Assessing the e-readiness for video-teleconferencing adoption and its perceived impacts in higher education in Kenya

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Full Length Research Paper

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Accepted 23rd April, 2013

This paper presents an investigation of the readiness of academic staff and students towards the use of videoconferencing (VTC) in teaching and learning. The aim is to shed some light on why Electronic learning initiatives have not succeeded in academic institutions in Kenya. E-readiness was measured by evaluating human readiness and institution readiness. Human readiness was gauged by evaluating the skills, attitudes and perception of the people to be involved in VTC whereas Institution readiness was measured by evaluating the infrastructure, technology, course content, availability of human resources and availability of finances to implement VTC. It was discovered that the factors that staff and students would consider before they accept VTC as investigated in this study are performance, quality of education, efficiency, financial savings, control of students, security of academic material and top management support. The main contribution of this paper lies in highlighting the fact that the implementation of videoconferencing in education will be shaped by how its impacts are perceived by both the learners and lecturers.

Key words: Perception, attitudes, e-readiness, video-teleconferencing, human readiness, institution readiness, metal readiness, skill readiness, infrastructure readiness, technology readiness, content readiness, financial readiness

INTRODUCTION

This paper explores mental and skill readiness of academic staff and students in Universities in Kenya towards the use of Videoconferencing technology in learning. In Kenya, Fixed traditional learning facilities are over-stretched and 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 students and academic institutions face (Tinio, 2002). There is also the need to reach the unprivileged communities (Anding, 2009).

The need to overcome these constraints and meet the growing demand for education, means understanding the impediments to application of ICT enabled learning systems has become essential for ability to meet higher education market needs. Video-teleconferencing removes space and time barriers (Powell, 2009).

This paper presents the findings of a case study aimed at capturing the perceptions and readiness of stakeholders (academic staff and students) towards the use of VTC in learning. The study had two main constructs:

1. The perception and readiness for video-teleconferencing and
2. The expected impacts of video-teleconferencing.

The overall goal of the paper is to explore the relationship between video-teleconferencing perception/readiness and its impacts in teaching and learning. The schematic diagram below (Figure 1) captures the envisaged relationships of video-teleconferencing views and impacts.

An analysis was undertaken on the two constructs of perception and impacts of video-teleconferencing to achieve the following objectives:

- Identification of factors that lead to acceptance of VTC technology in teaching and learning.
- The perceived impacts of video-teleconferencing which will explain acceptance or rejection in learning.
The contribution of this paper is thus two-fold. Firstly, it proposes an explanatory model that links expected impacts as a result of how video-teleconferencing is perceived by staff and students. The implications may be critical in ensuring success of video-teleconferencing projects in education, especially given that Electronic learning initiatives have not succeeded (Wagner et al., 2008).

The success of video-teleconferencing initiatives should be partly hinged on the nature of this relationship between expected impacts and perception since the knowledge will help in illuminating the phenomenon of video-teleconferencing as a technology artifact. Thus the postulation of the expected impacts has implications in terms of how, as a concept, video-teleconferencing is operationalized by the implementers. It is felt that the main contribution of this paper lies indeed in highlighting the fact that the implementation of VTC technologies in academic institutions of higher education is shaped by how their impacts are perceived or at least that there is a strong correlation between the perception and the (expected) impacts. Thus management of academic institutions, purveyors of the technologies and researchers can be made aware that, because of the very different expectations, VTC initiatives may succeed or fail.

A second contribution is that this paper provides empirically derived factors which correlate how video-teleconferencing is perceived with expected video-teleconferencing impacts. The factors are based on a case study carried out at the University of Nairobi where questionnaires were distributed to members of academic staff and students of the University of Nairobi from the School of Business and the School of Education. Hence, because of the sampling location, the findings of this research should be treated as indicative rather than conclusive.

**Background and informing literature**

**Brief history of distance education and electronic learning in Kenya**

Kenya has seen a steadfast increase in the number of institutions of higher learning from one (The Royal Technical College of East Africa, now called The University of Nairobi) in 1956 to many public and private universities.

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

At Kenyatta University (KU), The School of Continuing Education which started in August 1998 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 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, 2008).

The African Virtual University (AVU) started in 1997. It 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. At AVU, courses are transmitted via satellite from universities in Canada, Europe and the USA (Juma, 2008).

