for each of the campuses	15	35	38	29	8	2.84	1.110
30.29	VTC will reduce the cost of operations at the University since less projectors will be bought for each of the campuses	20	34	35	27	10	2.786	1.184
30.30	VTC will reduce the cost the University incurs when lecturers travel to teach in campuses in other towns.	29	46	38	8	6	2.339	1.048
30.33	For VTC to succeed, it must be strongly supported by top management	64	31	19	1	7	1.819	1.096
30.34	Overall, VTC enhances teaching effectiveness	45	42	35	3	1	1.992	0.898

Table 4.4 Questions with more negative than positive responses towards VTC

	Videoteleconferencing (VTC)	Number of respondents who:-					Mean	Std Deviation
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
30.14	With VTC, the opportunity for lecturers to get feedback from students through body language would be eliminated	38	46	17	25	4	2.315	1.175
30.15	Introduction of VTC may lead to loss of lecturers' intellectual property rights, this can discourage research	32	29	18	28	22	2.837	1.451
30.16	The security of students assignments sent online will be at risk	25	33	35	21	12	2.698	1.235
30.17	There may be loss of control of students with the use of videoteleconferencing, students in the remote campuses can become unruly and interrupt the lecture	21	37	31	27	13	2.798	1.234
30.18	The instructor lacks the opportunity to evaluate student understanding of the content at an instant	48	42	12	18	7	2.165	1.233
30.19	VTC is ineffective since it removes social contact between lecturers and students	26	39	33	21	7	2.556	1.156
30.20	Videoteleconferencing leads to loss of equality to students in teaching, students who physically meet the lecturer are likely to perform better than those at remote campuses	15	46	33	22	10	2.730	1.127
30.32	Most lecturers will not agree to be trained on the use of VTC since it will require extra time and effort	23	29	41	21	12	2.762	1.209

Source: Survey data, 2008

4.3.3 Factor Analysis

A factor analysis was undertaken for responses in part C of the questionnaire in order to identify the key factors that would indicate the attitudes of responses towards VTC. The principal factor analysis technique was used. To be able to extract sufficient factors from several components, factor loadings in every component were determined using Eigen values. The total variance explained by the factors extracted was determined as 77.164% as presented in table All in Appendix II. After the identification of the factors by Eigen values was made, the components and the factors were rotated using varimax with Kaiser Normalisation to determine the maximum variables in each factor matrix. The results gave the factors and the components that comprise the outlined factors. Table All in Appendix II presents the results of factor analysis. The findings were as follows:-

4.3.2.1 Factor I: Savings on resources

The questions that loaded heavily on this factor are as follows.

- i. The amount of money spent on learning resources such as textbooks will be reduced (30.22).
- ii. The amount of time spent in traffic jams and travelling to class will be reduced (30.24).
- iii. There will be less congestion in classes and lecture theatres with the use of VTC (30.25).
- iv. With the use of VTC, duplication of teaching efforts by lecturers will be reduced since a lecture is taught once and it is not repeated in different locations (30.23).
- v. VTC will reduce the cost of operations at the University since less laptops will be bought for each of the campuses (30.28).
- vi. VTC will reduce the cost of operations at the University since fewer projectors will be bought for each of the campuses (30.29).
- vii. Overall, VTC enhances teaching effectiveness (30.34).

4.3.2.2 Factor II: Quality

The central theme in the factors that loaded heavily on factor II is quality. The following are the questions that loaded heavily on factor I.

- i. The work of lecturers will be made easier with the use of VTC (30.6)
- ii. Using VTC will enhance the capabilities of lecturers (30.7)
- iii. The lecturers' job will be enriched with the use of VTC (30.8).
- iv. The use of multimedia and graphics in VTC enhances student understanding of what the lecturer is teaching (30.9).
- v. The use of VTC will make teaching material more available to students (30.21).
- vi. Overall, VTC enhances teaching effectiveness (30.34).

4.3.2.3 Factor III: Efficiency

The questions that loaded heavily on this factor are as follows.

- i. The use of VTC will make learning ineffective since the learning material presented on the screen during a lecture may not always be clear (30.11).
- ii. Coordination of student learning will be made difficult with the use of Videoteleconferencing (30.13).
- iii. The instructor lacks the opportunity to evaluate student understanding of the content at an instant (30.18)

- iv. VTC is ineffective since it removes social contact between lecturers and students (30.19)
- v. Videoteleconferencing leads to loss of equality to students in teaching, students who physically meet the lecturer are likely to perform better than those at remote campuses (30.20).

4.3.2.4 Factor IV: Control

The questions that loaded heavily on this factor are as follows.

- i. Coordination of student learning will be made difficult with the use of Videoteleconferencing (30.13).
- ii. With VTC, the opportunity for lecturers to get feedback from students through body language would be eliminated (30.14).
- iii. Introduction of VTC may lead to loss of lecturers' intellectual property rights; this can discourage research (30.15).
- iv. Introducing Videoteleconferencing is a waste of resources since it will not be accepted by lecturers (30.26).

