Information and Communication Technology in Ugandan Higher Education: A Case of Makerere University

John Michael Edoru and Tajudeen Sanni Adebayo[a]
[a]Kabale University,
P.O. Box 317, Kabale, Uganda

Abstract

This article specifically focuses on the use of Information and Communication Technology (ICT) as a strategy for delivering effective management of educational services in a cross-section of educational institutions, universities inclusive. Makerere University (MAK) in Uganda was taken as a case study where ICT was introduced with the main aim of improving effectiveness in the delivery of educational services. Information and Communication Technology (ICT) has become a matter of great importance in today's business in all spheres of life, globally. From commerce to aeronautics, medicine to education, there is no discipline which is an exception in the need to use ICT in their daily operations. In the area of higher education management, ICT use is of central significance too. Universities of the contemporary world cannot afford to ignore the role of ICT in carrying out their business lest they are left behind by the supersonic developments in the various areas of life. Therefore, as a matter of necessity, the universities must embrace ICT adoption in teaching/learning and administrative activities. This study discusses the nature of ICT tools installed in MAK, perceptions and experiences of stakeholders in the effectiveness of ICT adoption and strategies for effective ICT use in educational services management.

1. Introduction

Globally, as Information and Communication Technology (ICT) continues to infiltrate every aspect of human life globally, its contribution becomes a subject of concern, especially when the problem-situation it is intended to help address is not solved as expected. the concern becomes even more critical to educationists when the problem situation is in the education sector generally (Maccallum, 2010) and in the provision of university education in particular (Odey, 2009).In Uganda, ICT continues to be adopted for various business and other purposes one of which is to serve as a management enhancement tool for ensuring that the country's vision of up to the year 2040 is effectively pursued in all sectors of the

economy ICT should be an enabler and be a cross-cutting in all sectors (Ministry of Works, Housing and Communications, 2003).In this vision, education is envisaged as a sector responsible for unlocking and developing the human capacity needed to accelerate Uganda's socio-economic, cultural, moral and technological transformation (Ministry of Education and Sports, 2012,Uganda Vision 2040,Uganda National Development Plan 11 2015/2016-2019/2020).Uganda's national aspirations include job creation, poverty alleviation, disease prevention, and improved quality of life (Ministry of Finance, Planning and Economic Development, 2012). It is hence one of the social services in whose management ICT is

being introduced (Ministry of Education and Sports, 2012; Farrell, 2007). Makerere University, where this study will be conducted, is one of the educational institutions that have introduced ICT in the management of its educational services (Baryamureeba, 2010; Matovu, 2009).

ICT became an integral part of managing educational services at Makerere University in the early 2000s (Tusubira & Mulira, 2004). This was after the University had developed the 2000 ICT Policy and Master Plan whose main purpose was to increase ICT capacity and utilization within a university-wide-system and in so doing, improve and make the management of educational services effective in all faculties. It was hoped that the introduction of ICT would speedily alleviate the challenges posed by the rapid growth that the university due to liberalization of education but this was not to be (Tusubira, 2005; Tusubira & Mulira, 2004). ICT was embraced to the extent that the university established the Faculty of Computer Science not only to ensure that the system was properly working but also offer ICT education as well (Baryamureeba, 2010).

Considering current Uganda, the delivery of the designed programme content is largely manual and largely dependent on the physical labour of lecturers who continue to be overloaded and (Kasenene, 2012; Ndagire, 2011). This is notwithstanding the fact that Makerere University has made attempts to stock every college computer laboratory with computers which are connected to the internet. Students are still discontented with the teaching and learning process; they complain about the absenteeism, unreliability and unresponsiveness of the lecturers to their learning and research supervision needs (Nantagya, 2010; Nabwire, 2008; Abaasa, 2005; Neema-Abooki, 2004). Students continue learning in squeezed environments both in lecture rooms and library facilities (Kasenene, 2012).The manpower to manage the computer laboratories are still inadequate, serving short job contracts and always on the lookout for greener pastures(Edoru,2018). This whole scenario casts doubt at the role of ICT in enhancing the effectiveness of educational services management particularly student learning at Makerere University.

