

A Study on Utilization of Information and Communication Technology in Teaching and Learning in Medical Training Colleges within Kakamega County

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Abstract: *The background of the study concerns information and communication technology (ICT) as a tool used in teaching and learning. Despite modern technology, innovations to enhance teaching and learning worldwide, the use of ICT for delivering education seem to be facing a number of problems. The objective of the study was to determine utilization of information and communication technology in teaching and factors that influence the use of information and communication technology in teaching. The study site was medical training colleges within Kakamega County. A descriptive cross-sectional design was used. Questionnaires and interview guides were used to collect both qualitative and quantitative data. The population of the study consisted of 1296 students and lecturers in medical colleges within Kakamega County. Stratified and simple random sampling was used. The sample size was 46 for tutors and 423 for students adopted by Yamane's method and Fisher's et al respectively size. A pilot study was carried out at Bungoma medical college to test validity and reliability of research instruments. The study findings revealed that skill rate of ICT is still low (36.7%) among tutors and students. The factors influencing use of ICT included inadequate computers and lack of administrative support among others. The study recommends continuous investment in ICT infrastructure, capacity building of existing human resource and training of ICT and culture change regarding use of ICT.*

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I. Background of the study

Information and communication technology (ICT) has brought many changes in medical education and practice in the last couple of decades. Teaching and learning medicine particularly has gone under profound changes due to computer technologies, and medical schools around the world, particularly in industrialized countries, have invested heavily in new computer technologies. In order to catch up with the rest of the world, developing countries need to research their options, design the necessary process, and implement essential changes in adapting to new computer technologies (Mingaine, 2013). The increased competition in a complex global market puts medical schools under pressure to embrace computer assisted learning; however, without support and training for staff and students, new technology could prove an expensive disaster. Expansion of computer assisted learning requires cultural change as well as careful strategic planning, resource sharing, staff incentives, active promotion of multidisciplinary working, and effective quality control (Mansoor, 2002).

There is substantial evidence that, in the right hands and used appropriately for specific purposes in specific contexts, ICT can be an effective tool in supporting teaching and learning. However, it is now firmly established that its introduction into schools does not by itself improve the quality of education or raise attainment. Encouragingly, there is growing and widespread awareness that the pedagogical and technical expertise of the teacher is absolutely critical here. Governments in sub-Saharan Africa (SSA), as elsewhere, are emphasizing teacher development as the key to effectively implementing policy and curricula, to using ICT to enhance teaching and learning, and to raising educational standards. In many African countries, however, a major impediment is the lack of qualified teachers (National Universities Commission, 2005).

Effectively, introducing technology into schools is also largely dependent upon the availability and accessibility of ICT resources (e.g. hardware, software and communications infrastructure). Clearly if technology cannot be accessed by the teacher, as in so many educational settings in SSA, then it will not be used. The state funding for such resources is scarce, and that ICT resources tend to be more available in urban than rural areas. Studies have shown use of ICT to enhance teaching and learning in East African schools (Hennessy and Onguko, 2010) shows that while the process has previously been painfully slow (Liverpool, 2002), the situation has been improving in the last few years. Schools are increasingly being equipped with computers for teaching, learning and administrative purposes, connectivity is improving and students are

enthusiastic about using computers for learning, despite the lack of equipment available. Some countries are developing digital content for use across the curriculum. Nevertheless, access and usage of ICT, like the electricity supply itself, remain rather sporadic. Formulation and implementation of national policies on ICT use, as outlined for the East African context (Hennessy, 2010).

Teachers can also benefit from the use of ICTs in education through integrating different ICTs into the various teaching activities. They can easily prepare, modify and distribute course material to students through email or Content Management Systems (CMS) that allow one to place documents in a pre-defined area so that students can access such information. Non-teaching tasks such as calculating continuous assessments and assessing individual pupil's performance over time and other administrative tasks like compiling pupil's attendance hours in a particular school term can be easily managed by use of software applications designed to perform such tasks. Further, teachers can use multi-media such as projectors, audio-video and so on to present their lessons in different ways and have students make presentations using different multi-media (Mtega, 2012). ICTs can improve administrative efficiency. Such tasks as managing the school timetables, class lists, events, announcements, memoranda, and letters and personnel files can easily be accomplished through the use of ICTs like school information management systems, email, word-processors and spreadsheets. Financial activities like student payments, budgeting and reports can all be enhanced through the use of ICTs (Mtega, 2012).