4.3.2.5 Factor V: Performance

The questions that loaded heavily on this factor are as follows.

- i. The use of VTC in teaching will give the University of Nairobi a better competitive advantage over the other Universities in Kenya (30.1).
- ii. VTC is critical in making the University of Nairobi a World class University (30.2).
- iii. To compete globally, it is necessary for a University to incorporate VTC in its teaching (30.3).

4.3.2.6 Factor VI: Security

The questions that loaded heavily on this factor are as follows.

- i. Introduction of VTC may lead to loss of lecturers' intellectual property rights; this can discourage research (30.15).
- ii. The security of students assignments sent online will be at risk (30.16).

4.3.2.7 Factor VII: Support

The questions that loaded heavily on this factor are as follows.

- i. Without training, it will be difficult to learn skills to engage in VTC (30.31).
- ii. For VTC to succeed, it must be strongly supported by top management (30.33).

4.3.2.8 Factor VIII: Prestige

The questions that loaded heavily on this factor are as follows.

- i. To compete globally, it is necessary for a University to incorporate VTC in its teaching (30.3).
- ii. The use of VTC prepares a person to work in a networked world (30.4).
- iii. VTC is a better mode of teaching than traditional classroom (30.5).
- iv. Using VTC will enhance the capabilities of lecturers (30.7).
- v. The lecturers' job will be enriched with the use of VTC (30.8).

4.3.2.9 Factor IX: Loss of culture

The questions that loaded heavily on this factor are as follows.

- i. Videoteleconferencing is a tool for substituting lecturers (30.12).
- ii. With VTC, the opportunity for lecturers to get feedback from students through body language would be eliminated (30.14).
- iii. Introduction of VTC may lead to loss of lecturers' intellectual property rights; this can discourage research (30.15).

4.3.2.10 Factor X: Flexibility

The questions that loaded heavily on this factor are as follows.

- i. With the use of VTC, duplication of teaching efforts by lecturers will be reduced since a lecture is taught once and it is not being repeated in different locations (30.23).
- ii. The amount of time spent in traffic jams and travelling to class will be reduced (30.24).

4.3.4 Analysis of Overall Attitude

To get the overall attitude of all respondents', each respondent's attitude was calculated. This was done by awarding scores to each of the 34 questions in Part C of the questionnaire and summing them up.

For questions that were phrased in a positive direction, scores were awarded as follows, Strongly Agree = 1, Agree = 2, Neutral = 3, Disagree = 4 and Strongly Disagree = 5 and for the questions that were phrased in a negative direction, Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4 and Strongly Agree = 5.

Therefore, all positive responses had a value ranging from 1-2.5, neutral responses from 2.5 to 3 and negative responses 3-5. These values are multiplied by the number of questions to get the range in scores for the attitudes. Each respondent's score for the 34 questions in Part C was then summed up and the respondent categorized as in table 4.5.

Table 4.5 Respondents Attitude Scores

Score	Attitude
34-85	Positive
86-102	Neutral
103-170	Negative

Source: Survey data, 2008

Majority of the respondents constituting 74.2% had a positive attitude towards use of VTC in education, 25.8% of the respondents had a neutral attitude. There were no respondents with a negative attitude towards the use of VTC in teaching and learning.

Table 4.6 Summary of all Respondents Attitudes towards use of VTC

Attitude	Frequency	Percentage
Positive	95	74.2%
Neutral	33	25.8%
Negative	0	0%
Total	128	100%

Source: Survey data, 2008

4.3.4.1 Cross tabulation of Respondents VTC attitudes against Age

Positive attitudes were reflected more with the younger generation. However, it was interesting to note that the only respondent >55years had a positive attitude. This is because most people are known to reject new technology with age. Age group 18-25 had 74.3% of its respondents with positive attitude towards VTC. Age bracket 26-35 had 82.5% of its respondents with a positive attitude towards VTC, this comprised mainly of masters students most of them who work during the

day and others have families hence they would not mind attending lectures from their offices or comfort of their homes. Age bracket 36-45 had 62.5% of its respondents with a positive attitude whereas age bracket 46-55 had a very low positive attitude towards VTC, only 20% of its respondents had a positive attitude. This is presented in table 4.7. The chi-square test calculated value (X^2) was 10.037 which is greater than the critical value (p) 9.49 from the table with a probability of 0.05 and a degree of freedom of 4. This indicated that there was a significant difference in attitudes between different ages.

Table 4.7 Cross tabulation of Attitudes against Age

Age	Overall Attitude			Total
	Positive	Neutral	Negative	
18-25	74.3% (55)	25.7% (19)	0	100% (74)
26-35	82.5% (33)	17.5% (7)	0	100% (40)
36-45	62.5% (5)	37.5% (3)	0	100% (8)
46-55	20% (1)	80% (4)	0	100% (5)
>55	100% (1)	0	0	100% (1)
Total	74.2% (95)	25.8% (33)	0	100% (128)

Source: Survey data, 2008

4.3.4.2 Cross tabulation of Respondents VTC attitudes against Gender

Majority of the female respondents, 78.4% had a positive attitude towards VTC compared to 72.5% of the male respondents. This was unexpected since men tend to embrace new technology more readily than women, women are normally cautious of change. The Chi-Square value (X^2) was 0.471 which is less than the critical value (p) 3.84 for a probability of 0.05 and a degree of freedom of 1. This means there was no significant difference in attitudes between males and females.