Therefore, the current research was carried out with as objectives:
1) To establish how Makerere University has provided access to ICT and facilitated the management of educational services through ICT adoption.
2) To examine the perceptions and experiences of educational services managers on the effectiveness of ICT implementation at Makerere University
3) To suggest ways to improve the current ineffectiveness in the use of ICT at Makerere University.

2. Materials and Methods

A mixed research methodology with a Morse notation system that combines both quantitative and qualitative orientation (QUAN+qual), was adopted. QUAN + qual notation implies a quantitatively oriented, quantitative, and qualitative simultaneous design (Morse, 1991). Primary data was collected from 323 lecturing staff, 374 students, 28 ICT administrators, 42 educational service managers and 7 university managers. Educational service managers included College Principals, Deans, and Heads of Department. On the other hand, university managers included; the Deputy Vice-Chancellor (Administration and Finance), the Deputy Vice-Chancellor (Academic), the University Secretary, the Academic Registrar, the University Bursar, the University Librarian and the Dean of Students.
The sample size was determined using the (1970) Krejcie and Morgan's statistical table which is recommended by Amin, (2005:454). This table indicates both the population size and the corresponding minimum sample size needed to achieve statistical representativeness and generalizability of findings. The table recommends at least 30 respondents to be a minimum for a sample of up to 1000 respondents. For survey research, at least 100 subjects should be selected in each major sub-group, 30-50 for correlational research, 10-30 for ex-post-facto or causal comparative and experimental research in each group to be compared (Amin, 2005). This means the sample size for this study was adequate.

Students and lecturing were selected from six colleges; Business and Management Sciences, Engineering, Design, Art and Technology, Agricultural and Environmental Sciences, Computing and Information Sciences and Education and External Studies. Convenience sampling technique was used to select students and lecturing staff from the six university colleges. ICT administrators were selected as participants using purposive sampling. Simple random and criterion sampling were used to select educational service managers. On the contrary, purposive sampling was undertaken in the selection of university managers.

For this inquiry, the researcher used open ended interviews to collect qualitative data. On the other hand, questionnaires were used to collect data and lecturing staff. The data were collected in form of firsthand views and perceptions that were told by ICT administrators about the nature of ICT hardware and software installed and its effect on the management of educational services at Makerere University. The participant responses to the interview questions were either written or digitally recorded. ICT administrators were at liberty to write or answer orally because by virtue of their jobs, they were literate enough to use any of the styles. In case a selected ICT administrator, educational services manager or university manager preferred to answer orally, the responses were recorded by the researcher using the very copy of the interview schedule that the respondent would have filled if they had opted for writing.

Three interview schedules were used because they could accommodate both open and closed-ended questions, enabling ICT administrators, the educational services managers and University managers to answer some of the questions freely. Document review checklist was also used for gathering of data. The data were collected for purposes of corroborating primary data collected from respondents.

Quantitative data was analyzed using Statistical Package for Social Scientists (IBM SPSS 22 programme). On the other hand, thematic content analysis was adopted in the analysis of qualitative data. Descriptive statistics, correlations and regression analyses were generated from quantitative data. Qualitative data was analyzed following four themes and a number of sub-themes. The intended outcome was to establish the ICT on the effective management of educational services at Makerere University.

3. Results and Discussions

Results from descriptive indicated that white board (19.6%) was the most accessed and installed hardware across Makerere University campus in almost all lecture rooms. Most lecturers used Microsoft Access (19.0%) and Result Management System applications to manage educational services (15.3%) at Makerere University (Edoru, 2019).