A number of studies have been done on ICTs and education and specifically investigating the benefits of ICTs in teaching, learning and administration in schools (GAID, 2009; Sampath, 2007; Adomi and Kpangban, 2010). The results of the studies revealed that there was improvement in the attentiveness exhibited by the learner, students engaged more in reading and learning, the overall performance of students improved and teachers' competence when dealing with technology also improved. While much has been done to encourage the use of ICT in education in Kenya, Medical Training Colleges within Kakamega County, the use of these technologies for delivering education seem to be facing number of problems. Medical professionals in developing countries face challenges of inadequate computer knowledge and skills to use ICT effectively. The study therefore sought to establish the use of ICT and factors that influence its use in teaching and learning in Medical Colleges within Kakamega County.

II. Literature Review

2.1 Utilization of Information and technology in Medical education

ICTs stand for information and communication technologies and are defined, for the purposes of this primer as a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. These technologies include computers, the Internet, broadcasting technologies; radio and television, and telephone (Heathcote, 2000). According to Patil (2012), some of ICT benefits to the students include: - Computers can improve independent access for students to education; students with special educational needs are able to accomplish tasks working at their own, create greater enthusiasm for learning amongst students; visually impaired students using the internet can access information alongside their sighted peers; give greater exposure to vocational and workforce skills for students, students with profound and multiple learning difficulties can communicate more easily; students using voice communication aids gain confidence and social credibility at school and in their communities; increased ICT confidence amongst students motivates them to use the Internet at home for schoolwork and leisure interests; provide distance learners country-wide with online educational materials and provide learners with additional resources to assist resource-based learning.

In addition, Patil (2012), says that ICT benefits for teachers, non-teaching staff includes: -Reduces isolation for teachers working in special educational needs by enabling them to communicate electronically; Provide opportunities for multiple technologies delivered by teachers; Offer the opportunity for more student centered teaching; Improved skills for staff and a greater understanding of access technology used by students; Enhances professional development and the effectiveness of the use of ICTs with students through collaboration with peers and materials already in electronic form (for example, from the Internet) are more easily adapted into accessible resources such as large print. ICT is being utilized in every part of life. Due to the increasing importance of the computer, students-the future citizens cannot afford to keep themselves aloof from this potential medium. In education, use of ICT has become imperative to improve the efficiency and effectiveness at all levels and in both formal and non-formal settings. Education even at school stage has to provide computer instruction. Profound technical knowledge and positive attitude towards this technology are the essential prerequisites for the successful citizens of the coming decades.

2.2 Factors influencing the use of ICT in teaching and learning

Many teachers who do not consider themselves to be well skilled in using ICT feel anxious about using it in front of a class of children who perhaps know more than they do. Larner and Timberlake (1995), found that teachers were worried about showing their pupils that they did not know how to use the equipment, and that it

was the teachers who experienced this kind of anxiety who were less willing and / or able to make use of computers in their teaching. In addition, pupils' attitudes and expectations of their teachers' competence in ICT are likely to contribute to this teacher anxiety. Guha (2000), states that students, who on the whole experience daily interaction with a wide range of technology, are increasingly placing demands on teachers, expecting them to be knowledgeable in the area of computer usage.

Mumtaz (2000), pointed out that evidence of very good practice in the use of ICT is invariably found in those schools that also have high quality ICT resources, and that a lack of computers and software can seriously limit what teachers can do in the classroom with regard to the implementation of ICT. The importance of schools being well resourced in ICT equipment is also highlighted by a recent Becta publication, *Primary Schools – ICT and Standards* (Becta, 2003). This study, which explored the relationship between schools' use of ICT and pupils' achievements in national tests, presented strong evidence to show that those schools which were well resourced in ICT tended to have better achievements than schools with unsatisfactory levels of ICT. The report was able to show that this relationship was not simply a result of the higher achieving schools having better socio-economic circumstances, and also that it was not as a result of those schools having better quality leadership. The lack of good ICT resources in a school, then, will not only prevent teachers from making good use of ICT in their teaching, but it is also likely to have a detrimental effect on pupils' achievement.

