An Investigation of the Relationship of ICT Access of Principals and ICT integration in Management Public Secondary Schools in Kenya

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Abstract

The purpose of this study was to find out whether there exists a relationship between ICT access of principals and ICT integration in management of public secondary schools in Kenya. Descriptive survey design was used in Nairobi County where quantitative and qualitative research strategies were applied for the collection of data using questionnaires. The target population comprised of 75 secondary schools in Nairobi County at the time of data collection. Simple Random sampling was used to select the public secondary schools with 7(10%) principals participating in the pilot study. Data collected by questionnaires from 68 principals out of 75 principals were analyzed using Pearson's chi square with the help of Statistical Package for Social Sciences (SPSS) programme. The findings of the analysis of data revealed that there was a significant relationship between the principals' educational level and ICT integration in management of public secondary schools in Kenya. Out of this study recommendations were made to the county government and secondary schools in Nairobi County and Kenya in general.

Key Words: - ICT Access of Principals, ICT integration and Management

Introduction and background to the study

The incorporation of Information Communication Technology (ICT) in school management has been promoted as a key step in bridging the digital divide (Han, 2002). Information Communication Technology (ICT) shows the way of distributing information in the school and is being used in management of school affairs to change education outcomes (Asan, 2003). The main ICT tool to be used in management and administration is likely to be the computer, together with basic software packages especially MS Word, Excel, PowerPoint, or the equivalent open source packages, and access to email and the internet. In addition there are software packages designed specifically for school management and administration, including timetabling, databases for learner records, systems for the recording of school development plans, syllabus completion reports, test data, school based assessment records and financial records.

This is a comprehensive study on the use of Information Communication Technology (ICT) in the educational environment and integration of computer-based applications into management of public secondary schools. Information Communication Technology (ICT) includes the use of the computer as a tool for management. It addresses the impact of the different computer modalities, use of the Internet and integration issues of educational technology in management. Information Communication Technology (ICT) includes computer tools for word processing, spreadsheet and database management.

Though many people believe and perceive ICT to be a new phenomenon, history has shown that humans have been storing, retrieving, manipulating and communicating information during the times of Sumerians of Mesopotamia (Reddy, 2013). The term information technology was first used and appeared in a 1958 in the Harvard Business Review (Reddy, 2013). The proponents of ICT terminology in the business and management world were Leavitt and Whisler whose work appeared in 1958 (Nwosu, 2003). Based on the storage and

processing technologies employed, it is possible to distinguish four distinct phases of IT development: pre-mechanical (3000 BC – 1450 AD), mechanical (1450–1840), electromechanical (1840–1940) and electronic (1940–present) **(**Roblyer, 2005). The first and earliest mechanical analogue computer (geared mechanism) referred to as the Antikythera mechanism was used at the beginning of the first century (Magni, 2009). However, it was not until 1645 when the first mechanical calculator capable of performing the four basic arithmetical operations was developed (Maki, 2008). It was not until 1940s when electronic computers, using either relays or valves began to appear for use in business and as a tool for management of organizations with electromechanical (Zuse Z3) completed in 1941 as the world's first programmable computer, and by modern standards one of the first machines that could be considered a complete computing machine.

The use of ICT innovation in school management can be tracked back to the 1970s when the computerization of schools gained momentum (Pang, 1995). However, a visible presence of this was evident to the customers since 1980s when some schools in Kenya could communicate to the outside world without necessarily the use of letters. The early decade of the 1990s saw the emergence of automated voice response (AVR) technology. The 1990s is a period in Kenya when the policy allowed the teaching of computer science in secondary schools as a subject though with challenges in terms of trained personnel and lack of power for most schools especially in the rural areas. Through the pledges by the current president and deputy president of Kenya during their campaigns, the teaching of Computer literacy is supposed to commence in standard one in all Kenyan primary schools. Before 1979, computers existed primarily in tertiary level educational institutions. Then, in the eighties, microcomputers began to be distributed to schools, and teachers began to grapple with the question of how to use computing for education rather than simply educating about computing. Starting from the mid-nineties, the use of ICTs in schools rapidly expanded in developed nations through curriculum support, networking, the professional development of teachers and software improvements (Aston, 2002).

In recent years, bandwidth has greatly increased and user familiarity with the Web and ICTs in general has evolved, contributing to an evolution of the Web. Some are referring to this evolution as numbered "versions" or "generations" (Web 1.0, 2.0 and 3.0). Web 1.0 refers to the first implementation of the Web which mainly allowed users to search for information and read it. The main goal of organizations creating such Web sites was to establish an online presence and make information available to anyone at any time. The Web as a whole hasn't moved beyond this stage yet. Web 2.01 refers to the trend in social networking, user-generated content and software as a service rather than a product. Many of the social networking tools have been around for a number of years (forums, chats, etc.) but there are new trends in communication and collaboration tools which are emerging (e.g., folksonomies, wikis, blogs, tools like Facebook, twitter, whatsapp etc.). More recently, the focus has shifted from the information society to the knowledge society and policies promoting, connectedness, the ability to take advantage of information resources (Ungerleider & Burns, 2003).

This research was guided by the following objective:

- to assess whether the level of access in Information Communication Technology (ICT) is related to their level integration of Information Communication Technology in management of public secondary schools in Nairobi County, Kenya;

This study answered the following research question:

- What is the relationship between the principals' level of access and the level of integration in information communication technology in the management of public secondary schools in Nairobi County in Kenya?

The null hypothesis that guided this study was:

Ho_1: There is no significant relationship between the principals' level of access in ICT and integration of information communication technology in management of public secondary schools in Nairobi County, Kenya.

Review of Related Literature

Access of ICT by Principals and Level of Integration of ICT

Pernia (2008) reported that the access dimension of ICT is characterized by a user's awareness of ICT and availability and the relevance of these ICT in both their personal and professional life. Access to digital content includes user accounts, personal file storage and communication tools such as e-mail and discussion forums. It is explained further that these services include network accounts, network-based file storage, access to e-mail, shared folders for learning and teaching materials. In this study, ICT access means awareness and availability in terms of acquisition of hardware and software. Awareness and acquisition state is that condition wherein the person becomes aware and conscious of the technology, analyses its significance, reflects on its value and subsequently, desires and decides on skills. She adds that, in the case of developing countries, the levels of ICT literacy are not all applicable because the levels of ICT availability in these countries vary. According to Albirini (2006), access to computer resources has often been one of the barriers for technology integration in both developed and developing countries. Kirsch and Lennon (2005) show that there is no statistically direct relationship between the ICT skills of more experienced workers and the less experienced workers.