Field findings on the adequacy of ICT services indicated that respondents accepted that library services are computerized; also lectures use e-mail to supervise students. The results on modernity of ICT tools indicated that most respondents agreed that students with PCs are enabled to access lecture notes. Some other findings indicated that lecturers were using were using e-mails to send lecture notes to students. Findings further indicated that students with PCs are enabled to access library services. Also, findings supported the fact that students with mobile phones are enabled to use library services.

On the perceptions of Makerere University lecturers towards ICT access and utilization at Makerere University, results revealed that most of them (78.0%) agreed that ICT-based sources of information are in place which enables lecturers to access content needed to be included in the curricula of the academic courses offered by Makerere University. Also, most lecturers (80.7%) believed that Makerere University has online facilities by which they can access the necessary curriculum updates. There was also a strong perception (71.5% of the lecturers) that Makerere University has internet facilities that support searching of relevant curriculum materials via the World Wide Web. Most lecturers (67.8%) also believed that Makerere University has online facilities to enable them network with other universities for purposes of internationalizing the curriculum content delivered to students. About the effects of ICT on Makerere University

management, respondents indicated that ICT adoption contributed a lot to University management. For instance, it eased supervision of staff and students in the University. ICT reduced the cost of sending mails and also expanded quick linkages in coordinating University activities. Concerning the effect of ICT on student learning at Makerere University, it was found out that students could use ICT to assist them in conducting research and also accessing class notes. Students accessed coursework's from the lecturers through use of personal emails. In addition, students accessed internet using their smart phones and there was use of projectors and microphones to enhance student learning at the University (ibid).

The ICT tools provided by Makerere University were used for both teaching and management functions. It was found out that a number of ICT tools have been adopted in different academic units of the university that is; Sun Systems which are used in accounting, International Business Management (IBM) servers which are gadgets used in managing and computing intensive workloads and business applications, Hewlett Packard (HP) servers, Unix/Linux operating systems, Microsoft Windows Operating Systems, Makerere University E-Learning Environment (MUELE), Human Resource Information System (HURIS), Academic Records Information System (ARIS), Financial Information System (FINIS) and Library Information System (LIBIS). In the College of Engineering, Design, Art and Technology (CEDAT), ICT tools were reported to have been incorporated in teaching of courses especially Computers, Projectors, Switches, I-max Printers, Publisher, Metrices, Textonics, Fiber optics, Visual studio, Python, MySQL, Workbench, PHP and Adobe. On the ICT access to students for learning, it was found out that Makerere University had stocked Computer laboratories with modern computers and accessories to assist the students in learning. The Makerere University Bursar confirmed that the University had procured a number of computers for academic purposes and were to be distributed to the colleges. The University also provided free wireless internet to all students with personal

laptops. This enabled the students to access online educational materials however, even students without laptops could use University installed computers to access academic materials. The University should enable students to use the emerging new windows platforms as well.

It was also clear that ICT had improved management of educational services at Makerere University in a number of ways. ICT had enabled teaching by helping students with no computer knowledge to understand the hardware and software. There were online open source integrated library services that enabled students to access notes. Also, the Makerere University E-Learning Environment (MUELE) had helped lecturers to update notes for their respective course units and students could download assignment results at their convenience and also upload assignments respectively. Students could also do their research, conduct online education in real time mode, submit coursework and access information on various subjects because of ICT adoption. ICT tools also help to find notes and coursework online. Besides, students also reach out to their lecturers through e-mail and even upload assignments. Technology advancement was reported in the School of Women and Gender Studies where the staff had reached an extent of doing a You-Tube class.

However, on the other hand, some respondents indicated that ICT had not improved teaching due to inadequate ICT infrastructure for instance in the College of Liberal and Performing Arts, the ICT Administrator reported a class of 120 students sharing 20 computers in the laboratory. There is need for the University to procure more computers to alleviate this challenge.