Fabry and Higgs (1997), point out that learning new skill in any profession requires time, but teachers have little time left after spending most of their day teaching, and with other commitments such as liaising with parents and attending staff meetings. Yet they do need that time to experiment with the technology, share their experiences with colleagues, and attend technology related in-service training programmes. According to Manternach-Wigans et al. (1999), teachers are very concerned about the lack of time for technology; they feel that they need more time to learn computer basics, plan how to integrate technology into their lessons, and actually use the technology in the classroom. Cuban et al. (2001) provide evidence to support this. In their survey of teachers at two American high schools, it was found that there was not enough time for computers to be incorporated fully into daily teaching. Teachers explained that they would need hours to preview web sites, prepare multimedia materials for lessons, and to undertake training.

Teachers resistant to change and negative attitudes, Ertmer (1999), discusses the importance of attempting to overcome problems caused by teachers' beliefs and attitudes concerning ICT, referred to as second-order barriers, before other external factors, or first-order barriers, are tackled. First-order barriers, such as the lack of access or training, it is claimed, are more readily observed and more easily tackled, whereas second-order barriers may require major changes in daily routines and underlying beliefs about effective practice. Mumtaz (2000), agrees, suggesting that *"teachers' beliefs about teaching and learning with ICT are central to integration"*.

Okuttah (2013), point out that lack of electricity supply to most public schools and institutions is a challenge. Kenya being a developing nation cannot boast of twenty four hours electricity supply to its citizens. The institutions are directly connected to Kenya Power and Lighting Company, yet no electricity of power is supplied to the institutions. It is on a sad note that some institutions cannot afford a generator set that can power the entire computer for teaching and learning. Consequently, both the teachers and students are handicapped and may not be able to offer the computer lesson.

Ignorance is the biggest problem facing institutions with regard to ICT. Many university and college managers have never experienced an environment where ICT is at full throttle like in many universities in North America. This makes them less appreciative of ICT. The Limited knowledge of functions and operations of ICT as reflected at the level of senior administrative staff of universities makes matters worse, especially on technical issues and need to invest in ICT. Many senior and influential university officials with positions of responsibility requiring decision-making received their education and early work experiences well before the advent of ICT. Many started their careers in the age of the typewriter, before the wide-scale introduction of the computer technology at universities and find it very hard to fathom many things in ICT. It is, therefore, not surprising that these administrators and lecturers lack sufficient grasp of the issues related to ICT resources and its management, and struggle to provide adequate and effective managerial direction and support that is so much needed. The students have taken advantage of this and are exploiting the lecturers and the university ignorance. Many are plagiarizing papers from the internet knowing very well that lecturers and the university have no way of finding out (Aduda, 2000).

Tinio (2002), however, noted that the reality of the Digital Divide the gap between those who have access to and control of technology and those who do not means that the introduction and integration of ICTs at different levels and in various types of education will be a most challenging undertaking. Failure to meet the challenge would mean a further widening of the knowledge gap and the deepening of existing economic and social inequalities. Fear of redundancy by older teachers and that students will know information and communication technology. Again the fear that their students will be exposed to undesired sites e.g. 'Internet fraud' increased moral degradation, Internet pornography, cyber bullying and other anti social behaviors is a

worrying emerging problem, through the use of the internet, the fear of infection of viruses to their computers leading to data loss, while this may be true to some extent, proper education on the safe use of computers and help alleviate some of the fears. Browsing system in Nigeria depending on the area of your location fluctuates. This often times lead to frustration and discouragement while browsing (Ohiwerei *et al*,2013).