Strathmore University has an active E-learning platform and has implemented blended learning. Blended learning combines traditional classroom practice with e-learning solutions (Omwenga, 2003). Egerton University launched their E-learning platform in January 2010. Most Universities in Kenya have ongoing E-learning initiatives.

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

**Electronic learning and synchronous 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. 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 lastly, there is synchronous learning which involves time with a live instructor teaching via the Internet (Obringer, 2001).

Synchronous learning mainly covers teleconferencing and video-teleconferencing. It involves time with a live instructor teaching via the Internet or even two-way live broadcasts to students in a classroom (Powell, 2009). These technologies make use of telephones, computers and the Internet for delivery, interaction and facilitation of learning. A videoconference also known as a video-teleconference 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 (Wolfe, 2007). Although learners love the convenience of online learning, videoconferencing eliminates the isolation factor and provides an engaging environment that allows users to remain at their offices or home (Powell, 2009).

E-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. 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, availability of human resources and funds etc 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 paper VTC readiness shall be defined as the human and institutions preparedness for Video-teleconferencing.

This paper presents both staff and students attitudes towards VTC. Attitudes play an important role in predicting behavior, (Tull and Hawkins, 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. Human readiness is gauged by skills, attitudes and perception of the people to be involved in VTC whereas Institution readiness is gauged by factors such as infrastructure, technology, content readiness, availability of human resources and availability of finances.

Human readiness
All new ICTs and ISs bring a range of associated changes with them that involve people and it is the people in the organization who are pivotal to the success of any ICT and IS implementation. Therefore, no matter how well designed or planned implementation of a new system is, only with proper consideration of the "human issues" will the system succeed (Cadie and Yeates, 2004).

Implementation of Video-teleconferencing 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". In looking at human readiness, both mental and skill readiness are gauged.

Instructor and learner perception (mental readiness)
Mueller (2006) describes attitude and/or perception as
the total sum of a man's inclinations, feelings, prejudice, bias, preconceived notions, ideas, threats and convictions about a specified topic or an object. Tull and Hawkins, (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 and Hawkins, (1993) further states that the importance of studying attitudes is due to the fact 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 that VTC is the way to go, they will work on completing tasks like preparing content. Lastly, due to their positions in authority, teachers and instructors have been to shape students opinions, this impacts on the students' abilities and willingness to act. The student who is encouraged to perform will outperform those who are taught they cannot perform (Kolensik, 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.

**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 Video-teleconferencing 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.

**Institution readiness**

This has been used to refer to the availability of Infrastructure (space, computers and the Internet), technology, course content in the appropriate format, human resources (technical support and facilitators) and finances to set up and run this technology.

**Infrastructure and technology readiness**

Video-teleconferencing just like any other form of e-learning is made possible through technological systems. An institution can assess its E-readiness in terms of technology by determining the availability of computers, ease to access computers and the Internet and if speed of the Internet connection is appropriate for the technology, availability of appropriate servers for archiving course content and lecture room acoustics. Institutions should also determine whether the weather system maintenance and support is adequate and availability of VTC equipment.

Video-teleconferencing infrastructure consists of video cameras, Internet connection, and dual plasma display system. The core technology used in a video-teleconference (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.

However, basic equipment for a Video-teleconference 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).

**Content readiness**

Content is the driving engine of Video-teleconferencing 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 Video-teleconferencing.
Kearsley (1985) notes that all course content can be delivered online through Electronic Learning.

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.

**Technical expertise, human resource and training**

Technical expertise is 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 Video-teleconferencing 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. Training is required for instructors, students, facilitators and technical personnel. 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.

**Financial readiness**

This looks at the cost of the equipment that is required for Video-teleconferencing 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.

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.

**Benefits of video-teleconferencing (VTC)**

VTC reduces the cost of education through economies of scale because education reaches a wider population with the same fixed costs compared to 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 (Arnfield, 2010). VTC saves on costs associated with purchase of ICT equipment like laptops and projectors and also saves on duplication of teaching efforts, lecturers 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). Employers too are saving on costs, they save on travel costs alone by delivering via videoconferencing. VTC causes maximum reach with minimal disruption to operations (Powell, 2009). Return-on-investment (ROI) can be determined by calculating travel savings, time lost during travel, effect on turnover rate, frequency of training, performance impact, and faster time in training development and delivery.