In Spain, familiarity with computers and years of experience with ICT correlate positively with levels of institutional management (Selwood, Fung & Mahony, 2003). This result suggests that principals who had access to computers and the Internet were more likely to use them than those who did not have adequate access to equipment and network connections. Therefore, access to hardware and software is factor related to computer use. The ICT facilities considered in this research are similar to those in a study done in a West England school where access to word-processing, spreadsheets, and databases, Internet/e-mail and PowerPoint among teachers was considered (Selwood et al., 2003). Similarly the current study considers the following hardware and software equipments. The hardware equipments are as follows: Electricity infrastructure, Computer, Printer, Scanner, Internet/e-mail infrastructure, School telephone, Digital/video camera, Fax machine, Copier, Surveillance camera, Projector. The softwares are: Word processing, Spreadsheets, Databases, Power Point and Internet/e-mail

Methodology

The study was conducted using descriptive survey design. The target population for this study consisted of 75 principals in public secondary schools in Nairobi County at the time of study. In this study the researcher choose census survey and all the 75 principals of public secondary schools in Nairobi County were selected for the study. Further nine principals, one from each district were randomly chosen for interview. The nine principals were interviewed after they had filled the questionnaires**.** Questionnaires were used to collect data. In the current study, one principal from each of the nine divisions was interviewed once during visits to schools using the interview schedule to allow opportunity for probing and clarifying collected data from the questionnaires. The number of respondents involved in the pilot test was seven public school principals from Nairobi County. The pilot test was carried at the schools with similar characteristics to those sampled. The instruments used for the study were subjected to scrutiny by experts in the areas of educational management. Their corrections on

ambiguities, length, structure and wording of the questionnaire and interview schedule were used to modify and restructure the instrument. Cronbach alpha (α) was used for estimating internal consistency.

The primary data was collected from the principals who were the respondents through use of questionnaires and interview schedules. The data obtained from this study were both qualitative and quantitative. Analysis was conducted to provide structure to the gathered data and allowed for triangulation between the various research instruments used. The data for the questionnaires were entered carefully and accurately into Statistical Package for Social Sciences (SPSS) version 20.0 after it had been arranged and coded. Frequency distribution and percentages were computed for all items. Descriptive statistics used included the frequencies and percentages. The analysis of the hypothesis the researcher used Chi Square test (χ^2) to test the relationships and the level of integration of ICT for management of public secondary schools in Nairobi County. Data for each hypothesis were tested at the 0.05 level of significance. The analysis of data collected by interview was done using focus by question analysis strategy. Data was presented in percentages and frequencies. The researcher also recognized objectivity as vital during data analysis to ensure that the collected data is interpreted correctly. Saunders et al. (2007) explain that researchers must try to minimize risk to participants and society while attempting to maximize the quality of information they produce. Therefore ethical measures were observed throughout the investigation.

Findings of the Study

Principals' Access to ICT and Integration of ICT for School Management

Most secondary schools administrators have moderately embraced the use of ICT to perform administrative tasks. Table 1 shows the level of access to ICT.

Table 1

Extent of Using ICT on School Administration.

	High		Moderate		Low	
	N	%	N	%	N	%
School Administration	25	37.9	34	51.5	7	10.6

School administration: Maki (2008) stated that ICT could play major roles in reducing operational inefficiency and improving decision-making in many areas of governance in schools and school administrative subsystems. The findings of this study show that 51.5% of the principals of secondary schools moderately make use of ICT (computer) for schools management, 37.9% use it highly while 10.6% minimally use it. Administrators use ICT in preparing, administering, and compiling and analyzing students' tests marks and for keeping records. It was revealed that they use ICT for in the Kenya Certificate of Secondary Education (KCSE) registration. However, it was observed that principals need to use ICT in making logical decisions and seeking information on school rules and policies both for teachers and students. The educational management information system (EMIS) can allow effective management of financial and human resource. Application of ICT shows that data can be stored, retrieved and disseminated online with the use of MIS provided ICT is available and applicable(Oguta,Egesa and Musienga, 2014)

Table 2

Extent of Using ICT to Manage Curriculum Instruction.

	High		Moderate		Low	
	N	%	N	%	N	%
Curriculum Instruction	28	42.4	32	48.5	6	9.1

Information Communication Technology 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 (Watson, 2001). Encouragingly, there is growing and widespread awareness that the pedagogical and technical expertise of the teacher is absolutely critical here. Effectively introducing technology into schools is also largely dependent upon the availability and accessibility of ICT resources (e.g. hardware, software and communications infrastructure). Tella, Toyobo, Adika & Adeyinka (2007) agree that there is universal emphasis on teaching basic skills and research studies indicate that integrating ICT into subject learning is far more effective for students. The skill emphasis is reinforced by the lack of technology located in classrooms and a corresponding concentration on purpose-built computer labs. In this study results, revealed that 48.5% moderately use ICT for Curriculum Implementation, 42.4% are high users while 9.1% were low - users. Principals revealed that they use ICT for posting students' marks, grading their performance and timetabling. Information Communication Technology when used in the classroom becomes a catalyst for change in teaching styles and learning approaches (Watson, 2001).

Table 3
Extent of Using ICT to Manage Financial Management.

	High		Moderate		Low	
	N	%	N	%	N	%
Financial management	26	39.4	33	50.0	7	10.6

Majority of the principals of secondary schools (50.0%) moderately use ICT to do their financial management, 39.4% highly use it while 10.6% are low-users. This shows that though not at a very high level, ICT is playing a great role in financial record keeping of the secondary schools in Nairobi County. Principals of secondary schools use ICT for fees payment records in computer files, preparing staff salaries and payment processing along with fee analysis. Table 9 shows the extent of using ICT to manage guidance and counseling.

Table 4
Extent of Using ICT to Manage Guidance and Counseling.

	High		Moderate		Low	
	N	%	N	%	N	%
Guidance and Counseling	3	4.6	46	70.8	16	24.6

The importance of guidance and counseling programme in secondary schools, include bringing to the students an increased understanding of the educational, vocational and social information needed to make wise choices (Oye, Obi, Mohd, and Bernice, 2012). In our society there are many influencing forces responsible for the gradual recognition of formal guidance to young people in various educational levels (Lorelei, 2010). The essence of incorporating guidance and counseling into the public secondary school system in Kenya was to eliminate overwhelming ignorance of many young people on their choices of career prospects and personality maladjustment among adolescents. The role of ICT in guidance can be seen in three ways: as a tool, as an alternative, or as an agent of change. This study revealed that a high proportion (70.8%) of the secondary schools moderately use ICT facilities for guidance and counseling, 4.6% highly use it while 24.6% are low -

users. The principals had a positive attitude towards the use of ICT in guidance and counseling. School guidance can benefit much from ICT in terms of record keeping and communication. Further insight from the interview showed that cost, confidentiality and security were issues that were identified as needing to be addressed since school guidance is an integral component of education that benefits a lot from ICT usage. Table 5 shows the extent of ICT usage in management of school resources.

Table 5
Extent of Using ICT to Manage School Resources.

	High		Moderate		Low	
	N	%	N	%	N	%
School resources	17	25.8	36	54.5	13	19.7

The researcher sought to establish use of ICT in management of store ledgers and stores balance in secondary schools. Findings of this study revealed that 54.5% of the public secondary schools principals' moderately use ICT for management of school resources, 25.8% highly uses it while 19.7% low -users. The study revealed that principals use computer applications such as Excel, Word and Access in managing of school resources. This has an impact in record keeping and retrieval of information whenever needed especially for auditing purposes. Table 6 shows the principals' level of integration of ICT.

Table 6
Principals' Level of Integration of ICT.

	Frequency	
Level of integration of ICT	N	Percent
High	22	33.3
Moderate	39	59.1
Low	5	7.6
Non response	2	3.0
Total	68	100.0

Table 6 indicates the level of principals' level of integration of ICT in management of secondary schools. The table indicates that majority of the principals have moderately (59.1%) integrated ICT in management of secondary schools, However, 33.3% of the principals have highly integrated ICT in the day to day management of their schools. Only a few indicated that they have lowly used or did not respond (9.6%). Generally although many of the principals have indicated that they have integrated ICT in management of secondary schools, their level of use of ICT is still at basic level.