III. Research Methodology

The target population of the study was 1296 people teachers and students of medical training colleges. The management, trained nurses and doctors in hospitals were excluded from participating in the study.

3.1 Sampling technique and sample size

Purposive sampling was used to select the tutors at the medical training colleges while stratified and simple random sampling was used to select students of both sexes. The sample was 46 for tutors and 423 for students adopted by Yamanes method and Fisher's *et al* respectively size.

3.2 Instruments of data collection

Data was collected by use of questionnaires and interview schedules. Interview schedules for tutors was used to collect information from the tutors and comprised of both open and closed ended. Piloting was done in a neighboring county, Bungoma County for purposes of editing the tools for validity and reliability.

Data collection procedures, Data analysis and Analysis

Questionnaires was administered to tutors and students who participating in the study. Data analysis done included percentages, frequency tables, and narratives.

IV. Research Findings

4.1 Demographic Information of the respondents

The proportion of students who participated varied across the three college with Kakamega Medical training College being presented by the highest frequency 204 (53.1%) followed by St. Elizabeth Medical Training College 102 (26.6%) then St. Mary's Medical Training College, which had the least frequency 78 (20.3%). On the other hand, the representation of the tutors from Kakamega was higher 20(40.8%) compared to St. Elizabeth and St. Marys. St. Mary's was represented by 18(36.7%) while St. Elizabeth was represented by 11(22.4%) (Table 1)

Table 1 Institution that Participated in the Study

College	Frequency	Percent
St. Elizabeth	11	22.4
Kakamega medical college	20	40.8
St. Mary	18	36.7
Total	49	100.0

Researcher, 2017

Pertaining to having knowledge in ICT, the study results revealed that a high proportion 310 (80.7%) of students had knowledge in ICT while the rest do not the highest proportion 188 (49.0%) of student can access a computer within the College, while the rest can access it in other areas such as cybercafé and home. The students were asked to rate the use of computers in their institution in teaching and learning. The study results indicated that ICT use in teaching and learning is practiced in the institutions with a higher proportion 273 (71.1%) of the students attesting to the same. In terms of access and reliability, the students indicated to have adequate access availability with 143 (37.2%) indicating that is adequate. Majority of the students rated themselves as good or adequate when it comes to using ICT. Majority of the students 141(36.7%) rated themselves as having good ICT skills as opposed to 33 (8.6%) who rated themselves as very good Asked how the students familiarized themselves with ICT186 (48.4%) of them indicated that they familiarized themselves through personal study. This was followed by those who obtained the skill through a course in college, at 81(21.1%).

Familiarity with ICT skills was also gauged by attempting to explore whether the students are registered in any of the available social websites such as Face book and twitter or email chats such as Gmail and yahoo. The study findings revealed that, collectively a significant majority 375 (97.7%) of the students were registered in one of the social sites. Pertaining to the quality of ICT use in the institutions, the rated the institutions as Good, with a higher proportion 102 (26.6%) being on the affirmative. The results indicated that majority of the staff who teach at the training institutions are below 40 years of age and are most likely to be conversant of use of technology in the schools because they are relatively younger, despite most of them having not stayed in the institution for long. A significant majority are also qualified in their respective fields to teach at the institutions with few having higher qualification.

4.2 Factors Influencing use of ICT

The study sought to establish the factors that negatively or positively influence the use of ICT in the institutions. The study findings revealed that inadequate computers is a cream negative factor that negatively influence the use of ICT in the institutions. One hundred percent 49(100.0%) of the tutors were of the view that lack of computers was negating use of ICT in the institutions. Other factors that negatively influence use of ICT in the institutions included lack of support from the college administration (89.8%), insufficient skill (81.6%) and power interruptions (87.8%). Notably, the tutors indicated that internet connectivity is not a factor since 95.9% disagreed. The student’s responses were consistent with those of the tutors (Figure 1).

