EFFECTS OF COMPUTER AND INTERNET ACCESS AND SKILLS ON ATTITUDES TOWARDS VIDEO-BASED DISTANCE LEARNING IN INSTITUTIONS HIGHER EDUCATION IN KENYA

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Full Length Research Paper

Effects of computer and internet access and skills on attitudes towards video-based distance learning in institutions higher education in Kenya

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This paper explores the possibility of using Videoteleconferencing (VTC) Technology to enhance distance learning mode of education for Institutions of Higher Learning in Kenya. It looks at the readiness with regard to the level of Infrastructure development in terms of availability of computers and the Internet. The competence of resource persons and students in use of computers and the Internet are also explored in this study. The study further tests the effects of Computer and Internet access on the attitude towards use of Videoteleconferencing or Video-based distance learning. Videoteleconferencing or Videoconferencing is a form of E-learning that falls in the category of Synchronous learning that involves distance learning students having a live instructor teaching via the Internet (Obringer, 2001). Implementation of Videoconferencing in Institutions of Higher Learning in Kenya would facilitate access of higher education to all Kenyans in the various towns as well as make Institutions of Higher Learning to sustain themselves due to additional revenue generated. The services of experts working in industry could be made available to the various Institutions thus saving on overhead expenses like office space, healthcare, pension plan, sabbaticals, secretarial help and infrastructure while at the same time the experts will disseminate a wealth of knowledge and experience to students. This research was a case study of the University of Nairobi, School of Business and School of Education. The findings indicated that 74.2% of the respondents had a positive attitude towards Videoconferencing. This implies that Videoconferencing is a form of learning that can be accepted by staff and students.

Key words: Video-based distance learning, videoconferencing, synchronous learning, electronic learning.

INTRODUCTION

Globalization and technological change are changing the face of organizations all over the world. Information and Communication Technologies (ICTs) are being adopted by organizations to meet their strategic objectives (O'Brien, 2000). Institutions of learning are also frantically restructuring their old instructional methods to incorporate the use of ICTs and Information Systems (ISs) so as to gain the advantages of using Computers, Information Systems and the Internet (Tinio, 2002). 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 or Online Learning. (Rosenberg, 2000) defines E-Learning as education via the Internet, network, or standalone computer and (Herridge Group, 2003) defines E-learning as use of electronic media for disseminating learning content for interaction and facilitating learning. This includes use of radio, television, overhead projectors and films among others. It also encompasses the use of computer based delivery methods and Internet.

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; Online support for instance online forums, chat rooms, e-mail, or live instant-messaging; Asynchronous learning where the students have reference materials in place of a live instructor. Asynchronous learning 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).

Videoteleconferencing (VTC) was first demonstrated in 1968. 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. 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 (Wolfe, 2007).

In the 1980s digital telephony transmission networks became possible, such as ISDN (Integrated Services Digital Network) that had a minimum bit rate of 128 kbps for compressed video and audio transmission. The first dedicated VTC started to appear in the market as ISDN networks were expanding throughout the world. The 1990s saw the advancement and development of VTC systems due to many factors, including technical advances in Internet Protocol (IP) and also more efficient video compression technologies were developed making the technology readily available to the general public at a reasonable cost. IP-based VTC have led to the development of free desktop or PC-based videoteleconferencing such as NetMeeting, MSN Messenger, Yahoo Messenger, SightSpeed, and Skype among others (Wolfe, 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 (Wolfe, 2007).

Videoconferencing can also be used in Medicine; telehealth is the delivery of health services through telecommunications technology. It is a very useful technology for telemedicine and telenursing applications, such as diagnosis, consulting, transmission of medical images in real time and physicians/paramedical professionals can discuss cases across large distances. Rural areas can use this technology for diagnostic purposes, thus saving lives and making more efficient use of health care money. In business, VTC can enable individuals in faraway places to have meetings on short notice. Time and money that used to be spent in traveling will be saved. In Law, VTC has allowed testimonies for individuals who are not able to attend the physical legal settings to be used.

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 and specialists from industry can easily share their wealth of knowledge gathered through experience, 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, a researcher can collaborate with colleagues at other institutions, 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 (Wolfe, 2007).

There are factors that would make staff and students accept videoconferencing technology. These are A factor analysis had been undertaken and the factors were determined as: - Factor I: Savings on resources (space, time and money), Factor II: Quality of education, Factor III: Efficiency and Effectiveness in teaching, Factor IV: Control of reading material by lectures due to intellectual property rights, Factor V: World Class Performance, Factor VI: Security of material sent via the Internet, Factor VII: Training and Top Management Support, Factor VIII: Prestige Factor IX: Loss of culture, Factor X: Cost cutting (Mogikoyo, 2013). Use of Videoconferencing in teaching is seen as being prestigious and an institution can be rated as being world class.