Table 4.8 Cross tabulation of Attitudes against Gender

Gender	Overall Attitude			Total
	Positive	Neutral	Negative	
Male	72.5% (66)	27.5% (25)	0	100% (91)
Female	78.4% (29)	21.6% (8)	0	100% (37)
Total	74.2% (95)	25.8% (33)	0	100% (128)

Source: Survey data, 2008

4.3.4.3 Cross tabulation of Respondents VTC attitudes against Academic Staff and Students

Majority of students have a positive attitude towards VTC compared to academic staff. 80.4% of students are positive towards introduction of VTC in teaching and learning compared to 42.9% of academic staff. The reasons academic staff may be more reluctant to embrace VTC could be because they are older and do not have time to learn new technology as supported by statement 30.32 in the questionnaire (Appendix I) or they may see VTC as a threat to their jobs. The University of Nairobi will need to do awareness especially for academic staff and explain the importance of VTC before its introduction to prevent failure of VTC initiatives due to rejection by academic staff. The Chi-Square value (X^2) was 12.913 which is much greater than the critical value (χ^2) 3.84. This means there was a significant difference in attitudes between academic staff and students. Table 4.9 presents attitudes against position.

Table 4.9 Cross tabulation of Attitudes against Academic Staff and Students

Position	Overall Attitude			Total
	Positive	Neutral	Negative	
Staff	42.9% (9)	57.1% (12)	0	100% (21)
Student	80.4% (86)	19.6% (21)	0	100% (107)
Total	74.2% (95)	25.8% (33)	0	100% (128)

Source: Survey data, 2008

4.3.4.4 Cross tabulation of Respondents attitudes against Graduate and Undergraduate students

Majority of the graduate students had a positive attitude towards VTC, 86.3%. This could be because they have many responsibilities at work and at home and most of them attend evening classes and they therefore would not mind attending a lecture from the comfort of their homes or from their offices. 75% of the undergraduate students had a positive attitude towards VTC. The Chi-Square value (X^2) was 2.151 which is less than the critical value (χ^2) 3.84 from the table. This means there was no significant difference in attitudes between graduate and undergraduate students. Table 4.10 presents attitudes against graduate and undergraduate students.

Table 4.10 Cross tabulation of Attitudes against Graduate and Undergraduate Students

Student type	Overall Attitude			Total
	Positive	Neutral	Negative	
Graduate	86.3% (44)	13.7% (7)	0	100% (51)
Undergraduate	75% (42)	25% (14)	0	100% (56)
Total	80.4% (86)	19.6% (21)	0	100% (107)

Source: Survey data, 2008

4.3.4.5 Cross tabulation of Respondents attitudes against Module I and Module II students

Table 4.11 presents attitudes against Module I and Module II students. Module I students have a higher positive attitude towards VTC compared to Module II students (87.5% vs. 74.6 respectively). This was not expected since most Module I students reside in-campus but most Module II students live at home and have to hassle with public transport, traffic jams, unexpected increase in fare etc to attend lectures at campus. The Chi-Square value (X^2) was 2.802 which is less than the critical value (χ^2) 3.84 from the table with a probability of 0.05 and a degree of freedom of 1. This means there was no significant difference in attitudes between module I and module II students.

Table 4.11 Cross tabulation of Attitudes against Module I and Module II students

Student type	Overall Attitude			Total
	Positive	Neutral	Negative	
Module I	87.5% (42)	12.5% (6)	0	100% (48)
Module II	74.6% (44)	25.4% (15)	0	100% (59)
Total	80.4% (86)	19.6% (21)	0	100% (107)

Source: Survey data, 2008

4.4 Analysis of Readiness for VTC

The readiness of the academic staff and students at the University of Nairobi for implementation of VTC was gauged with regard to computer skills, Internet skills, computer access, Internet availability, extent of use of the Internet and ICT support. Information given by staff and students at the University of Nairobi gives the following state of readiness.

4.4.1 Skill Readiness

4.4.1.1 Possession of Computer Skills

Table 4.12 Responses to possession of computer skills

Response	Frequency	Percentage
Yes	76	58.5%
No	54	41.5%
Total	130	100%

Source: Survey data, 2008

There were 58.5% respondents with adequate computer skills. Computer skills include word processing, use of spreadsheets, graphics, and presentation packages among others. The percentage of the respondents who do not have adequate computer skills is 41.5%. Computer skills are important for staff and students to engage in VTC. Academic staff will need computer skills to prepare content in electronic form whereas students need to do their assignments

electronically. The University needs to engage in training of both staff and students on computer skills.