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 student’s 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 (Tinio, 2002). Anyone can get access to education anywhere anytime, 365days, 24 hrs a day (Omwenga, 2003).

VTC will increase enrollment in Universities since its use can allow colleges to adopt a re-structured semester system. They can increase to six semesters in a year from two semesters (Lueddeke, 1997).

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

Electronic learning equalizes students (Tinio, 2002). 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.

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 (Getter, 2008).

**Challenges likely to be faced in VTC implementation**

Learning through video-teleconferencing 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 (Sullivan, 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 (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 computers and setting up laboratories, employing technical staff and facilitators to assist lecturers and 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 video-teleconferencing implementation (Powell, 2009). Most institutions of higher education especially public Institutions may not be able to attract and retain qualified technical experts due to limited resources (Watkins et al., 2003).

In video-teleconferencing 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 in line with the curriculum (Omwenga, 2003).

VTC can lead to social problems. People who spend a lot of 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 (Obringer, 2001). Lecturers might also develop favorites thus making the rest of the learners withdraw from participating. 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 (K. Laudon and J. 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 on the associated costs leading to lack of implementation or failure due to lack of proper planning by the decision makers (Omwenga, 2003).

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, 2003).

The future of video-teleconferencing (VTC) in education

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

Laying of the 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 reliable, this will lead to growth in usage of VTC in education.

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, anyplace 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 (Sharples et al., 2007).

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/intranet servers and network
management software, TCP/IP Internet networking products, and network security fire walls are some of the technologies that are being applied in Internet and Intranet applications for e-commerce, e-learning and collaborations (Arntfield, 2010).

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

METHODOLOGY

Empirical data was collected from academic staff and students on their perceptions and readiness towards the use of video-teleconferencing technology in education. Their readiness was assessed in terms attitudes, computer skills and Internet skills, computer availability, Internet availability, Internet access and extent of use of ICT equipment.

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. 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).

Purposive sampling technique was used since the School of Business has affiliate campuses in Kisumu and Mombasa whereas the School of Education has extramural centers in several towns such as Nairobi, Mombasa, Nakuru, Kisumu, Nyeri among others.

There were 165 questionnaires that were administered. 80% of these questionnaires (132 questionnaires) were received back and used in the analysis. 20% of the questionnaires issued were not returned by the respondents. Out of the ones received back, 22 (13.4%) were from academic staff and 66.6% were from students. Out of the 132 respondents, only 128 (97%) responded on the section that covered attitudes, 3% were blank and could not be analyzed for attitudes.

ANALYSIS AND FINDINGS

The data collected was analyzed through descriptive analysis (frequencies, percentages, means), cross tabulations, factor analysis and chi-square tests. Chi-square tests were useful in determining the relationship between various variables under investigation.

A factor analysis was undertaken for responses 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%. Identification of the factors by Eigen values was made then the components and the factors were rotated using Varimax with Kaiser Normalisation to determine the maximum variables in each factor matrix. This resulted to 10 factors as follows:-

Factor I: Savings on resources

The central theme in the variables that loaded heavily on factor I is Savings. The variables are; The amount of money spent on learning resources such as textbooks will be reduced (76%); The amount of time spent in traffic jams and travelling to class will be reduced (62%); There will be less congestion in classes and lecture theatres with the use of VTC (76%); VTC, will reduce duplication of teaching efforts by lecturers (77%); VTC will reduce the cost of operations at the University since less laptops will be bought for each of the campuses (85%); VTC will reduce the cost of operations at the University since fewer projectors will be bought for each of the campuses (83%) and Overall, VTC enhances teaching effectiveness (84%).

Factor II: Quality

The central theme in the variables that loaded heavily on factor II is Quality. These are; The work of lecturers will be made easier with the use of VTC (74%); Using VTC will enhance the capabilities of lecturers (66%); The lecturers’ job will be enriched with the use of VTC (82%); The use of multimedia and graphics in VTC enhances student understanding of what the lecturer is teaching (83%); The use of VTC will make teaching material more available to students (80%) and Overall, VTC enhances teaching effectiveness (84%).