Relationship between Principals' Access to ICT and Level of Integration of ICT in Secondary School Management

The researcher was interested in establishing the relationship between principals' access to ICT and the level of integration of ICT in public secondary schools in Nairobi County. Table 26 shows the relationship between principals' access to ICT and level of integration of ICT in secondary school management. From Table 22, it can be noted that 45.5% of the respondents who had moderately integrated stated that they had inadequate access to computers and 26.4% who had highly integrated ICT stated that they inadequate access. This examination revealed that principals do not have adequate access to computers.

Table 7

Principals' Access to ICT and Level of Integration of ICT in Secondary School Management.

	Level of ICT integration							
	High		Moderate		Low		Total	
Access to computer	N	%	N	%	N	%	N	%
Adequate	3	4.4	8	11.7	0	0.0	11	16.1
Inadequate	18	26.4	31	45.5	1	1.4	50	73.6
Not available	0	0.0	3	4.4	4	5.9	7	10.3
Total	21	30.8	42	61.7	5	7.3	68	100.0

Table 8 shows the results of Chi square tests on access to ICT of principals**.**
Table 8

Chi Square Tests on Access to ICT of Principals.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	12.481[a]	3	.032	.122	
Likelihood Ratio	14.528	3	.069	.084	
Fisher's Exact Test	10.823			.141	
Linear-by-Linear Association	3.562[b]	1	.059	.071	.035

Table 27 indicates the results of the chi square (χ^2) testing of the hypothesis on relationship between access to information communication technology of principals and the level of integration information communication technology in management of secondary schools. The null hypothesis ($H0_5$) was tested using chi square statistic (df=3, Pearson $\chi 2$=12.48, p= 0.032 at 0.05 level of significance) indicated that the finding was highly significant and therefore the null hypothesis ($H0_5$) was therefore rejected. Access to information communication technology to the principals is therefore significantly related to the level of integration of information communication technology in management of secondary schools. This result is expected. It is expected that the higher the level of access to ICT a principal has, the higher the information communication technology exposure and use. Therefore principals with higher level of access to ICT are expected to highly integrate information communication technology use in management of secondary schools compared to those with low level of access to ICT. There is an apparent relationship between access to ICT by principals and integration of ICT for management by principals of secondary school in Nairobi County.

Answering interview questions a(1,2,3) b,c (derived from research question 5) which was seeking information on whether there was a relationship between

Principals ICT access and the level of ICT integration in secondary schools, 5(55.5%) out of the 9 interviewees agreed that training matters while 4 (44.4%) out of 9 disagreed. The results of the analysis are presented in Table 9

Table 9

Responses from Interviewees on Principals' ICT access in ICT Integration in Public Secondary Schools Management in Nairobi County

Principals views on ICT access	% responses from the 9 sampled principals
Level of ICT usage	3(33%)
Have you benefitted from ICT	4(44%)
Frequency of using ICT	2 (22%)
Duration of using ICT	1(11%)
Total	9 (100%)

Results of the Chi Square test based on hypothesis 5 and research question 5 (interview items a1,a2,a3,b,c) are in agreement that ICT access is paramount for ICT integration in management of public secondary schools in Nairobi County. Principals through interviews were asked to give their views on ICT access in ICT integration in management of public secondary schools in Nairobi County. Their opinions showed that 3 (33 %) out of the 9 indicated that level of ICT usage by principals was mainly with timetabling and financial management. Responses from 4 (44 %) indicating that principals benefitted from ICT in terms of efficiency, accuracy, confidentiality and timeliness. Results indicate that 2 (22%) of the principals indicated that they use ICT frequently in management of public secondary school. On the other hand, 1 (11 %) of the principals indicated that more time was spent on ICT for management of public secondary schools in Nairobi County. (See Table 9)

Findings of this study from interview and observation checklist indicated that Nairobi county secondary school principals are lacking in proficiency on database, spreadsheet, presentation/ multimedia software, the Internet, and information seeking as compared with other technology competencies. Hence, the government needs to provide professional development for principals to become proficient in all the competency areas. Also, they should implement an evaluation system that ensures school principals are working with the technologies at a proficient level.

Therefore, access to ICT is a key element to successful integration of ICT in secondary schools. A study by Yildrim (2007) found that access to technological resources is one of the effective ways to ICT integration. In another study on ICT integration among faculty members in higher education in Turkey conducted by Usluel, Askar & Bas (2008) it was revealed that majority of the respondents 81.2 percent reported having access to ICT

Discussions

This part of the investigation attempted to establish the link between ICT access, which included hardware and software, and use of ICT in management of secondary school. The most available ICT hardware to principals consisted of a computer. The results indicate that Pearson $\chi^2 = 12.48$, $p=0.032$ at 0.05 level of significance e (df=3). The null hypothesis ($H0_4$) was therefore rejected. It was not accepted. The level of access of ICT of the principal is therefore significantly related to the level of integration of information communication technology in management of secondary schools. The integration of ICT is expected to promote principals access to ICT. It is important to provide enough ICT equipment both hard and software and maintenance to secondary schools in Kenya. This will give principals ample time to manage the schools effectively. This task lies with the ministry of education and all the stakeholders of the schools.

The results from checklist observation revealed that one school did not have electricity at the time of the study. The school was constructed by CDF funds. It is clear that there were less ICT equipment and infrastructure in

most of the schools. In conclusion, it is evident that generally there were inadequate equipment, infrastructure and security as there were no surveillance cameras. Only ten schools had internet connection.

Conclusions

From the findings of the study, it was concluded that access to ICT was significantly related to their level of integration of ICT in management of secondary. This study revealed that the available ICT facilities in the Nairobi county schools were not adequate and their utilization was low.

References

Adam, K. (2005). The Role of Department Heads as Change Agents in the Implementation of Educational Reform in the United Arab Emirates. PhD thesis. Pretoria: University of South Africa. Accessed July 12, 2008 from http://etd.unisa.ac.za/ETD-db/theses/available/etd

Adebayo, E.L. & Adesope, O.M. (2007). Awareness, access and usage of information and communication technologies between female researchers and extensions, International Journal of Education and Development Using Information and CommunicationTechnology (IJEDICT), 3, (1): 85-93.

Adeyemi, G. &Adeyemi, T. (2003). "Gender Issues in Nigerian Politics" in Kwanashie, M. (ed), Politics andPolitical Power Relations in Nigeria**.**Oshodi, Dat& Partners Logistics Ltd.

Aladejana, F. (2007). *The implications of ICT and NKS for Science Teaching*: Whither Nigeria.Complex Systems 17, 113 – 124.

Amviko, A. (2011). *Computerized Accounting Systems and Financial Reporting*. Research Report submitted to the Department of Distance and Lifelong Learning in Partial Fulfillment of the Requirements for the Award of the degree of Masters of Commerce of Makerere University.

Anderson, R., & Dexter, S. (2005). School Technology Leadership: An empirical investigation of prevalence and effect. *Educational Administration Quarterly, 41*(1), 49-82.

Anderson, B., Gale, C., Jones, M.L.R. and McWilliam, A. (2002). Domesticating broadband: what consumers really do with flat rate, always-on and fast internet access", *BT Technology Journal*, *20*(1)103-114.

Afashari M., Jones M., and Muniapa B. (2008*). Exploring the extent of ICT integration among secondary school principals in Malaysia*. www.swinburne.edu.my/research_staff_publication.php?do=staff_publication_2008-53k

Agarwal, R. and Prasad, J. (1998). "*A Conceptual and operational definition of personal innovativeness in the domain of information technology*". Information Systems Research, *9*(2), p. 204.