On the perceptions of educational services managers on the effectiveness of ICT at Makerere University, it was found out that there was quite effective ICT implementation at Makerere University because the University had embraced ICT policy due to its importance. There are many ways that ICT has been used

effectively at Makerere University for instance Statistical Package for Social Scientists (SPSS), Epidata, Epi Info, and Stata programmes are used to analyze socio-economic data and write reports. According to the Head of Department in the School of Distance and Lifelong Learning, there was a positive perception that ICT had played a big role in the effectiveness of learning at Makerere University. It was however noted that there is still much to do to make it effective. The Dean School of Education shared her perceptions on the ICT progress indicating that the implementation of ICT has been successful in different colleges since the ICT facilities function independently. It was also noted that the staff had access to both wireless and Local Area Network in doing administrative and teaching work.

The Dean, Margaret Trowel School of Industrial and Fine Arts noted how ICT has helped them to develop graphics to ease the art and design work instead of using hands. The Dean, School of Food Technology, Nutrition and Bio-Engineering observed that Makerere University had gone into ICT training in order to improve ICT implementation. For instance, it was made compulsory to teach all first year students computer techniques. Besides, the Dean School of Computing and Information Sciences believed a milestone has been achieved, and courses had been developed to suit the current ICT needs.

There was however no policy on online courses by Makerere University although it had been promoted. The University needs to come up with policies on online courses for students and computer literacy for staff as a pre-requisite for promotion in order to encourage them to acquire the skills. It was also revealed that numerous experiences of respondents about the effectiveness of ICT implementation for instance, the Principal of the College of Computing and Information Science (CoCIS) observed how ICT had helped in settling complaints among students as soon as possible for instance financial management aspects, updating of students results, tracking academic progress of students as well as printing of

testimonials among others. There were also reports of class group e-mails being mandatory to all students for them to have updates. The feedback provided to students online in some cases is timely because students and lecturers access free internet. Research supervision is done to a large extent online, meeting students under supervision done only when there is great need to do so hence helping lecturers to cope with big numbers of students to supervise. In the College of Humanities and Social Sciences (CHUSS), a good number of lecturers had picked up the use of ICT in teaching and research for instance about 80% of the lecturers effectively used ICT for teaching using Power Point which improved on teaching and research techniques. It was also reported that ICT had attracted sponsorship of projects to enhance its implementation for instance Swedish Programme for ICT in Developing Regions (SPIDER) project. The Norwegian Agency for Development Cooperation (NORAD) also gave aid in terms of powered whiteboards stationed in different colleges of Makerere University.

However, it was found out that some of the students could not cope with latest technological innovations since most of them were not exposed to ICT before. The Head of Department, Economics Theory and Analysis expressed his experience that some lecturers were still using old pedagogy for instance giving handouts to students and that a small proportion of the University staff had attained training in modern ICT pedagogy locally particularly in the use of PowerPoint and demonstrations in teaching.

Findings from the University managers revealed that ICT was very important in planning for the university. It particularly helps the university to cope with other universities of the world through adoption of best practices. The Deputy Vice Chancellor in charge of Finance and Administration noted that ICT gadgets like telephones are used in communication with staff to plan for activities such as meetings with colleges, Bursar's office or even the University Secretary. It was also noted that they benefit from tools used for planning financial and administrative affairs. The University Librarian

underscored the role of ICT in accessing library records in all college libraries and the main library including telling the books in short supply or even follow trends in libraries of other universities in the world.

The University Secretary reported that ICT was used to photocopy, print and scan important documents for instance the strategic plans of the University. ICT is useful in making estimates, calculations, tabulating information in programming activities for the department like information on employee's leave. The Dean of Students uses ICT to draw programmes for student activities in a semester in view of the amount of money on the student guild account. Similarly, ICT helps to determine the number of students to be accommodated in the male and female halls of residence which eases planning for beds, meals and sanitary facilities. ICT has assisted the University management in organizing function in a number of ways. This has ensured speedy management of information and its reliable storage for instance through Financial Information System (FINIS) and Human Resource Information System (HURIS). It was indicated by the University Bursar that Makerere University had procured a module used for management of financial records from South Africa which is used in managing student financial information, asset management and payroll management using packages like PEOPLE MANAGER. ICT is also very useful in processing, storing and disseminating information at the University.