There are factors that are necessary for implementation of Videoconferencing. The technology requires use of computer systems and telecommunication systems. Videoconferencing infrastructure consists of video cameras, Internet connection, and dual plasma display systems. Lecturers and students will also need access to computers and fast Internet and there may be need for servers for archiving course content.

The participants' attitudes and skills are also of importance. Several international studies have concluded that learning from video is only possible if teachers and parents support a young student's learning process. Conceptualization of viewing is now commonly regarded as a skill that can be taught. Learning from video therefore demands the development of particular skills (Butcher, 2003). The also lecturers need word processing skills and presentation skills to prepare and deliver the content in an appropriate format.

Institutions of Higher education around the world like Massachusets Institute of Technology (MIT) among others started to embrace the benefits of VTC 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 (Greenberg, 2009). This has made VTC to be

considered as a step forward in E-learning ahead of Print learning and Asynchronous learning.

Some of the pioneers in use of VTC in education in Africa are South Africa, Botswana, Côte d'Ivoire, Guinea, Mauritius and Senegal. In Kenya, video-based distance learning started with AVU. The AVU was started in 1997 to offer satellite courses from universities in Canada, Europe and the USA. The goal of the AVU initiative was to enhance access to quality higher education in sub-Saharan Africa using ICT (Butcher, 2003). AVU has its headquarters in Kenya. The University of Nairobi and Kenyatta University are examples of two public Universities in Kenya that have print-based distance learning programs (Mbwesa, 2005). There are initiatives for Online learning in most Universities in Kenya but it is not actively being utilized for fully fledged programs. There are readiness factors that need to be put in place for this to succeed. These include skill readiness, mental readiness (attitudes), infrastructure readiness, technology readiness, content readiness, human resource readiness and financial readiness (Mogikoyo, 2013).

As institutions in Kenya prepare for the above readiness factors amidst resource constraints, there has been a growing population of Kenyans in various towns seeking opportunities for higher education. This has led to Universities diversifying and opening branches in various towns. However, fixed traditional facilities are over-stretched and still 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. The need to overcome these constraints and meet the growing demand for education has led to proposals to apply ICT to meet higher education market needs and this is the purpose of carrying out this study to find out the effects of access to and competence in use of computers and the Internet towards Attitudes in use of Videoconferencing in Higher Learning in Kenya.

METHODOLOGY
The research was a case study of the University of Nairobi. The target population was academic staff and students at the University of Nairobi. A sample was taken from the University of Nairobi's School of Business (SOB) and School of Education (SOE) because they already have distance learning programs and want to improve and expand learning using technology. A stratified random sample size of one hundred and sixty five (165) respondents was taken out of which 25 questionnaires were given to Lecturers and 140 questionnaires to students.

DATA ANALYSIS AND RESULTS
Analysis of Data was done using Descriptive Analysis such as Mean and Standard deviation, Cross tabulation

and Chi-square tests were done. Regression analysis was carried out to infer effects of computer and internet access and competence on attitudes towards use of video-based distance learning.

Mean and Standard Deviation
Frequencies, means and standard deviation of responses on attitudes towards VTC are presented in tables 1 and 2. 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 means that there were diverse opinions on VTC ranging from strongly agree to strongly disagree.

Responses were categorized into two, those that had more positive responses towards VTC and those with more negative responses towards VTC. As shown in the tables, there were more responses that reflected positively on VTC than those that reflected negatively on VTC. This means more lecturers and students had a positive attitude towards videoconferencing.

Access to and competence in use of computers and internet
There were questions on computer access and Internet access at the University and at home. Based on the mean score of each item, respondents seemed to agree that they had access to computers and Internet access at the University. However, they seemed to have frequent Internet and Power failures at the University. Approximately half of the population indicated having computers and internet access at home.

Computer skills and Internet Skills were also tested. 58.5% of respondents had adequate computer skills while 91.6% of the respondents had adequate Internet skills. This is may be due to the fact that surfing the Net does not require complex skills compared to work processing and presentation skills.

It was observed that more male students frequented computer labs compared to female students and consequently 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. Hence it is likely that female students are technology shy compared to the male students. The Chi-square calculated value (X^2) was 6.84, which was greater than the critical value 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. On Internet skills, 91.5% of males against 91,9% of females indicated having adequate Internet skills. There was no significant diference in Internet skills between males and females.

A larger percentage (over 77%) of the older generation (above 35 years) indicated knowledge on Computer skills compared to the younger generation (60%). The younger generation (below 35 years) was expected to accept new technology more easily than the older generation.