4.4.1.2 Cross tabulation of Computer Skills against Gender

Table 4.13 shows respondents' computer skills against gender. 65.6% of the male population indicated that they had adequate computer skills whereas only 40.5% of the female population had adequate computer skills. A larger percentage of men had adequate computer skills compared to that of women. The Chi-square calculated value (X^2) was 6.84, which is greater than the critical value ($\chi^2_{0.05, 1}$) 3.84 from the table for a probability of 0.05 and a degree of freedom of 1. This means there was significant difference in computer skills between males and females.

Table 4.13 Cross tabulation of Computer skills against Gender

Gender	Adequate Computer Skills		Total
	Yes	No	
Male	65.6% (61)	34.4% (32)	100% (93)
Female	40.5% (15)	59.5% (22)	100% (37)
Total	58.5% (76)	41.5% (54)	100% (130)

Source: Survey data, 2008

4.4.1.3 Cross tabulation of Computer Skills against Age

The older generation (over 35 years) had more respondents with adequate Computer skills compared to the young people (below 35 years). This was not expected since the younger generation is expected to accept new technology more easily than the older generation. However, the possible explanations for this unexpected occurrence are, the older generation is able to pay for personal training and the University of Nairobi has a user training programme for staff. The University needs to also focus on training students in preparation for VTC implementation. The Chi-square calculated value was 3.849, which is much less than the critical value 9.49 from the table with a probability of 0.05 and a degree of freedom of 4. This means there was no significant difference in computer skills between the various age brackets.

Table 4.14 Cross tabulation of Computer skills against Age

Age	Adequate Computer Skills		Total
	Yes	No	
18-25	60.8% (45)	39.2% (29)	100% (74)
26-35	48.8% (20)	51.2% (21)	100% (41)
36-45	77.8% (7)	22.2% (2)	100% (9)
46-55	60% (3)	40% (2)	100% (5)
55	100% (1)	0	100% (1)
Total	58.5% (76)	41.5% (54)	100% (130)

Source: Survey data, 2008

4.4.1.4 Cross tabulation of Computer Skills against Academic Staff and Students

More lecturers than students have adequate computer skills, 72.7% of academic staff compared to 55.5% of the students. This could be because of the training that the University carries out on staff for computer skills. The University should also plan to carry out training for students to equip them with computer skills. The Chi-square calculated value (X^2) was 2.219, which is less than the critical value (χ^2) 3.84 from the table with a probability of 0.05 and a degree of freedom of 1. This means there was no significant difference in computer skills between academic staff and students.

Table 4.15 Cross tabulation of Computer skills against Academic Staff and Students

Position	Adequate Computer Skills		Total
	Yes	No	
Staff	72.7% (16)	27.3% (6)	100% (22)
Students	55.5% (60)	44.5% (48)	100% (108)
Total	58.5% (76)	41.5% (54)	100% (130)

Source: Survey data, 2008

4.4.1.5 Possession of Internet skills

Table 4.16 Responses to possession of Internet skills

Response	Frequency	Percentage
Yes	120	91.6%
No	11	8.4%
Total	131	100%

Source: Survey data, 2008

It would have been expected that the number of those with adequate Internet skills would equal those with adequate computer skills. However, the results in table 4.16 show that 91.6% of the respondents had adequate Internet skills whereas table 4.12 showed that only 58.5% of respondents had adequate computer skills. This is due to the fact that surfing the Net does not require complex skills, a little exposure to the Internet is enough to attain required skills. Therefore, a greater percentage of respondents have adequate Internet skills than those with adequate computer skills.

4.4.1.6 Cross tabulation of Internet skills against Age

Table 4.17 Cross tabulation of Internet skills against Age

Age	Adequate Internet Skills		Total
	Yes	No	
18-25	92% (69)	8% (6)	100% (75)
26-35	87.8% (36)	12.2% (5)	100% (41)
36-45	100% (9)	0	100% (9)
46-55	100% (5)	0	100% (5)
55	100% (1)	0	100% (1)
Total	91.6% (120)	8.4% (11)	100% (131)

Source: Survey data, 2008

Table 4.17 shows respondents Internet skills against respondents' age-bracket. Age category 26-35 had the highest number of those without adequate Internet skills; this consisted of 12.2% of the respondents in that category. It was followed by age group 18-25 that had 8% of its respondents

without adequate Internet skills. It was surprising to find out that those in the older generation (over 35 years) had no problem with Internet skills. The Chi-square calculated value (X^2) was 2.159, which is much less than the critical value (P) 9.49 from the table with a probability of 0.05 and a degree of freedom of 4. This means there was no significant difference in Internet skills between the various age brackets.

4.4.1.7 Cross tabulation of Internet Skills against Gender

More men had adequate computer skills compared to women (table 4.18). However, both categories have high levels of respondents with Internet skill, 91.5% of men and 91.9% of women. Table 4.23 presents respondents Internet skills against their gender. The Chi-square calculated value (X^2) was 0.006, which is much less than the critical value (P) 3.84 from the table, with a probability of 0.05 and a degree of freedom of 1. This means there was no significant difference in Internet skills between males and females..