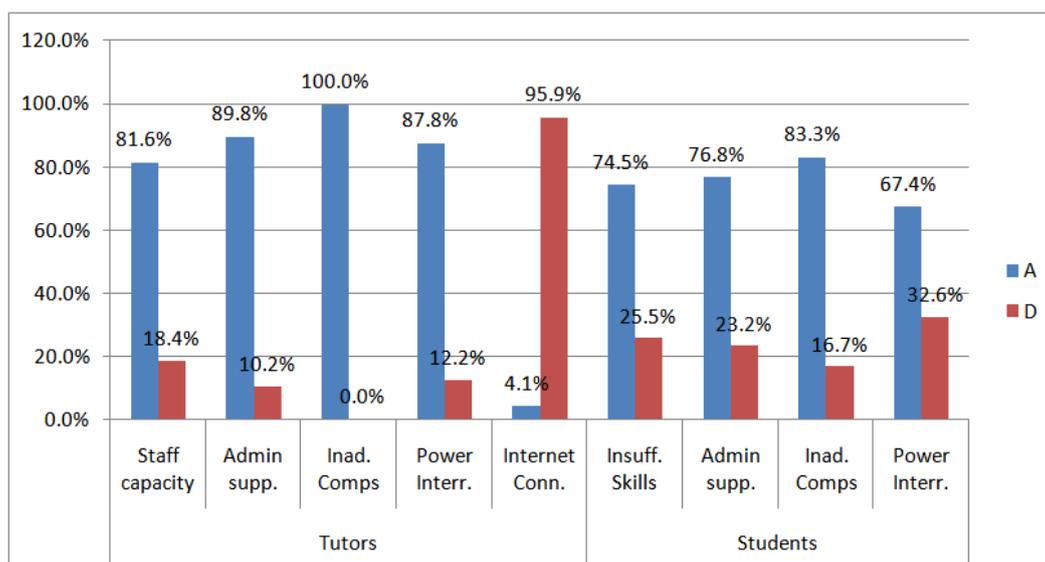


Figure 1 Summary of Negative factors Influencing use of ICT according to students and tutors

The above responses were distributed as follow; 27 (55.1%) of the tutors strongly agreed 13 (26.5%) indicated that insufficient knowledge on ICT influenced use of ICT the institution. The responses of the other negative factors are as shown in Table 11

Table 2 Negative factors influencing use of ICT according to students and tutors

	SA		A		D		SD	
	N	N %	N	N %	N	N %	N	N %
Staff capacity	13	26.5%	27	55.1%	9	18.4%	0	0.0%
Admin supp.	13	26.5%	31	63.3%	5	10.2%	0	0.0%
Inad. Comps	20	40.8%	29	59.2%	0	0.0%	0	0.0%
Power Interr.	13	26.5%	30	61.2%	6	12.2%	0	0.0%
Internet Conn.	1	2.0%	1	2.0%	26	53.1%	21	42.9%

Key: SA-Strongly Agree A-Agree D-Disagree SD-Strongly Disagree

The negative factors that influence use of ICT has been common across many organizations and measures to mitigate such factors have been formulated. For instance, to mitigate power interruptions, photovoltaic equipment maker Go-solar Systems has installed solar power in rural areas where electrical infrastructure remains underdeveloped (Hennessy and Onguko, 2010). This will boost of ICT because power is required all or most of the time. The administration or managers of most organizations need to be reigned upon to increase budgetary allocations for more computers and laptops, since the support and experience pf the administrators do play an important role in the use of computers in Kenyan classrooms (NACOSTI, 2010).

V. Discussion

As discussed in literature, generally there are many changes which Information and communication technology (ICT) has brought. In particular, the medical education and practice has benefited a lot in the recent past because with computer, tutors as well as students will be able to make get online resources which are exclusively educative. According to Mingaine (2013), there is need for medical training colleges to invest well in ICT infrastructure so as to benefit from computer aided learning. The results from the three medicinal colleges is encouraging from the fact that the students and tutors of had knowledge in ICT this may have been possible with access to a computer either within the college or elsewhere such as cybercafé and home. From the

results, there is evidence of use of computers in teaching and learning in the medical training institutions. The students were using ICT to enhance their learning through accessing online materials through the wifi connection available at the campus. Evidently, the institutions and in particular, have embraced the use of ICT in their teaching and learning.