On ICT contribution to University supervision function, the study findings indicated that ICT was very instrumental in establishing who is doing what, at what time and where using the staff data base hence enabling communication. It enables the University Secretary to get information regarding the Human resource matters at the colleges and staff issues at the different colleges thus ensuring accountability. The package called SAGE PASTEL makes supervision in finance very easy because one can use it to detect who is responsible for a mistake in any transaction. SAGE PASTEL also assists to tell the number of transactions executed in a

day. The University Librarian observed that ICT enables easy access to information on library affairs from different University college libraries. It also facilitates Library staff to network and share their experiences with each other.

From the findings, it was established that ICT was very key in giving direction to Makerere University for instance 42 policies were made and passed by the University through the help of ICT. It was noted that policies provide direction to the University besides students getting information on their academic status and other relevant information coming from University Management. This was revealed by the Deputy Vice Chancellor in charge of Finance and Administration. The University Bursar noted the fact that ICT enables division of labour in activities like posting receipts, posting expenditure, reconciliation through FINIS (Financial Information System). Findings from the University Bursar indicated that ICT had helped in coordinating all the staff in the Bursar's office through use of internet as well as linking up with other University units like the Dean of Student's Office and University Secretary Office. The University Secretary being at the centre of coordinating University activities was reaping much more than anyone else from ICT in terms of coordinating his daily work. This was made possible through usage of intranet among the staff. There is also the use of phones to arrange meetings and meet appointments among the University staff.

ICT contribution to University budgeting function was very significant. For instance, findings indicated that a University manager like the University Librarian was aware about the importance of ICT in budgeting for instance she indicated that computer aided budgets are used to develop spreadsheets for budgeting purposes. The University Bursar reported that the University has software for budgeting purposes by the different colleges in the University. It was also found out that the University uses bottom-up system of budgeting where departments or colleges are asked to put together their budgets and send to the Bursar's office using ICT. Besides,

ICT helps in using the budget frame to fit into the Uganda government financial limits.

4. Conclusions

The major conclusions drawn from the study were based on the four study objectives as follows:
Makerere University has installed and provided access to ICT tools that are important in the management of educational services. The University has done much in as far as having improved ICT tools working in place however the draw backs still exists due the identified gaps. The university should adopt new emerging technologies for better integration of ICT through regular benchmarking exercises with universities outside the country which have superior ICT systems.

5. Recommendations

From the study results, the researcher recommends the following in the order of research objectives:

There is need for investment in more ICT infrastructure at Makerere University. The University should have an annual budget to purchase more ICT tools for instance projectors, computers and other accessories. There is needed to get new computers after every 4 years and also increase the security in the computer laboratories to prevent computer parts from being stolen. There is also need to carry out more training on how to use ICT tools at all levels, that is for staff, students and ICT technical staff.

This will equip them on how to use the ICT tools hence in learning. There is also need for

The perceptions of educational services managers are that ICT is quite effective in the management of educational services at Makerere University. The experiences of educational services managers are such that they are familiar with it and use it quite regularly for many operations at work except for a very small percentage of them. ICT has improved the University Management and student learning at Makerere University to a large extent.
The stakeholders do not feel that the implementation of ICT at Makerere University is as effective as it should be. This means that there is a lot of room for improvement in the implementation of ICT at the University. It is important to note here that ICT inclusion is key to even the last mile users.

training students on how to use computers and other ICT technologies better.

Makerere University Management should lobby for donations, funding and encourage proposal writing so that money can be secured for development of ICT.

Makerere University still has a long way to go to improve the implementation of ICT through many avenues such as: buying standby generator since the university frequently experiences load shedding, increasing on the bandwidth, building more computer laboratories and expanding existing ones, providing laptops to both lecturers and administrators.