Ajzen, I. and Fishbein, M. (1980). *Understanding attitudes and predicting social behavior,* Prentice-Hall, Engle-wood Cliffs, NJ.

Akbaba-Altun, S. (2006). *Complexity of Integrating Computer Technologies into Education in Turkey*. [Electronic version]. Educational Technology and Society, *6*(9), 367-380.

Akbulut, Y., Kesim, M., & Odabasi, F. (2007). *Construct Validation of ICT Indicators Measurement Scale* (ICTIMS). [Electronic version]. International Journal of Education and Development using Information and Communication Technology, *3*(3), 1-17.

Albirini, A. (2006). Teachers' attitudes toward Information and Communication Technologies. *Journal of Computer& Education*, 47, 373-398.

Amara, S. (2006). *Census on Computer Literacy of Teachers - November 2006*, Sri Lanka Department of Census and Statistics. Accessed Dec 19, 2007 from http://www.statistics.gov.lk/

Anao, A. R. (2003). *Society, knowledge incubation and management* - Lagos. The Guardian Newspapers, November 11, 75

Asan, A. (2003). *Computer Technology Awareness by Elementary School Teachers: A Case Study from Turkey*. [Electronic version]. Journal of Information Technology Education, *2*(3), 153-164.

Awoleye, M. O., Siyanbola, O. W., & Oladipo, F. O. (2008). Integration assessment of Internet usage amongst undergraduates in Nigerian Universities - a case study approach. *Journal of Technology Management and Innovation, 3*(1), 84-89.

Bayo-Moriones, A., & Lera-López, F. (2007). A firm-level analysis of determinants of ICT integration in Spain. *Technovation, 27*(6-7), 352–366. doi:10.1016/j.technovation.2007.01.003

British Educational Communications and Technology Agency (BECTA), ICT Research, (2009). The Becta Review 2009. *Evidence on the Progress of ICT in Education.* http://about.becta.org.uk/display.cfm?page=1644

British Educational Communications and Technology Agency (BECTA), (2009). *Pupils and Teachers perceptions of ICT in the home, school and community*. Accessed June 14, 2009 from http://publications.becta.org.uk/download.cfm

British Educational Communications and Technology Agency (BECTA), (2004). *A review of the research literature on barrier to the uptake of ICT by teachers*. Retrieved from www.becta.org.uk (January 13, 2011)

British Educational Communications and Technology Agency (BECTA), (2003). *What Research Says about Barriers to the Use of ICT in Learning.* Retrieved from www.becta.org.uk/research.

Bryman, A. (2004*). Social research methods*. New York: Oxford University Press.

Bell, J. (2005). *Doing Your Research Project: A Guide for First-time Researchers in Education, Health and Social Science.* London. McGraw-Hill International (UK) Limited

Berg K. E. & Latin R. W. (2008). *Essentials of Research Methods in Health, Physical Education, Exercise Science, and Recreation,* 3rd edition. Maryland: Lippincott Williams &Wilkins

Berube, W., Gaston, J., & Stepans, J. (2004). *The Role of the Principal in Teacher Professional Development.* [Electronic version]. NOVAtions Journal, *4*(1).

Bigum, C. (2006). *The knowledge producing school.* http://www.deakin.edu.au/education/lit/kps. Accessed 20 September, 2013.

Bless, C., Higson-Smith, C., & Kagee, A. (2006). *Fundamentals of social research methods: An African perspective*. Juta and Company Ltd.

Black, N. F., Lockett, A., Winkhofer, H. & Ennew, C. (2001). "The integration of Internet financial services: A qualitative study". *International Journal of Retail and Distribution Management, 29* (8), pp. 390 – 398

Blake, R. (2000). *An Investigation of Technology Competencies of School-Based Administrators in Florida Schools*. Dissertations Abstract International.AAT 9977808

Blumberg, B.F. Cooper, D.R.& Schindler, P.S. (2008). *Business Research Methods.* McGraw-Hill Higher Education.

Boohan, R . (1994). *Interpreting the world with numbers. An introduction to Quantitative modelling In H Mellar, J Bliss, R Boohan, J Ogborn and C Tompsett (eds.) Learning with Artificial Worlds*: Computer Based Modelling in the Curriculum. London: The Falmer Press.

Borghans, L. & Ter Weel, B. (2004). "Are computer skills the new basic skills? The return to Computer, Writing and Math skills in Britain," *Labour Economic. 11*(1): 85-98.

Borotis, S. & Poulymenakou, A. (2004). E-Learning Readiness Components: Key Issues to Consider Before Integrateing e-Learning Interventions. In J. Nall & R. Robson (Eds.), <cite>Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2004</cite> (pp. 1622-1629). Chesapeake, VA: AACE.

Bradley, L. and Stewart, K. (2002). *"*Study of the drivers and inhibitors of Internet banking: compare Singapore and South Africa". *Journal of Global Information Management, 12*(2), pp 1 – 26.

Breisser, S. R. (2006). An examination of gender differences in elementary constructionist classrooms using Lego/Logo instruction. *Computers in the Schools,* 22, pp.7-19.

Butler, J. A. (1992). Staff Development. Retrieved 20 August, 2007, from http://www.nwrel.org/scpd/sirs/6/cul12.html

Carveth, R. and Kretchmer, S.B. (2002). The digital divide in Western Europe:problems and prospects. *Informing Science*, pp. 239-49.

Campbell D. & Sellbom, M. (2002), Barriers to Integrateing Technology for Teaching and Learning', *Educase Quarterly*, 25 (2), 22-28.

Campbell, L. (1996). *Students or teachers? Who should our targets be*? ACCESS, 10 (4): 14-16.

Chauhan, B. P. (2004). *ICT Enabled Library and Information Services*. Paper Presented at the Winter School on ICT Enabled Library & Information Services, Thapar Institute of Engineering & Technology, Patiala 2004.

Chemwa,G.W. & Mburu, S.N.(2007). *Longhorn Secondary Computer Studies for Form 2.* Nairobi: Longhorn Publishers.

Cheng, T.C.E, Lam, D.Y.C, & Yeung, A.C.L (2006) *Integration of Internet banking: An empirical study in Hong Kong, Decision Support Systems, 42* (3), Pages 1558-1572.

Chepkonga, S. (2012). *Training needs assessment of principals in financial management.* Published Master's thesis, LAP Lambert Academic Publishing. Saarbrucken, Germany.

Chigona, W., Miller, L., Naidoo, M., & Van Belle, J. P. (2006). School-level ICT Integration Factors in the Western Cape Schools. Department of Information Systems, University of Cape Town. Proceedings of Fourth IEEE International Workshop on Technology for Education in Developing Countries, 10-12 July, Iringa Tanzania, pp. 57 – 61.

Cho, I. & Kim, Y. (2002). "Critical Factors for Assimilation of Object-Orientated Programming Languages," *Journal of Management Information Systems, 18* (3): 125-156.

Christians, C.G. (2000) `Ethics and politics in qualitative research', in Denzin, N.K. and Lincoln, Y.S. (eds) *Handbook of Qualitative Research*, London: Sage Publications.

Christopher, J.C. (2003). Extent of Decision Support Information Technology Use by Principals in Virginia Public Schools. Doctorate Thesis. Virginia: Virginia Commonwealth University.

Cohen, L. Manion, L & Morrison, K.(2000). *Research methods in education*. London: Routledge Falmer.