Factor III: Efficiency and Effectiveness

The variables that loaded heavily on this factor are; The use of VTC will make learning ineffective since the learning material presented on the screen during a lecture may not always be clear (80%); Coordination of student learning will be made difficult with the use of Video-teleconferencing (79%); The instructor lacks the opportunity to evaluate student understanding of the content at an instant (79%); VTC is ineffective since it removes social contact between lecturers and students (85%); VTC 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 (76%).

Factor IV: Control by lecturers

The variables that loaded heavily on this factor are, coordination of student learning will be made difficult with the use of Video-teleconferencing (79%); VTC will eliminate the opportunity for lecturers to get feedback from students through body language (75%); Introduction of VTC may lead to loss of lecturers’ intellectual property rights, this can discourage research (75%) and introducing VTC is a waste of resources since it will not
be accepted by lecturers (82%).

**Factor V: World class performance**
The variables that loaded heavily on this factor are, the use of VTC in teaching will give the University of Nairobi a better competitive advantage over the other Universities in Kenya (78%); VTC is critical in making the University of Nairobi a World class University (81%) and To compete globally, it is necessary for a University to incorporate VTC in its teaching (82%).

**Factor VI: Security**
The variables that loaded heavily on this factor are; Introduction of VTC may lead to loss of lecturers' intellectual property rights, this can discourage research (75%) and the security of students assignments sent online will be at risk (74%).

**Factor VII: Training and top management support**
The variables that loaded heavily on this factor are; Without training, it will be difficult to learn skills to engage in VTC (82%) and For VTC to succeed, it must be strongly supported by top management (85%).

**Factor VIII: Prestige**
The variables that loaded heavily on this factor are; To compete globally, it is necessary for a University to incorporate VTC in its teaching (82%); The use of VTC prepares a person to work in a networked world (63%); VTC is a better mode of teaching than traditional classroom (72%); Using VTC will enhance the capabilities of lecturers (66%) and Lecturers' job will be enriched with the use of VTC (82%).

**Factor IX: Loss of culture**
The variables that loaded heavily on this factor are; Video-teleconferencing is a tool for substituting lecturers (68%); VTC, eliminates the opportunity for lecturers to get feedback from students through body language (75%) and Introduction of VTC may lead to loss of lecturers' intellectual property rights, this can discourage research (75%).

**Factor X: Cost cutting**
The variables that loaded heavily on this factor are; The use of VTC will reduce duplication of teaching efforts by lecturers since a lecture is taught once and it is not being repeated in different locations (77%) and The amount of time spent in traffic jams and travelling to class will be reduced (62%).

**DISCUSSION**
The results obtained from the analysis indicated that out of the 128 respondents on attitudes, 74.2% had positive attitudes towards Video-teleconferencing (VTC), 25.8% had neutral attitude, and none (0%) had a negative attitude towards VTC. The factors that staff and students are likely to consider when adopting VTC as investigated in this study are world class performance, quality of education, efficiency, savings flexibility in learning, control of students by lecturers, security of academic material and top management support.

The research was able to establish that academic staff and students believed that Video-teleconferencing 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. It was noted that 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 research also established that 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 Video-teleconferencing technology will need both Computer and Internet skills to be able to enjoy the full benefits of this technology. Hence training on Computer skills is essential.

**SUMMARY AND CONCLUSION**
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. 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. This will also increase lecturer productivity as time usually used writing on the board and dictating notes will be saved. There will be more time to explain notes and give illustrations.

Videoconferencing can be used in institutions of higher education in several ways, academic staff can teach students from the comforts of their homes or offices, a faculty member can conduct a lecture while away for a week at a conference, a guest lecturer from another institution /professional in a field can be brought into a class without loss of time and money due to travel as students gain a wealth of knowledge, a faculty member can participate in a thesis defense at another institution and a researcher can collaborate with colleagues at other institutions. When used in all these ways, videoconferencing will improve the competitiveness of an academic Institution. Administrators on tight schedules can collaborate on a budget preparation from different parts of a campus thus saving time, money and increasing productivity.

Future research is necessary to involve more stakeholders of the Institution population in various administrative positions such as, Finance Officer to help determine availability of funds to purchase and maintain the VTC equipment, its ROI and sustainability; the Director, ICT and other ICT personnel to gauge the readiness of the Institution 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.

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