Table 4.18 Cross tabulation of Internet skills against Gender

Gender	Adequate Internet Skills		Total
	Yes	No	
Male	91.5% (86)	8.5% (8)	100% (94)
Female	91.9% (34)	8.1% (3)	100% (37)
Total	91.6% (120)	8.4% (11)	100% (131)

Source: Survey data, 2008

4.4.1.8 Cross tabulation of Internet skills against Academic Staff and Students

Table 4.19 Cross tabulation of Internet skills against Academic Staff and Students

Position	Adequate Internet Skills			Total
	Yes	No		
Staff	100% (22)	0% (0)		100% (22)
Students	89.9% (98)	10.1% (11)		82.6% (109)
Total	91.6% (120)	8.4% (11)		100% (131)

Source: Survey data, 2008

Table 4.19 shows the cross tabulation of respondents position against Internet skills. All academic staff had adequate Internet skills. 89.9% of the students also had adequate Internet skills but 10.1% did not. Both categories have a very high level of Internet skills. This is because it is very easy to learn how to surf the Internet if given a brief demonstration. The Chi-square calculated value (X^2) was 2.424, which is much less than the critical value (P) 3.84 from the table, with a probability of 0.05 and a degree of freedom of 1. This means there was no significant difference in Internet skills between academic staff and students.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECCOMENDATIONS

5.1 Introduction

The findings of this research confirm that videoconferencing is a technology that members of academic institutions can accept to use in teaching and learning. Most staff and students at the University of Nairobi had positive attitudes towards this technology.

5.2 Summary

This research sought to establish the attitudes and readiness of academic staff and students for Videoteleconferencing. A case study of the University of Nairobi was taken and data was collected from the School of Business and School of Education. The survey data collected was analyzed through descriptive analysis (frequencies, percentages, means), cross tabulations, factor analysis and chi-square tests.

Chi-square tests are useful in determining the relationship between various variables under investigation. It was necessary to identify the association between attitudes with respect to the demographic factors of the respondents like age, gender, staff or student, undergraduate or graduate, module I or module II students and level of skills. The results showed that most of the responses were significantly associated with age and staff or students. However, there was no significant association between attitudes and gender or type of student.

The factors that staff and students consider before they accept VTC as investigated in this study are performance, quality of education, efficiency, savings on the part of students, control of students, security of academic material and top management support.

The research was able to establish that academic staff and students believed that Videoteleconferencing technology can lead to savings of time used to travel to and from class, time spent stuck in traffic jams and money spent on learning resources.

The research also established that there are factors that should be considered for this technology to succeed. The quality of education should not be compromised, the service delivery should be efficient and lecturers should not lose control of the students they teach.

The findings indicated that 74.2% of the respondents had a positive attitude towards Videoteleconferencing. The majority were students who formed 78.1% whereas academic staff formed 41%. There is need to establish the reasons academic staff were not as enthusiastic to adopt this technology compared to students. This also means that an aggressive awareness campaign on the importance of VTC in education should be done for academic staff.

Most staff and students feel they have adequate Internet skills (91.6%) but average computer skills (58.5%) to engage in VTC. It is important to note that users of Videoteleconferencing technology will need Computer and Internet skills to be able to enjoy the full benefits of this technology. Even though lecturers can still teach using chalk and board, use of power points is encouraged to enable students download the notes immediately after or even before the lecture. Fast Internet speeds will also be required to ensure all these services are efficient.

5.3 Recommendations

This research focused on the attitudes of teaching staff and students towards Videoteleconferencing technology. However, there are some staff at the University who will be involved in the implementation and running of this technology such as the ICT personnel and administrators.

A study needs to be conducted that involves more members of the University population in various administrative positions such as, University Finance Officer to help determine availability of funds to purchase Videoteleconferencing equipment and implement this technology, the Director, ICT and other ICT personnel to help determine the technical requirements of the Videoteleconferencing equipment and to gauge the readiness of the University in terms of Infrastructure and Internet speeds.

A broader study can also be conducted to look at the ICT infrastructure in Kenya and if the country is ready to adopt VTC in its education system.

5.4 Limitations of the Study

During the course of the study, a number of limitations were observed. There was time constraint which made it not possible to obtain responses from some target respondents like Professors and senior lectures.

Application of VTC in education seemed to be unknown especially by academic staff and some of the students hence the response given by the respondents may not reflect how well the respondents understood the questions.

5.5 Conclusion

It is hoped that this study will play a key role in providing useful insight to academic institutions and the Government of Kenya into the advantages that Videoteleconferencing technology can positively impact education. However, because of the sampling location, the findings of this research should be treated as indicative rather than conclusive of the attitudes and readiness of academic staff and students to adopt use of Videoteleconferencing technology in teaching and learning.