Computer For Schools Kenya (CFSK). (2007). *ICT in Education and Training: Backgroung information*. Accessed Nov 13, 2007 from http://www.cfsk.org

Cotton, K. (2001). Applying Total Quality Management principles to secondary education. *School improvement research series.* Accessed August 04, 2008 from http://www.nwrel.org/scpd/sirs/9/s035.html

Creighton, T. (2003). *The Principal as Technology Leader.* Crown press 2455, Teller Road,Thousand Oaks, CA 91320-2218. ISBN – 619-4541-5

Darling-Hammond, L. (2000). *Teacher quality and student achievement: a review of state policy evidence*. Education Policy Archives, *8*(1): 1-32.

Davis, F. D. (1986). *Perceived usefulness, perceived ease of use, and user acceptance of information technology.* MIS Quarterly, 13(3), 319-340.

Davies, J. E. (2002). *Assessing and Predicting Information and Communication Technology Literacy in Education Undergraduates*. PhD thesis. Canada: University of Alberta. Accessed Oct 28, 2006 from http://proquest.umi.com/pqdweb?did=7264

Davis, P. R. (2008). *"A Relationship Approach to Construction Supply Chains,"* Industrial Management & Data Systems 108(3), 310-327.

Day,C., & Sachs, J. (2004*). International Handbook on the Continuing Professional Development of Teachers.* London: Open University Press.

Dawson,C., & Rakes, G. (2003). *The influence of principles' technology training on the integration of technology into schools*. Journal of Research on Technology in Education, *36*(1), 29-49.

DeJaeghere,J., Williams, R. & Kyeyune, R. (2008). *Ugandan Secondary School Headteachers' Efficacy: What Kind of Training for Whom?* International Journal of Educational Development, 29, 312–320.

Denzin,N. K., & Lincoln,Y. S. (2000). *Handbook of Qualitative Research* (2nd ed.). United States of America: Sage Publications.

Di Benedetto, A. (2005). Does Technology Influence Teaching Practices in the Classroom? Paper presented at the National Educational Computing Conference. Philadelphia, PA. http://www.iste.org/Content/NavigationMenu/Research/NECC_Research_Paper_Archives/NECC_2005/DiBenedetto-April-NECC05.pdf

Dholakia, R.R., Dholakia, N. and Kshetri, N. (2004). *Gender and Internet Usage*. The Encyclopedia

Drago-Severson, E. (2004). *Helping Teachers Learn*. *Principal Leadership for Adult Growth and Development.* California: Sage Publications.

Elbanna A. (2009). *Actor-Network Theory in ICT Research: A Wider Lens of Enquiry*. IJANTTI 1(3): 1-14 **(**2009**).** 2008. 6, Electronic Edition · pubzone.org.

e-Living Consortium. (2003). *Gender and ICT's*: Implications for Policy and Strategy.Soffer, T. and Raban, Y.

Ezz, I., & Papazafeiropoulou, A. (2006). "*Inter-organisational collaboration towards process integration in the public sector*. E-government collaboration in Egypt". Hawaii International Conference on Systems Sciences (HICSS-39). Jan 4-7. Hawaii, USA

Farrell, G., & Shafika, I. (2007). *Survey of ICT and Education in Africa: A SummaryReport, Based on 53 Country Surveys*. Washington, DC: *info*Dev / World Bank. Available at http://www.infodev.org/en/Publication.353.html

Farris, E. (2001). *Internet Access in US Public Schools and Classrooms* 1994-2000. National Center for Educational Statistics

Fraenkel, J. R., & Wallen, N. E. (2000). *How to design and evaluate research in education*. New York: McGraw-Hill.

Ferrigan, C. (2007). *Passing the ICT skills Test*: 2nd edition. London: Learning Matters Ltd.

Fialova, K. (2006). Associating gender with ICT policy. *Association for Progressive Communications Women's Networking Support Programme.* Information for Development. Retrieved from http://www.i4donline.net/articles/currentarticle.asp?articleid=590&typ=Features.

Foley, W. (1996). *Information Structure*. www.sil.org/linguistics/Bibliographyfoleyw1996htm3k

Fullan, M. & Hargreaves, A.(1998). *What is Worth Fighting for Out There?* New York: Teachers College press.

Fullan, M. (2000). The return of large-scale reform. *The journal of educational change,* 1(1):1-23.

Gakuu, C. M. (2009). *A Path Analysis Model of the Relationship Between Lecturers' Issues of Concern and Readiness to Integrate eLearning*, University of Nairobi, Kenya.

Gakuu, C. M. (2006). *Analysis of the factors and attitudes that influence lecturers readiness* Published at the Department of Extra Mural Studies (http://ems.uonbi.ac.ke)

Garba P.K., & Garba A.G. (2010). *Women in Economic Research and Graduate Training in Nigeria.* Nairobi : African economic research consortium. Kenya

Gooden, J. S. (2006). Computers, Use and Impact of. *Encyclopedia of Educational Leadership and Administration*: SAGE Publishers.

Gupta, R. (Ed.) (2008). Gender and ICTs. *Empowering women in the knowledge society.* Retrieved from I4D-www.i4donline.net .

Introduction to SAS. UCLA: Statistical Consulting Group. (2007). from http://www.ats.ucla.edu/stat/sas/notes2/ (accessed November 24, 2007).

Hafkin, N. J. (2003). *Some Thoughts on Gender and Telecommunications/ICT statistics and indicators*. Paper presented at the 3rd World Telecommunication/ICT Meeting held in Geneva.

Han, C. (2002). *Leadership Roles of a Pre School Principal in the Use of Information Communication Technology: A Hong Kong Experience* (Electronic Version) Contemporary Issues In Early Childhood,3(2)293-297)

Haines, R. & Leonard, L.N.K. (2007). *"Situational Influences on Ethical Decision-Making in an IT Context,"* Information & Management 44(3), 2007, 313-320.

Hezel Associates LLC. (2005-2006). PBS Teacher Line National Survey of Teacher Professional Development. New York. files.eric.ed.gov/fulltext/ED499124.pdf

Higgs, J. (1997). Barriers to the Effective Use of Technology in Education', *Journal of Educational Computing*, 17 (4), 385–395.

Hollenstein, H. (2004). *Determinants of the integration of Information and Communication Technologies (ICT).* Structural Change and Economic Dynamics, 15(3), 315–342. doi:10.1016/j.strueco.2004.01.003

Ismail, A., Ahmad, N. & Affandy, H. (2013). The Use of ICT in Rural School Libraries.*Journal of Asian Scientific Research*, 3(6):587-599.

Jegede, P. O., Dibu-Ojerinde, O. O. & Ilori, M. O. (2007). Relationship between ICT competence and attitudeof some Nigerian lecturers. Education Research and Review. Retrieved November 30, 2007 from http://www.academicjournals.org/ERR/PDF/pdf%202007/Jul/Jegede%20et%20al.pdf

Johnson, B. & Christensen, L. (2004). *Educational Research: Quantitative and Qualitative Approaches;* Boston: Allyn & Bacon press.