6. References

Abaasa, F. (2005). Makerere University is a mess. *New Vision*, October 3. Retrieved August 9, 2012 from http://www.ugpulse.com/articles/daily/homepage.asp?ID= 166.

Adepiju, L. (2008). *Fundamentals of school administration, planning and supervision*. Ibadan: Alafas Nigeria Company.

Adeyemi, T.O. (2011). Impact of information and communication technology (ICT) on the effective management of universities in South-West Nigeria. *American Journal of Social and Management Sciences*. (Online).Available:http://www.scihub.org/AJSMS.

Afshari, Abu Bakar, Su Luan, Afshari,Say Fooi, & Abu Samah.(2010). Computer use by secondary School principals.*The Turkish Online Journal of Educational Technology* – July,(9) 3.

Aginam, E. (2006). *Nigerian higher education has less 5% ICT applications*. [Online]. Available: http://www.vanguardngr.com/articles/html [22 August, 2012].

Akinsende, A.O. (2002). *Electronics services in Nigerian libraries (hardware requirement in information management: CD-ROM, database and networking*. Paper presented at the Nigerian Library Association Conference at the University of Abeokuta, Abeokuta.

Akpan,C.P (2014). ICT competence and lecturers' job efficacy in universities in Cross River State, Nigeria. *International Journal of Humanities and Social Science*, 4 (10).

Alexander, S., McKenzie, J., & Geissinger, H. (2008). *An evaluation of the effectiveness of information technology projects for university learning*. Canberra: Committee for University Teaching and Staff Development.

A Lthobeti, M. O. (2013).Administration and Integration of ICT in Saudi Universities. *International Journal of Technology and Inclusive Education (IJTIE)*,2(2).

Amin, M. (2005). *Social science research: conception, methodology and analysis*. Kampala: The Makerere University Printery.

Ashton, H.S., Beevers, C.E., Korabinski, A.A. Youngson, M.A. (2005). Investigating the medium effect in computer-aided assessment of school chemistry and college computing national examinations. *British Journal of Educational Technology*, 36 (5): 771–787.

Barreket, G., Scott, W. & Payne, A. (2009). *Equity and effective use of CIT in higher education*. Canberra: DETYA-Australian Government Printing Service.

Baryamureeba, V. (2007). *ICT as an engine for Uganda's economic growth: the role of and opportunities for Makerere University* [Online]. Available: cit.mak.ac.ug/iccir/download/Venansius%20Baryamureeba,07 [13 August, 2012].

Baryamureeba, V. (2010). *On curricula for creating human capital needed for ICT-led economic growth: Case of Faculty of Computing and IT*. Proceedings for Frontiers of knowledge for Science and Technology in Africa: University Leaders Forum, University of Cape Town, South Africa: Partnership for Higher Education in Africa. BECTA (2007)

Bitok, E.B. (2017).Teachers' Perception and Support on the Use of Information Communication Technology in Teaching/Learning of Biology in Secondary Schools in Uasin Gishu County, Kenya. *International Journal of Science and Research (IJSR)*.Moi University, Eldoret, Kenya.

Brockman, J. R. (2005). *Just another management FAD? The implications of the TQM for library and information services, Library services proceedings*. [Online]. Available: http://www.emeraldinsight.com [5 March 2013].

Buabeng-Andoh, C. (2012). An exploration of teachers' skills, perceptions and practices of ICT in teaching and learning in the Ghanaian second-cycle schools. C*ontemporary Educational technology*. 3(1), 36-49. Pentecost University College, Ghana.

Carlsson, C. (2006). Adoption of mobile devices/services: Searching for answers with the UTAUT.

Proceedings of the 39th Annual Hawaii International Conference on System Sciences. Hawaii.

Carnoy, M. (2004). ICT in Education: Possibilities and Challenges. Inaugural Lecture of the 2004-2005 Academic Year, University of Catalonia. http://www.uoc.edu/inaugural04/dt/eng/carnoy1004.pdf

Curtain, R. (2004). Information and communications technologies and development: Help or hindrance? Report Commissioned by the Australian Agency for International Development.