There are evidence of inadequacy of the ICT tools, devices and infrastructure. The study findings also indicated that, while the students and the tutors were using teaching and learning, the access of ICT facilities is not satisfactory. Despite the fact that, the students considered themselves to be good in ICT, the proportion that said so were still small and this calls for deliberate investment in ICT infrastructure in the medical colleges. Mansoor (2002), hints that for an instructor who is keen of delivering a more effective education (medical), then use of ICT will be mandatory. Given the fact that different institutions have embraced the usage of ICT, there is evidence of increased competition in a complex global market and this puts medical schools under pressure to embrace computer assisted learning.

Expansion of computer assisted learning requires cultural change as well as careful strategic planning, resource sharing, staff incentives, active promotion of multidisciplinary working, and effective quality control (Mansoor, 2002). Heads and management of these institutions need to formulate strategic plans towards institution wide adoption of ICT use. Other than familiarizing themselves on ICT matters through core training, computer and other ICT equipments the ICT infrastructure in the institutions ought to be adequate enough so that the institution is “self-contained” so that all members of the institutions, be it students or tutors are able to familiarize themselves with the skill. The current situation is that some student were familiarizing themselves with the skill through personal means despite sometimes paying levies towards ICT infrastructural development.

Familiarity with ICT skills was also gauged by attempting to explore whether the students are registered in any of the available social websites such as Face book and twitter or email chats such as Gmail and yahoo. The study findings revealed that, collectively a significant majority 375 (97.7%) of the students were registered in one of the social sites. Pertaining to the quality of ICT use in the institutions, the rated the institutions as Good, with a higher proportion 102 (26.6%) being on the affirmative.

One area in which students are excelling is being registered on social websites such as facebook, twitter and emails. This phenomenon is indicative of the generational embrace of ICT. By running on programs on android and windows platforms, the students can continually improve their ICT skills.

There has been criticism on how people, especially the youth use the social media for all the wrong things, other than educative purposes. There has been a wide claim on how the youth misuse the social media and this happens in academic institutions. There is overuse of the phone as evidenced by almost half of the students not using the phone. Specifically, the fear that students will be exposed to undesired sites e.g. ‘Internet fraud’ increased moral degradation, Internet pornography, cyber bullying and other anti-social behaviors is something that has been in the public domain.

ICT skills development requires that students are proficient all round in all the available technologies for purposes of enhancing meaningful work. With more practice and enhancement of ICT skills, computers data losses may be avoided to the bear minimum and help alleviate any fear that arise.

The results were indicative of the fact that the availability of a particular ICT device or tool will be used depending on its availability and demand. Today, ICT in education encompasses a great range of rapidly evolving technologies such as desktop, notebook, and handheld computers, digital cameras, local area networking, Bluetooth, the Internet, cloud computing, the World Wide Web, streaming, and DVDs; and applications such as word processors, spreadsheets, tutorials, simulations, email, digital libraries, computer-mediated conferencing, videoconferencing, virtual environment, simulator, emulator etc. Evidently the tutors were using laptops in most cases as it was obviously used almost daily to prepare lessons plans and other teaching and learning materials. Indeed the laptop was the most popular ICT device among the tutors compared to students. Because of its portability nature is can easily be move from office to office, to class then home. Well charged laptops with long battery hours can be used to teach effectively even where the tutor do not have, hard copies of the notes. Therefore, laptop is one of the basic ICT device that every institutions of learning ought to have in plenty. Other devices which can be used hand in hand with the laptop/desktop is the slide projector. In modern classrooms in developed nations, projectors are mounted in classrooms, and is one of the requirements in the so called “tech” classrooms. Advanced “tech” have smart boards that can be operated without a laptop. Such devices are able to present diagrams or animations that reinforce concepts learned in class. It is important to note that, the slide projector is basically used for a given number of learners or classroom. Therefore one projector per class or department may sometimes suffice.