Kabbar , E.F., & Crump, B. J. (2006). *The Factors that Influence Integration of ICTs by Recent Refugee Immigrants into New Zealand*. Informing Science : The International Journal of an Emerging Transdiscipline, 9 , 111-121

Karanja, T. (2012). *ICT in East African Education*: *The Inescapability Dilemma* CEMASTEA, Nairobi. Kenya

KENET, (2007). *E-Readiness Survey of Higher Education Institutions In Kenya. ICT Strategy brief.* Kenya Education Network Trust

Kennedy, T., Wellman, B. & Klement, K. (2003). Gendering the Digital Divide. *Journal of IT & Society.* Vol. 1, No. 5, pp. 72-96. Retrieved February 06, 2009, from http://www.stanford.edu/group/siqss/itandsociety/v01i05/*v01i05a05.pdf*

Kenney, A. J. (2006). The Final Hurdle? A new test may finally bring information literacy the recognition it deserves. *School library journal*. Accessed July 11, 2008 from http://www.schoollibraryjournal.com/article

Kenya Education Sector Support Programme (KESSP), (2006). *The Ministry Of Education (MOE) Strategic Plan (2006-2011)*

Kenya Education Staff Institute (KESI), (2008). Training of Secondary School Principals in ICT Integration Management. Ministry of Education. Tom Mboya Labour College, Kisumu.

Kerlinger, F.N. (1973). *Foundation of Behavioral Research*. Holt Rinchart Winston International, New York

Khazanchi, D. (2005). "Information Technology (IT) Appropriateness: The Contingency Theory of "FIT," *Journal of Computer Information Systems*

Kiarie, J. (2007). *Successful Strategies for Implementing ICT in Schools*. http://www.checkpoint-elearning.com/article/3936.html

Kidombo, J. and Gakuu, C.M. (2009). *Status of Pedagogical Integration of ICTs in Kenya*. Pan African Research Agenda. www.ernwaca.org/panaf/spip.php article946.

Kincheloe. (2004). *Rigour and complexity in educational research*. McGraw-Hill International.

Kinyanjui, P. (2004). NEPAD initiatives in information and communications technologies and associated capacity building, paper presented to the All Africa Ministers' Conference on Open and Distance Learning. Cape Town, February 2004

Kipsoi, E. J., Chang'ach, J. K. & Sang, H. C. (2012). 'Challenges facing integration of information communication technology (ICT) in educational management in schools in Kenya'. *Journal of Sociological Research.* 3 (1).

Kirsch, I. & Lennon, M. (2005). "*The ICT literacy framework*", *Measuring Adult Literacy and Life Skills: New Frameworks for Assessment.* Ottawa: Statistics Canada. 189-252-MIE, (13)

Krishnaveni, R. & Meenakumari, J. (2010). *Usage of ICT for information administration in higher education institutions – a study*. International Journal of Environmental Science and Development. 1 (3):282 – 286

Kombo, D.K. & Tromp, D.H.A. (2003). *Proposal and Thesis Writing. An Introduction.* Africa, Nairobi : Pauline publications , GPO, Kenya

Kumar, N. (2008). *Predictors of Technology Deployment among Malaysian Teachers* . American Journal of Applied Sciences. 5(9) pp 1127-1134

Kumar, N., Rose, R. C. & D'Silva, J. L. (2008). *Teachers' readiness to use technology in the classroom: an empirical study*. European Journal of Scientific Research. 21 (4): 603-616

Langat, G. K (2008). *An Evaluation of the Impact of Government Instructions on Financial Management in Public Secondary Schools in Kenya*. Egerton University.

Leedy, P. D. (1993). *Practical research: Planning and design.* 5th edition. New York: Macmillan.

Leung, W. M. (2004). An Innovative program with ICT in early childhood program in Hong Kong. Paper presented in the XXIV World Congress of OMEP, Melbourne, Australia.

Magni (2009),"ICT usage in Higher education", International Technology and Education and Development Conference, Spain March 9-11 2009.

Makewa, L., Meremo, J., Role, E., & Role, J. (2013). ICT in secondary school administration in rural southern Kenya: An educator's eye on its importance and use. *International Journal of Education and Development using ICT* [Online], 9(2). Available: http://ijedict.dec.uwi.edu/viewarticle.php?id=1593

Maki, C. (2008). *Information Communication Technology for Administration and Management of Secondary Schools in Cyprus*. Journal of Online Learning and Teaching. 4 (3). Retrieved on 6 /02/11 www.pliroforiki.org/joomla/index.php?option=com_docman...

Manduku, J. Kosgey, A. & Sang, H. (2012). Integration and Use of ICT in Enhancing Management of Public Secondary Schools: A Survey of Kesses Zone Secondary Schools in Wareng District of WasinGishu County, Kenya. www.ijhssnet.com/journals/.../8.pdf

Markauskaite, L. (2006). Exploring Differences in Trainee Teachers' ICT literacy: Does Gender Matter? CoCo (Centre for Research on Computer Supported Learning and Cognition). University of Sydney. Retrieved November, 2010 from http://www.pdfdownload.org/pdf2html/view_online.php?url=http%3A%2F%2Fwww.ascilite...org.au%2Fconferences%2Fbrisbane05%2Fblogs%2Fproceedings%2F51_Markauskaite... Pdf

Markauskaite, L. (2005). *Exploring Differences in Trainee Teachers' ICT Literacy: Does Gender Matter?* Accessed Dec 06, 2007 from http://www.ascilite.org.au/conf/brisbane05/blogs/proceedings/51- markauskaite.pdf

Means, B. (1994*). Reform Technology and Educational*. San Fransisco Jossey-Bass Inc.

Meenakumari, B and Vipinkumar, V P and Shanthi, B and Jayasankar, P (2013) *Glimpses of gender mainstreaming in Indian marine fisheries sector.* Discovery Science, 5 (14). pp. 24-34.

Menjo D. & Boit. (2008)The challenges of using Information Communication Technology (ICT) in School Administration in Kenya www.kaeam.or.ke/e journal/articles/vol1/menjofulltext.pdf . Retrieved on 20th Jan 2011

Merriam, S. B. (1998*). Qualitative Research and Case Study Applications in Education*. San Francisco: Jossey-Bass Inc.
Merriam-Webster, Inc (1997).

Merriam-Webster's Geographical Dictionary. Merriam-Webster. p. 786. ISBN 0-87779-546-0.

Mikalista, S.M. (2010). Gender-speciific Constraints Afecting Technology Use and Household Food Security in Western Province For Kenya. *African Journal of FoodAgriculture Nutrion and Development (Ajfand) Online.* Vol. 10, No. 4. April, 2010. ISSN 1684-5374

Miles, M.B, Saxl E. R & Lieberman, A. (1998). What skills do educational "change agents" need? An empirical view. *Curriculum Inquiry*, 18(2): 157-193

Mioduser, D., Nachmias, R., Tubin, D., & Forkosh-Baruch, A. (2003). Analysis schema for the study of domains and levels of pedagogical innovation in schools using ICT. *Education and Information Technologies, 8:* 23- 36.

Monyatsi, P.P. (2002). Teacher Appraisal: An Evaluation of Practices in Botswana Secondary Schools. PhD thesis. Pretoria: University of South Africa. Accessed Nov 08, 2007 from http://etd.unisa.ac.za/ETD-db/theses/available/etd

Muhamed A. E. (2013). Exploring the Relationship between Teaching Staff Age and their Attitude towards ICT. *International Journal of Instruction Vol. 6, No1 ESSN 1308-1470 www.e-iji.net*

Mulwa, A. S., & Kyalo, D. N. (2013). The Influence of Principals', Teachers' and Students' attitude on Readiness to Integrate e-Learning in Secondary Schools in Kitui District, Kenya. *European Scientific Journal*, 9(5).