Table 1: Means and standard deviations of positive responses towards VTC

S/N	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
30.21	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 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
30.33	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

However, the older generation is able to pay for Computer training. The Chi-square calculated value was 3.849, which was 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. There was also no significant difference in Internet skills among the various age brackets.

More academic staff than students indicated that they had 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 ($\square^\square$) 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. There was also no significant difference in Internet skills between academic staff and students.

Analysis of overall attitude

To get the overall attitude of respondents, each respondents attitude was calculated. 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 and no respondents had a negative attitude.

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 may be because most people are known to reject new technology with age. The chi-square (X^2) test calculated

Table 2: Means and standard deviations of negative responses towards VTC

S/N	Videoteleconferencing (VTC)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std Deviation
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
30.32	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

value was 10.037, which was greater than the critical value 9.49 from the table. This indicated that there was a significant difference in attitudes between different ages.

In testing for differences in attitudes between staff and students, majority of students had 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. The Chi-Square value (X^2) was 12.913, which was much greater than the critical value 3.84. This means there was a significant difference in attitudes between academic staff and students.

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 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.

Effects of computer and internet access at the university on attitudes

The established multiple linear regression equation on Overall Attitude based on Access to Computer and Internet at the University is $Y = 1.6327 - 0.1613X_1 + 00.0023X_2 - 0.0505X_3$

Where

Constant = 1.6327, shows that if Access to Computer, Internet Connection and Power failure take zero values, Overall Attitude would be 1.6327

$X_1 = -0.1613$, shows that one unit change in Access to Computer results in 0.1613 units decrease in Overall Attitude

$X_2 = 0.0023$, shows that one unit change in Internet Connection results in 0.0023 units increase in Overall Attitude

$X_3 = -0.0505$, shows that one unit change in Power failure results in 0.0505 units decrease in Overall Attitude

Effects of computer and internet access at home on attitudes

The established multiple linear regression equation on Overall Attitude based on Home Computer and Internet Access is: $Y = 1.3755 - 0.1616 X_1 + 0.0882 X_2$

Where

Constant = 1.3755, shows that if Access to Computer and Internet Connection at Home take zero values, Overall Attitude would be 1.3755

$X_1 = 0.1616$, shows that one unit change in Access to Computer at Home results in 0.1616 units decrease in Overall Attitude

$X_2 = 0.0882$, shows that one unit change in Internet Connection at Home results in 0.0882 units increase in Overall Attitude

Effects of computer and internet skills on attitudes

The established multiple linear regression equation on Overall Attitude based on Computer and Internet Skills is:

$$Y = 1.7544 - 0.2228 X_1 - 0.1645 X_2$$

Where

Constant = 1.7544, shows that if Computer Skills and Internet Browsing Skills take zero values, Overall Attitude would be 1.7544

X_1 = 0.2228, shows that one unit change in Computer Skills results in 0.2228 units decrease in Overall Attitude

X_2 = 0.1645, shows that one unit change in Internet Browsing Skills results in 0.1645 units increase in Overall Attitude

DISCUSSION

The findings indicated that 74.2% of the respondents had a positive attitude towards Videoconferencing. An awareness campaign on the advantages of Videoconferencing in education should be done.

The factors that had been presented in an earlier paper that staff and students consider before they accept Videoconferencing are World Class performance of the Institution, quality of education, savings, control of students, security of material sent via the internet and top management support. This study also established that there are factors that should be considered for this technology to succeed these are, availability of computers, the Internet and dedicated power were also considered as being important for VTC initiatives to succeed.

Most staff and students felt they had adequate Internet skills (91.6%) but average computer skills (58.5%) to engage in Videoconferencing. It is important to note that users of Videoconferencing technology will need Computer and Internet skills to be able to enjoy the full benefits of this technology. Even though lecturers can still write on the board, use of power points is encouraged to enable students download the notes immediately after or even before the lecture.

On attitudes, there was a significant difference in attitudes between different ages with the younger generation having more positive attitude. There was also a significant difference in attitudes between teaching staff and students, majority of students had a positive attitude towards VTC compared to academic staff. Hence, the University should carry out an aggressive sensitization on use of ICT and in particular Videoconferencing in learning especially among teaching staff.

In summary, the findings of this research confirm that videoconferencing is a technology that members of academic institutions (staff and students) can accept to use in teaching and learning. 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 Videoconferencing technology in teaching and learning.

It is hoped that this study will play a key role in providing useful insight to academic institutions and Governments, in Kenya and East Africa into the advantages of Videoconferencing technology and how it can positively impact education.

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