VI. Conclusion

There is evidence that ICT is an important learning tool and investing in it is a mandatory undertaking for all any learning institution. The use of ICT in the learning institutions is somehow on the average. However, there is still relatively a high proportion of the students and tutors who have not embraced it fully. It is quite

encouraging to see find that a high percentage of tutors understand the situation or scenarios in which ICT can be used for effective learning there is still much ground to be covered as far as ICT use is concerned in our academic institutions, and in particular medical colleges.

5.2 Recommendations

Based on the study findings, the study made the following recommendations:

1. Investment in ICT infrastructure

Based on objective one, the study recommends that college management need to invest heavily on ICT infrastructure. This investment should be a continuous process, and any time acquisition of new ICT equipment is made, care should be taken to leverage on existing old technologies, otherwise they will become relevant. The management of such institutions should privy of technologies required in the institutions and the departments.

2. Capacity building of existing human resource and training of ICT

For students and tutors to fully, embrace use of ICT technology, the study recommends that the tutors and the lecturers require to be continually capacitated through trainings, seminars and conferences. Relevant institution's, through their respective ICT department can develop user-defined training tailored to the need of the staff and students in the institutions.

3. Intervention measures on ICT adoption and use

There is need to create awareness among student and tutors for effective use of ICT for effective medical instruction.

References

- [1]. Aduda, D. (2000). "Computer Studies Getting Popular with Teachers". Daily Nation, 4 September 2000.
- [2]. Becta (2003). Primary schools – ICT and Standards. An analysis of national data from Ofsted and QCA by Becta. Coventry: Becta. <http://www.becta.org.uk/research/research.cfm?section=1&id=538>
- [3]. Ertmer, P.E.A. (1999). Examining teachers' beliefs about the role of technology in the elementary classroom. *Journal of Research on Computing in Education*, 32 (1), pp.54-72.
- [4]. Fabry, D., Higgs, J. (1997). Barriers to the effective use of technology in education. *Journal of Educational Computing*, 17 (4), pp.385-395.
- [5]. Guha, S. (2000). Are we all technically prepared? Teachers' perspectives on the causes of comfort or discomfort in using computers at elementary grade teaching. Paper presented at the Annual Meeting of the National Association for the Education of Young Children Atlanta, GA, November 8-11, 2000.
- [6]. Heathcote P.M. (2000). A Level of ICT. West Midland: Payne-Gallway publishers
- [7]. Hennessy, S., and Onguko, B. (2010). Developing use of ICT to enhance teaching and learning in East African schools: a review of the literature. Cambridge and Dar es Salaam: Faculty of Education, University of Cambridge and Aga Khan University Institute for Educational Development - Eastern Africa.
- [8]. Lerner, D., Timberlake L. (1995). Teachers with limited computer knowledge: variables affecting use and hints to increase use. The Curry School of Education, University of Virginia
- [9]. Mansoor I. (2002). Computer skills among medical learners: A survey at King Azia University, Jeddah. *Journal of Ayub Medical College*, 14, 13-5.
- [10]. Manternach-Wigans, L., et al.. (1999). Technology integration in Iowa high schools: perceptions of teachers and students. College of Education, Iowa State University.
- [11]. Mingaine, L. (2013). Challenges in the Implementation of ICT in public secondary schools in Kenya. *International Journal of Science and Education*, 224-238.
- [12]. Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: a review of the literature. *Journal of Information Technology for Teacher Education*, 9 (3), pp.319-341.
- [13]. Ohiwerei, F., O., Azih, N. and Okoli, B. E. (2013). Problems militating against utilization of ICT in teaching of business education in Nigerian Universities. *European Journal of Science and Technology*.
- [14]. Okuttah, M. (October 17th, 2013), "Digital age: Huge steps towards e-learning in schools", Daily Nation, pp.13, 18
- [15]. Patil, S. V. (2012). The Role of ICT in education sector. *Lokavishkar International E-Journal*, ISSN 2277-727X, Vol-I, Issue-IV, Oct-Nov-Dec 2012
- [16]. Tinio, V.L. (2002). *ICT in education*. Retrieved from <http://www.eprimers.org>

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