Mugenda, A.G. & Mugenda, O.M. (2003). *Research Methods; Quantitative and Qualitative Approaches.* Nairobi: ACTS press

Mugenda, A. G. (2008). *Social science research: Theory and principles.* Nairobi: Applied Research and Training Services Press

Muilenburg, L.Y. & Berge Z.L. (2005). "Student barriers to online learning: A factor analytic study", Distance Education, 26 (1): 29-48. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.88.2865&rep=rep1&type=pdf Accessed 2009-12-07 18:03:52

Nachmias, F. and Nachmias, D. (1996). Research Methods in Social Sciences. London: Edward Arnold.

Ndiwa, K. S. (2001). "Information Communication and Technology and the Sustanable Management of Secondary Schools in Uasin Gishu County, Kenya. *KEMI Journal,* 3*(1),* pp. 390 – 398

NEPAD e-Africa Commission (2003). The NEPAD e-Initiative: Ensuring that Young Participate Actively in the Global Information Society and Knowledge Economy. Retrieved on October 22, 2007. http//www.eafricacommission.org

NDP (National Development Plan). (August, 2007). *Gender Equality in IT, Ecommerce and Internet Usage*. Compiled by Reeves Associates. Retrieved November 06, 2007 from http://ndpgenderequality.ie/downloads/factsheets/it&internet.pdf

Nolan, K., Friesen, D., Maeers, V., & Couros, A. (2005). *A Case-Study of Pre-service Teachers Learning to Teach with Technology*.

Noman, H. (2002). United Nations Development Programme (UNDP). An overview of the Demographics and Usage Patterns of Internet Users in Developing Countries: Yemeni *Internet Population as a Case Study*. Retrieved August 05, 2007 from UNDP website: http://www.undp.org.ye/ict.php

Norris, C., Sullivan, T., Poirot, J., & Soloway, E. (2003). No access, no use, no impact: snapshot surveys of educational technology in K-12. *Journal of Research on Technology in Education*, 36(*1*), 15–27.

Nwosu A.A. (2003). Integrating ICT into STM Classroom: Status And Implications Proceedings of the 44th Stan Conference 58 to 60

Oguta, J.O.,Egesa, R.K.W.,& Musienga, D. (2014). Effects of Information Communication and Technology (ICT) Application on Strategic Educational Quality Standards Management in Bungoma County, Kenya. International Journal of Business and Management Invention ISSN (Online): 2319 – 8028, ISSN (Print): 2319 – 801X www.ijbmi.org 3 (*5*)‖ May. 2014. PP.11-17 www.ijbmi.org 11 |

Okebukola, P. (1997*). Old, new and current technology in education*. UNESCO

Olatokun, W.M. (2008). Gender and National ICTs policy in Africa: issues, strategies and policy options. Journal, *Information Development*.24, 53-66

Ong, C.S. & Lay J.Y. (2006) "Gender differences in perceptions and relationships among dominants of e-learning acceptance", *Computers in Human Behavior*, 22 (5): 816-829.

Onguko, B.N. (2004) Building scenarios for the development and implementation of a computer based management information systems for Kenyan secondary schools. *A dissertation for the award of masters of Science, and Training Systems Design*. University of Twente, Netherlands

Orodho, A. J. (2005). *Elements of Social Science Research Methods.* Nairobi: Hurlifax printers

Orodho, A. J. (2004). *Techniques of Writing Research Proposals and Reports in Educational and Social Sciences*. Nairobi: Reata Printers.

Oye N. D., Obi M. C., Mohd T. N., Bernice, A. (2012). Guidance and Counseling in Nigerian Secondary Schools: The Role of ICT, *International Journal of Modern Education andComputer Science*, 4(8): 26-33

Pawlak, M. & Malyszek, E. (2008). "A Local Collaboration as the Most Successful Co-ordination Scenario in the Supply Chain," *Industrial Management & Data Systems* 108 (1), 22-42.

Panneerselvam, R. (2008). *Research Methodology.* (6th Ed.) New Delhi: Prentice Hall of India Private Ltd.

Peansupap.V. & Walker D.H.T. (2005). "Exploratory factors influencing information and communication technology diffusion and integration within Australian construction organizations: a micro analysis, *Construction Innovation: Information, Process, Management*, 5 (3), pp.135-157, doi:10.1108/14714170510815221

Pedrom, H., Enrique, H., Ernesto, L. & Lucio, R. (2004).*Technology in Schools: Education, ICT and the Knowledge Society*.

Pernia, E. E. (2008). Strategy framework for promoting ict literacy in the asia-pacific region. publication of unesco bangkok communication and information unit. asia and pacific regional bureau for education, bangkok 10110, thailand. accessed july 14, 2007 from http://portal.unesco.org/ci/en/ev.php-

Persaud, B. (2006). *School administrators' perspective on their leadership role in technology integration.* PhD thesis. Minnesota: Walden University. Accessed Oct 11, 2006 from http://0proquest.umi.oasis.unisa.ac.za:80/pqdweb?diid=1127209711

Pfeffer, J. (1982). *Organizations and Organization Theory*. Pitman, Marshfield

Pole, C. J. & Lampard, R. (2002). *Practical Social Investigation: Qualitative and Quantitative Methods in Social Research.* Harlow, England: Prentice-Hall.

Polizzi, G. (2011). Measuring School Principals' Support for ICT Integration in Palermo, Italy. *The National Association for Media Literacy Education's Journal of Media Literacy Education* 3:2 (2011) 113 – 122

Republic of Kenya, (2005): ICTs in Education Options. Paper, Ministry of Education, Science and Technology Draft 16th June, 2005

Robyler M.D.(2005). Educational Technology Research That Makes a Difference : *Series Introduction, Contemporary Issues in Technology and Teacher Education* 5(2) 2005

Rogers, E.M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.

Rogers, E.M. (1995). *Diffusion of Innovation*s (4th Edition), New York: The Free Press.

R.o.K (2005*). Sessional Paper No. 1 of 2005 on Policy Framework for Education, Training and Research: Meeting the Challenges of Education and Training to All Kenya.* Nairobi: Ministry of Education, Science and Technology.

R.o.K (2006a). *The National Information and Communication Technology Policy* Nairobi Government Printers

R.o.K (2006b). *National Strategy for Education and Training, Nairobi* Government PrintersGordon, G. (2003). *Do Principals Make a Difference*? Retrieved 30 August, 2007://www.centerforcsri.org/index.php?option=com

Salerno, C. (2009). 'Administrator's Role in Technology Integration'. Education World

Sani, A. &Tiamiyu, M. (2005). *Evaluation of Automated Services in Nigerian Universities*. The Electronic Library, 23(3): 274-288.

Saunders, M., Lewis, P. & Thornhill, A. (2007). Research Methods for Business Students. 4th edition. England: Prentice Hall.

Schreiber, J. B., & Asner-Self, K. (2011). *Educational Research: The Interrelationship of Questions, Sampling, Design, and Analysis.* United States of America: John Wiley & Sons, Inc.

Shapka, J. D. & Ferrari, M. (2003). Computer-related Attitudes and Actions of Teacher Candidates. *Computers in Human Behaviour,* 19(3): 319 -334.

Sekaran, U. (2003). Research Methods for Business: A Skill-Building Approach. 4th Edition. Singapore. John Wiley & Sons, Inc.

Selwood, D., Fung, A. & O'Mahony, C. 2003. *Management of Education in the Information Age*: *The Role of ICT*. IFIP TC3/WG3.7 Fifth Working Conference on Information Technology in Educational Management (ITEM 2002), Helsinki. IFIP Conference Proceedings, 248. London: Kluwer Academic Publishers.