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APPENDICES

Appendix I: Descriptive Statistics

	Videoteleconferencing (VTC)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std Deviation
30.1	The use of VTC in teaching will give the University of Nairobi a better competitive advantage over the other Universities in Kenya.	88	30	9	2	1	1.446	0.758
30.2	VTC is critical in making the University of Nairobi a World class University	93	24	9	4	0	1.415	0.755
30.3	To compete globally, it is necessary for a University to incorporate VTC in its teaching	77	36	13	2	1	1.558	0.799
30.4	The use of VTC prepares a person to work in a networked world	65	48	13	4	0	1.662	0.783
30.5	VTC is a better mode of teaching than traditional classroom	30	37	38	18	5	2.461	1.115
30.6	The work of lecturers will be made easier with the use of VTC	39	41	31	15	3	2.240	1.081
30.7	Using VTC will enhance the capabilities of lecturers	44	40	29	9	4	2.119	1.070
30.8	The lecturers job will be enriched with the use of VTC	36	37	36	10	4	2.260	1.069
30.9	The use of multimedia and graphics in VTC enhances student understanding of what the lecturer is teaching	51	31	28	11	3	2.064	1.102
30.10	The quality of teaching may be lost with the use of VTC	33	44	22	25	6	2.438	1.194
30.11	The use of VTC will make learning ineffective since the learning material presented on the screen during a lecture may not always be clear	22	20	36	36	16	3.031	1.269
30.12	Videoteleconferencing is a tool for substituting lecturers	18	31	24	34	22	3.085	1.323
30.13	Coordination of student learning will be made difficult with the use of videoteleconferencing.	26	25	18	35	25	3.062	1.34
30.14	With VTC, the opportunity for lecturers to get feedback from students through body language would be eliminated	38	46	17	25	4	2.315	1.175
30.15	Introduction of VTC may lead to loss of lecturers' intellectual property rights, this can discourage research	32	29	18	28	22	2.837	1.451
30.16	The security of students assignments sent online will be at risk	25	33	35	21	12	2.698	1.235
30.17	There may be loss of control of students with the use of videoteleconferencing, students in the remote campuses can become unruly and interrupt the lecture	21	37	31	27	13	2.798	1.234
30.18	The instructor lacks the opportunity to evaluate student understanding of the content at an instant	48	42	12	18	7	2.165	1.233
30.19	VTC is ineffective since it removes social contact between lecturers and students	26	39	33	21	7	2.556	1.156
30.20	Videoteleconferencing leads to loss of equality to students in teaching, students who physically meet the lecturer are likely to perform better than those at remote campuses	15	46	33	22	10	2.730	1.127
30.21	The use of VTC will make teaching material more available to students	47	35	24	13	2	2.074	1.081
30.22	The amount of money spent on learning resources such as textbooks will be reduced.	42	44	18	21	2	2.189	1.118
30.23	With the use of VTC, duplication of teaching efforts by lecturers will be reduced since a lecture is taught once and it is not be repeated in	25	64	23	9	5	2.246	0.985

	Videoteleconferencing (VTC)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std Deviation
	different locations							
30.24	The amount of time spent in traffic jams and travelling to class will be reduced	43	53	26	1	1	1.903	0.811
30.25	There will be less congestion in classes and lecture theatres with the use of VTC	48	55	16	7	0	1.857	0.846
30.26	Introducing videoteleconferencing is a waste of resources since it will not be accepted by lecturers	3	18	38	25	42	3.675	1.151
30.27	Introducing VTC is a waste of resources since it will be rejected by students	11	16	24	37	37	3.584	1.277
30.28	VTC will reduce the cost of operations at the University since less laptops will be bought for each of the campuses	15	35	38	29	8	2.84	1.110
30.29	VTC will reduce the cost of operations at the University since less projectors will be bought for each of the campuses	20	34	35	27	10	2.786	1.184
30.30	VTC will reduce the cost the University incurs when lecturers travel to teach in campuses in other towns.	29	46	38	8	6	2.339	1.048
30.31	Without training, it will be difficult to learn skills to engage in VTC	56	46	5	8	6	1.859	1.098
30.32	Most lecturers will not agree to be trained on the use of VTC since it will require extra time and effort	23	29	41	21	12	2.762	1.209
30.33	For VTC to succeed, it must be strongly supported by top management	64	31	19	1	7	1.819	1.096
30.34	Overall, VTC enhances teaching effectiveness	45	42	35	3	1	1.992	0.898

Table A1: Descriptive Statistics

Appendix II: Factor Analysis (Total Variance explained)

Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.138	20.394	20.394	7.138	20.394	20.394	4.264	12.182	12.18
2	5.462	15.605	35.999	5.462	15.605	35.999	3.682	10.520	22.70
3	3.485	9.958	45.957	3.485	9.958	45.957	3.114	8.897	31.60
4	2.193	6.264	52.221	2.193	6.264	52.221	3.014	8.612	40.21
5	2.119	6.055	58.276	2.119	6.055	58.276	2.981	8.518	48.73
6	1.671	4.774	63.051	1.671	4.774	63.051	2.563	7.323	56.05
7	1.544	4.411	67.462	1.544	4.411	67.462	2.281	6.517	62.56
8	1.276	3.645	71.107	1.276	3.645	71.107	1.994	5.696	68.26
9	1.098	3.137	74.245	1.098	3.137	74.245	1.823	5.210	73.47
10	1.022	2.919	77.164	1.022	2.919	77.164	1.291	3.689	77.16
11	.974	2.783	79.947						
12	.867	2.477	82.424						
13	.713	2.038	84.462						
14	.668	1.907	86.369						
15	.576	1.645	88.014						
16	.503	1.437	89.451						
17	.436	1.244	90.696						
18	.422	1.207	91.902						
19	.365	1.044	92.946						
20	.307	.877	93.823						
21	.292	.834	94.657						
22	.264	.753	95.411						
23	.234	.669	96.080						
24	.224	.640	96.720						
25	.206	.589	97.309						
26	.203	.579	97.888						
27	.147	.419	98.307						
28	.130	.371	98.678						
29	.113	.322	99.001						
30	.097	.276	99.276						
31	.075	.213	99.489						
32	.066	.187	99.677						
33	.056	.161	99.837						
34	.034	.097	99.934						

Extraction Method: Principal Component Analysis.

Table All: Total variance explained

Appendix III: Letter to the Respondent

University of Nairobi,
School of Business,
P.O. Box 30197,
Nairobi.

Dear Sir/Madam,

**RE: AN INVESTIGATION INTO VIDEOTELECONFERENCING (VTC) ADOPTION IN HIGHER
EDUCATION IN KENYA**

I am a postgraduate student undertaking a Master of Business Administration Degree at the School of Business, University of Nairobi. I am currently carrying out a research on adoption of videoteleconferencing technology in Higher Education in Kenya.

My objective is to study the perception and readiness of academic staff and students towards integration of videoteleconferencing technology in teaching and learning through a survey and to find out the VTC readiness factors by reviewing literature and carrying out site visits.

A case study of the University of Nairobi's academic staff and students will be carried out to find out the perception and readiness of staff and students towards adoption of VTC. My approach to this study involves filling of questionnaires by academic staff and students at the University of Nairobi.

I kindly request you to provide me with the information I require. The information required is strictly for academic purposes and will be treated with confidentiality.

Thanking you in advance, I remain

Yours Faithfully,

Mogikoyo Nancy K.

D61/7676/2006

Appendix IV: Questionnaire

This questionnaire is designed to gather information for a research which seeks to establish the perception and readiness of the University of Nairobi's academic staff and students towards the use of Videoteleconferencing (VTC) technology in teaching and learning.

Videoteleconferencing is a form of Electronic Learning (E-learning) that employs use of computers, the Internet and telecommunications networks to enable students in remote campuses/locations to attend a live lecture by a lecturer who is in another location. The student can attend the lecture from a remote campus, office or home.

Completion of this questionnaire is voluntary and all responses will remain confidential.

PART A: General Demographic Data

1. Name of College _____

2. Name of Campus _____

3. What is your gender?

Male

Female

4. What is your age?

18-25

26-35

36-45

46-55

>55

5. What is your highest level of education?

PhD Masters Undergraduate

6. Are you staff or student?

Staff Student

7. If staff, what title do you hold at the University?

Professor Senior Lecturer Lecturer

8. If student,

8.1 Are you a graduate or undergraduate student?

Graduate Undergraduate

8.2 Are you a module I or module II student?

Module I Module II

PART B: General Questions

Computer and Internet access, Computer and Internet skills and ICT Support at UoN

9 Are you readily accessible to a Computer at the University? Yes () No ()

If No, why _____

10 Is the computer connected to the Internet? Yes () No () N/A ()

11 Do you have a personal computer or a laptop at home or in the hostel? Yes () No ()

12 Do you have off-campus access to the Internet? Yes () No ()

13 Would you be willing to pay for connection in order to attend a lecture from home? Yes () No ()

14 Do you have adequate skills to browse the Internet? Yes () No ()

15 Where do you usually surf the Internet?

<input type="checkbox"/> At the University	<input type="checkbox"/> At Home	<input type="checkbox"/> At a Cyber	<input type="checkbox"/> Other. Specify? _____
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16 How often do you surf the Internet?