Daouk, A.G. (1995). Assessing the uses of ICT in a private Lebanese University: Changes in the working modes of teachers and librarians.Lebanese

American University (Unpublished Master's dissertation).

Davis, F.D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. International Journal of man-machine studies,38:345-487.

Deaney, R, Ruthven. K & Hennessy. S. (2003). Pupil perspectives on the contribution of information and

Communication technology to teaching and learning in the secondary school research papers in education. Cambridge Journal of Education 18 (2):141-165.

Dix, K.L. (2007).A longitudinal study examining the impact of ICT adoption on students and teachers. Flinders University of South Australia (Unpublished PhD dissertation).

Edoru, J.M.(2018).Information and Communication Technology and Educational Services Management

at Makerere University. University of South Africa(Unpublished Doctoral Thesis).

Eggleston, K; Jensen, R. & Zeckhauser, R. (2002). Information and communication technologies, markets

and economic development. In Kirkman, G. The Global Information Technology Report:Readiness for the Networked World. New York: Oxford University Press.

E-learning Nordic.(2006)Impact of ICT on Education.

Farrell, G.(2007).Survey of ICT and Education in Africa: Uganda Country Report .

Giusy,C.(2007).Impact of ICT in school, the modification of the school activities and the learning environment using ICT to overcome distance and isolation: The case of Marettimo

National Agency for the Support of School Autonomy, Florence, Italy.

Goyal,E., Purohit,S & Bhagat.M.(2010).Factors that affect information and communication technology usage: A case study in management education.Journal of Information Technology Management.

Hamdane,K., Khaldi, M &Bouzinab.A.(2013).Teaching Mathematics with new technologies, some perceptions of effectiveness of ICT use in Morocco.=European ScientificJournal.Specialedition,volume3.http://www.ncsl.org.uk/mediastore/image2/walsh-ict summary.pdf full report (Accessed 9 April 2003).

Kasenene, E.S. (2011). Are African universities centres of excellence? The consumer perspective of

Ugandan universities. The University Journal of Higher Education, 5(3):33-50.

Kasenene, E.S. (2012). Quality assurance management and the quality of higher education in Uganda.

Kyambogo University Journal of Higher Education, 3(1): 75-89.

Kasozi, A.B.K. (2003). University education in Uganda: Challenges and opportunities for reform,

Kampala: Fountain Publishers Ltd.

Krishnaveni,R & Meenakumari,J. (2010). Usage of ICT for information administration in higher education

Institutions. International Journal of Environmental Science and Development, (1)3.

Kyalo,J.K & Nzuki,D.M.(2014).Determinants of information and communication technology (ICT)

integration in tertiary institutions. International Journal of Education and Research,2(3).

Mac Callum, K. (2010). Adoption theory and the integration of mobile technology in education. Eastern

Institute of Technology, School of Information Technology and Computing.

Matovu, M. (2009). Availability, accessibility and use of information and communication technology in management of students' academic affairs in Makerere University. Makerere University. [Online]. Available: http://mak.ac.ug/documents/Makfiles/theses/MATOVU_Mo ses.pdf [16 August, 2012].

Ministry of Education and Sports (Uganda), 2012.

Ministry of Finance, Planning and Economic Development(Uganda), 2012.

Ministry of Works, Housing and Communications(Uganda), 2003.

Mishra, A & Akman, I. (2010). Information Technology in Human Resource Management: An Empirical Assessment.. Public Personnel Management, (39) 3.

Mwendwai ,N.K(2017) Perception of Teachers and Principals on ICT Integration in the Primary School

Curriculum in Kitui County, Kenya. European Journal of Education Studies. Moi University, Eldoret, Kenya.

Nabwire, A.(2008). Budget management and services delivery at Kyambogo University. Uganda Management Institute (Unpublished MBA Dissertation).