Seyoum, A.F. (2004). Key Issues in the Implementation and Integration of ICT in Education Systems of the Developing Countries. Downloaded on 11/7/2011 from: http://www.ictes2004gstit.edu.et/session%20IV full papers/Key%20Challenges%20factors%20imple_Abbe% 20Feleke.pdf

Schiller, J. (2002). Interventions by School Leaders in Effective Implementation Information and Communications Technology: Perceptions of Australian Principals. *Technology, Pedagogy and Education, 11*(3), 289

Schreiber, J., & Asner-Self, K. (2011). *Educational research: The interrelationship of questions, sampling, design, and analysis*. Wiley.

Shiels, H., McIvor, R., & O'Reilly, D. (2003). Understanding the implications of ICT integration: insights from SMEs. *Logistics Information Management*, *16*(5), 312–326. doi:10.1108/09576050310499318

Siddike, A., Munshi, N. &Sayeed, A. (2011). *The Integration of Information and Communication Technology (ICT) in the University Libraries of Bangladesh: An Exploratory Study*. Paper delivered in the

International Seminar "Vision 2021: the role of libraries for building digital Bangladesh" on 04 February 2011, organized by Library Association of Bangladesh.

Siegel, J. (1999). The State of Technology and Educational Management in Schools: [Electronic Version] *Electronic Learning*, 14 (8), 43-53.

Smith, D. (1989). *Microcomputers in schools*. In M. Eraut (Ed.), The International Encyclopedia of Educational Technology, Oxford: Pergamon Press,

Steyn, G. M., & Van Niekerk, E. J. (2005). Human Resource Management in Education. Pretoria: UNISA Press

SO, T. & Swatman, P. M. C. (2006). e-Learning Readines of Hong Kong Teachers. University of South Australia.

Teachers Service Commission (TSC). (2007). 10 Key Policies. *Teachers' Image*: *Quarterly Magazine*, (13)6: 9-11.

Tee, W. (2003). The Role of Beliefs in the Use of Information Technology: Implications for Teacher Education, or Teaching the Right thing at the Right Time', [Electronic Version] *Journal of Information Technology for Teacher Education*, 2 (2), 139–153.

Tella, A., Toyobo, O. M., Adika, L. O., & Adeyinka, A. A. (2007). An Assessment of Secondary School Teachers Uses of ICTs: Implications for Further Development of ICT's Use in Nigerian Secondary Schools. *Online Submission, 6*(3).

Terry, P.M. (2003). Empowering teachers as leaders. National Forum Journals, 1:1-8.

Tichapondwa, M.S. (2013). *Preparing your Dissertation at a Distance: A Research Guide.* Vancouver: VUSSC Press.

Tijani, O. M., & Mohammed, A. K. (2013). Computer-Based Accounting Systems in Small and Medium Enterprises: Empirical Evidence from a Randomized Trial in Nigeria.

Trinidad, A.C. (2002). An initial assessment of the Philippines' preparedness for e-learning, Philippine Journal of Third World Studies. 17, (2).

Tyagi, R.S.(2009). Administration and Management in School Education, Shipra Publications, Delhi.

Usluel, Y.K, Askar, P., & Bas, T. (2008). A Structural Equation Model for ICT Usage in Higher Education, Educational Technology & Society, 11(2), pp 262-273.

Van Hamersveld, C. E. (2007). A survey of schools administrators' beliefs regarding the potential of school library programmes to impact students achievements. Unpublished doctoral Thesis. Retrieved from IIUM Online Databases: Proquest Dissertation& Thesis.

Veenhof, B., Clermont, Y. & Sciadas, G. (2005). *Literacy and Digital Technologies: Linkages and Outcomes.* Research Paper for Science, Innovation and Electronic Information Division (SIEID), Statistics Canada. Ontario: Ministry of Industry.

Venter, A. & Marais, L. (2006). Gender and housing policy in South Africa: policy and practice in Bloemfontein. Journal of family Ecology and Consumer Sciences, 34: 69-79.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*, 425–478.

Venkatesh, V. and David, S. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies, [Electronic Version] *Management Science*,

Vekiri, I., & Chronaki, A. (2008). Gender issues in technology use: Perceived social support, computer self-efficacy and value beliefs, and computer use beyond school. *Computers & Education*, *51*(3), 1392–1404. doi:10.1016/j.compedu.2008.01.003

Vipinkumar, V.P., Meenakumari, B., Jayasankar, P. & Shanthi, B. (2013). *Paradigm of Mainstreaming Gender Perspective in Marine Fisheries Sector of India*. Open Access Scientific Reports (822). pp. 1-20

Volman, M. & Van Eck, E. (2001). Gender equality and information technology in education: The second decade. *Review of Educational Research*, 71(4): 613-634.

Waema, T. M. (2002). ICT Human Resource Development in Africa: Challenges and Strategies. ATPS special paper series No. 10. African technology policy studies network. Nairobi: Ideas & Places.

Waibodhi, J.M. (2002). Application of ICTs in Africa: Development of Knowledge Workers in Centres of Learning. ATPS special paper series No. 11. African technology policy studies network. Nairobi: Ideas & Places.

Wango, G. (2009). *School administration and management: Quality assurance and standards in schools*. Nairobi: Jomo Kenyatta Foundation.

Waryzynski, C. (2006). '*An actor network approach to leading technological change: Implementing a new technology at a prominent U.S Research University'* The network approach: building organisations and society. Amsterdam: Van Gorcum.

Watson, D. M. (2001). Pedagogy before technology: Re-thinking the relationship between ICT and teaching. *Education and Information technologies*, *6*(4), 251-266.

Wims, P. & Lawler, M. (2007). *Investing in ICTs in Educational Institutions in Developing Countries: An Evaluation of Impact in Kenya* IJED 3(1), (2007)

Woodbridge, J. (2004). *Technology Integration as a Transforming Teaching Strategy.* [Electronic version]. Techlearning, 2004 (March).

World Bank. (2009*).* Information and Communications for Development: Extending Reach and Increasing Impact. Retrieved August 05,

World Bank. (1999). *World Development Report Knowledge for Development*. New York: Oxford University Press

Wozney, L., Venkatesh, V., & Abrami, P.C. (2006). *Implementing Computer Technologies: Teachers' Perceptions and Practices*. J. Technol. Teach. Educ., 14(1): 173-207.

Yamani, N., Salehi, K., Mostafavi, N. S., & Shakour, M. (2014). *The Effect of Some Contextual Factors on Knowledge and Use of Information and Communication Technology by Faculty Members in Isfahan University of Medical Sciences.* Iranian Journal of Medical Education, 13(11), 979-988.

Yang, S. (2003). *Teachers' Perception of Use of Student Performance Information*: Technology Acceptance Model. An Unpublished Thesis. The University of Texas at Austin. Retrieved 14th March 2006 from www.lib.utexas.edu/etd/d/2003/yangsk03/yangsk03.pdf#page=3.

Yuen A.H.K., Law, N., & Wong, K.C. (2003). ICT Implementation and School Leadership: Case Studies of ICT Integration in Teaching and Learning. *J. Edu. Admin*, 41(2):158-170

Zhao, Y. and Frank, K.A. (2003). Factors Affecting Technology Uses in Schools: An Ecological Perspective *American Educational Research Journal*, 40(4)