<input type="checkbox"/> Daily	<input type="checkbox"/> Once per week	<input type="checkbox"/> Once per month	<input type="checkbox"/> Never
--------------------------------	--	---	--------------------------------

17 Do the Internet speeds at the University slow down or frustrate you? Yes () No () I don't know ()

18 Do you feel you have adequate knowledge on word processing, spreadsheets, databases, graphics etc
Yes () No ()

19 Do you have a University of Nairobi email address? Yes () No ()

20 Are you able to send notes or learning material using your University of Nairobi email address? Yes () No ()

21 Do you at times use your personal email address for official communication to lecturers or students on matters pertaining learning e.g. assignments, notes etc? Yes () No ()

If yes, why _____

22 How would you classify the failures per week of your campus Internet services?

<input type="checkbox"/> Always works	<input type="checkbox"/> 1-5 times	<input type="checkbox"/> > 5 times	<input type="checkbox"/> I don't know
---------------------------------------	------------------------------------	------------------------------------	---------------------------------------

23 What is the frequency of failure of the computer you use in the laboratory or office?

<input type="checkbox"/> Daily	<input type="checkbox"/> Once per week	<input type="checkbox"/> Once per month	<input type="checkbox"/> Hardly	<input type="checkbox"/> I don't know
--------------------------------	--	---	---------------------------------	---------------------------------------

24 Do you call the helpdesk/user support in your campus when there's failure? Yes () No () N/A ()

25 When there is a failure, how long does it take to fix the fault failure?

<input type="checkbox"/> < 1 hour	<input type="checkbox"/> 1-5 hrs	<input type="checkbox"/> 6-12 hrs	<input type="checkbox"/> 1-2 days	<input type="checkbox"/> >2 days	<input type="checkbox"/> I don't know
-----------------------------------	----------------------------------	-----------------------------------	-----------------------------------	----------------------------------	---------------------------------------

26 Which is the most common type of computer failure?

Unable to log in No Internet Unable to load applications Viruses Computer is dead N/A

27 How often do you experience power failure?

<input type="checkbox"/> Once a day	<input type="checkbox"/> At least once per week	<input type="checkbox"/> At least once per month	<input type="checkbox"/> Never	<input type="checkbox"/> I don't know
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PART C: Questions that pertain to the primary objective of this study, Videoteleconferencing

28 Have you ever heard of videoteleconferencing?

Yes () No () If yes, how: _____

29 Has the University or your department sensitised you on use and importance of videoteleconferencing technology in learning? Yes () No () If yes, explain how: _____

30 Please indicate your level of agreement with the following statements.

	Videoteleconferencing (VTC)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
30.1	The use of VTC in teaching will give the University of Nairobi a better competitive advantage over the other Universities in Kenya.					
30.2	VTC is critical in making the University of Nairobi a World class University					
30.3	To compete globally, it is necessary for a University to incorporate VTC in its teaching					
30.4	The use of VTC prepares a person to work in a networked world					
30.5	VTC is a better mode of teaching than traditional classroom					
30.6	The work of lecturers will be made easier with the use of VTC					
30.7	Using VTC will enhance the capabilities of lecturers					
30.8	The lecturers job will be enriched with the use of VTC					
30.9	The use of multimedia and graphics in VTC enhances student understanding of what the lecturer is teaching					
30.10	The quality of teaching may be lost with the use of VTC					
30.11	The use of VTC will make learning ineffective since the learning material presented on the screen during a lecture may not always be clear					
30.12	Videoteleconferencing is a tool for substituting lecturers					
30.13	Coordination of student learning will be made difficult with the use of videoteleconferencing.					
30.14	With VTC, the opportunity for lecturers to get feedback from students through body language would be eliminated					
30.15	Introduction of VTC may lead to loss of lecturers' intellectual property rights, this can discourage research					
30.16	The security of students assignments sent online will be at risk					
30.17	There may be loss of control of students with the use of videoteleconferencing, students in the remote campuses can become unruly and interrupt the lecture					

	Videoteleconferencing (VTC)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
30.18	The instructor lacks the opportunity to evaluate student understanding of the content at an instant					
30.19	VTC is ineffective since it removes social contact between lecturers and students					
30.20	Videoteleconferencing leads to loss of equality to students in teaching, students who physically meet the lecturer are likely to perform better than those at remote campuses					
30.21	The use of VTC will make teaching material more available to students					
30.22	The amount of money spent on learning resources such as textbooks will be reduced.					
30.23	With the use of VTC, duplication of teaching efforts by lecturers will be reduced since a lecture is taught once and it is not repeated in different locations					
30.24	The amount of time spent in traffic jams and travelling to class will be reduced					
30.25	There will be less congestion in classes and lecture theatres with the use of VTC					
30.26	Introducing videoteleconferencing is a waste of resources since it will not be accepted by lecturers					
30.27	Introducing VTC is a waste of resources since it will be rejected by students					
30.28	VTC will reduce the cost of operations at the University since less laptops will be bought for each of the campuses					
30.29	VTC will reduce the cost of operations at the University since less projectors will be bought for each of the campuses					
30.30	VTC will reduce the cost the University incurs when lecturers travel to teach in campuses in other towns.					
30.31	Without training, it will be difficult to learn skills to engage in VTC					
30.32	Most lecturers will not agree to be trained on the use of VTC since it will require extra time and effort					
30.33	For VTC to succeed, it must be strongly supported by top management					
30.34	Overall, VTC enhances teaching effectiveness					

Thank you for taking the time to complete this survey. The results of this survey will be available in November 2008. Please provide you e-mail address. _____

For a full report

For a summary