Nantagya, G. (2010). The contribution of the privately funded programmes to the sustainability of socio- academic

welfare of Makerere University lecturers and students. Makerere University (Unpublished M.Ed Dissertation).

Ndagire. R. (2011). Remuneration and job satisfaction of academic staff in School of Education, Makerere University: Makerere University (Unpublished M. Ed Dissertation).

Neema-Abooki, P. 2004. Integration of total quality management in the management of universities in Uganda. Makerere University (Unpublished PhD thesis).

Newhouse, C.P.,Trinidad, S., & Clarkson, B. (2002). Quality Pedagogy and Effective Learning with Information and Communications Technologies (ICT): A review of the literature about a teacher professional ICT attributes framework – outcomes, guidelines, equipment and processes. Perth: Specialist Educational Services.

Nyambane, C.O & Nzuki, D.(2014).Factors influencing ICT integration in teaching- A literature review. International Journal of Education and Research, (2).3.

Odey, J.E. 2009. ICT as an effective tool for university education. Benue State University Journal of Education, 8 (7):254-266.

Oguta,J.O ,Egessa, Robert K. W, &Musiega.(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. Volume 3(5):11-17.

Oluoch,J & Osida,J.(2014).Building strengths in information communication and technology in Kenyan universities: way forward for the 21st century.

Wyno Academic Journal of Social Sciences, 2(2): 10-16. Available online at http://www.wynoacademicjournals. org/soc_sci.html.

Sarkar,S .(2012).The role of information and communication technology(ICT) in higher education for the 21st Century. The Science Probe. 1(1): 30-41.

Scott, G., & Yates, W. (2007). The virtual university and educational opportunity: issues of equity and access for the next generation. Washington D.C.: The College Board.

Sharples, M., Taylor, J. & Vavoula, G. (2005). Towards a theory of mobile learning. In H. van der Merwe & T. Brown, mLearn 2005 4th World Conference on m-Learning. [Online]. Available: http://www.mlearn.org.za/CD/paper s/Sharples%20Theory%20of%20 Mobile.pdf [25 August, 2012].

Song,H.D & Kang,T.(2012). Evaluating the impacts of ICT use: a multi-level analysis with hierarchical linear modeling. The Turkish Online Journal of Educational Technology,(11): 4.

Tusubira, F.F, & Mulira, N. (2004). Integration of ICT in organizations: Challenges and best practice recommendations based on the experience of Makerere University and other organizations. Paper presented to Conference on Universities: Taking a leading role in ICT enabled human development. 6 – 8 September, Kampala, Uganda.

Tusubira, F. (2005). Makerere University information and communication technology policy [Online].

Retrieved August 9, 2012 from http://www.makerere.ac.ug/makic t/documents/policydoc/copy.htm. Uganda National Development Plan

11 2015/2016-2019/2 Uganda Vision 2040.

Umeagukwu, E O& Ngozi,E.B.(2014). An analysis of ICT impact on the curricular of major Nigerian Universities in the last ten years 2003-2013. International Journal of Science and Technology,3(1).

University of Kabianga, ICT Strategic Plan 2014-2018.

Václav, O., Antonín,P& Petra,J. (2011). Processes, performance drivers and ICT tools in human resources management. Journal of Competitiveness, Issue 2.

Walsh, K. (2002). ICT's about learning: school leadership and the effective integration of informatioand communications technology.

National College of School Leadership (NCSL).

Willis, B. (2014).The advantages and limitations of single case study analysis. [Online]. Available: http://www.e-ir.info/2014/07/05/the-advantages-and-limitations-of-single-case-study-analysis/ [8 August 2014].

Yanti,H; Setiawan,A; Nurhabibah and Yannuar(2017).Teacher's Perception about the Use of E- Learning/Edmodo in Educational Activities IOP Conf. Ser.: Mater. Sci. Eng. 306 012055.

Yee, D.L., (2000). Images of school principals' information and communications technology leadership. Journal of Information Technology for Teacher Education, 9 (3): 287-302.