

An Assessment of the Implementation of Digital Library Technologies in Institutions of Higher Learning: A Case Study of Kenyatta University

Fernando Wangila

School of Human Resource Development, Jomo Kenyatta University of Agriculture and Technology, P. O. Box 62000-00200, Nairobi, Kenya.

Email: fernandobarasa@yahoo.co.uk

DOI: 10.6007/IJARBSS/v4-i9/1176 URL: <http://dx.doi.org/10.6007/IJARBSS/v4-i9/1176>

Abstract

Advancements in the information and communication technology (ICT) fields have proved to be the most economical way to go if sustainable growth and development is to be achieved. This kind of technological advancements are constantly being adopted at different levels; even locally in different institutions which include institutions of higher learning. These ICT advancements are seen to be a crucial tool for sharing and transferring in institutions of higher learning where the acquisition, preservation and transfer of information are the major mode of achieving their educational and research objectives. Such implementations of ICT technologies include the use of Digital Library Technologies by the institutions of higher learning. In particular, the university library is a vital organ of the institution since it is at the core through which most of the academic activities evolve. Therefore, this study sought to assess the implementation of Digital Library Technologies in institutions of higher learning. Cross-sectional evaluation survey was used and stratified random sampling technique will be utilized. The data collection tools used were questionnaires and interview schedules to obtain data from primary sources Data analysis was facilitated by Statistical Package for Social Sciences (SPSS).

Key words: Digitisation, Digital library, Information and Communication Technology

Introduction

The world today is faced with both a digital revolution as well as an economic globalization. These great advancements in the information and communication technology (ICT) fields have, more than once, proved to be the most economical way to go if sustainable growth and development is to be achieved. This kind of technological advancements are constantly being adopted at different levels; even locally in different institutions. This ensures that such institutions and individuals as well, improve on how they execute their daily tasks as well as take advantage of the arising opportunities. The Kenyan higher education sector has similarly seen tremendous growth in the last decade both in the public and private sectors (Wawire & Messah, 2010). Generally, DLTs developments are meant to unify the overall IT structures of an institution of higher learning and to transform the learning process through innovative technology. Thus, for African universities to gain a more equal footing with their sister

institutions of the West, they need to upgrade their information access facilities by embracing the current advancements in the ICT sector ((Miner & Missen, 2005). Kenyatta University College old Library was the first library that served Kenyatta University College (KUC) which was set up through the University of Nairobi Act of 1970. It was housed in a two-floor building which had been designed as a canteen for soldiers in transit. As the university population grew, the need for space necessitated the construction of the Post-Modern Library which was completed in August 2011. It was officially opened by H.E. the President Honorable Mwai Kibaki on 7th October, 2011 and is now in use. The Post-Modern Library is a five (5) storey building which is equipped with cutting edge information and knowledge resources for quality services and has a seating capacity of over 6,000. Kenyatta University considers research as fundamental in all academic endeavours. It is for this reason the University adopted open-access to all research work.

Problem Statement

The tremendous growth and expansion experienced in the local institutions of higher learning; as a result of an increased quest for Kenyan higher education, have in-turn directly affected the universities' libraries (Wawire & Messah, 2010). The university library is a vital organ of the institution since it is at the core through which most of the academic activities evolve. Thus, it is quite important for this facility to be treated as a special entity if academic excellence is to be achieved. Therefore, this growth in local universities has called for the introduction and implementation of suitable technologies to enable effective service delivery by their university libraries. However, there are still challenges being faced by such universities in the implementation of the Digital Library Technologies and lies therein tremendous amounts of opportunities yet to be exploited from the technology. Therefore, this study sought to assess the level of preparedness of institutions of higher learning in implementing Digital Library Technologies in Kenyatta University- Kenya

Objectives

To assess the implementation of Digital Library Technologies in institutions of higher learning

Literature Review

Literature review gives an overview and synthesizes previous studies (Ngechu, 2006). A review of theoretical and analytical literature and gaps to be filled by the study is provided in this chapter. This research borrows from the three models to highlight the variables identified from this study; Preparedness, Policies and strategies.

Implementation of Digital Library Technologies

The integration of the digital library technology with the educational enterprise ultimately called for the partnership between the ICT specialists and the librarians especially when use of the technology shifted to a large and diverse campus audience. This development occurred at a similar time when the student requirements for access to library resources also heightened. More so, with the development of the internet, individual's expectations for access to information have greatly increased (Sun Microsystems, 2002). For instance, patrons don't expect to go to one particular location at certain hours to be able to access particular information or even wait for several days for the item to be delivered and so on. However, patrons expect instant access to all requisite information sources, from any location, at any

time and from any device. The implementation of the Digital Library Technology is expected to fulfill this objective. The upcoming information society calls for the capability on the part of the user to identify, locate, evaluate and apply information (Mutula, 2004). He asserts that there are numerous studies have revealed that information illiteracy is somewhat the cause of underutilization of existing ICTs and information resources. Institutions should know and appreciate their information requirements, where and how to get the information, and finally how to use it importantly. Inevitably information illiteracy hinders effective endurance in an information society. Therefore policies and strategies should be developed for capacity building to support the implementation of digital technologies for the librarians and the user fraternity.

Policies and Strategies Influencing Use of Digital Libraries

The development of policies, guidelines and standards has been a common practice in libraries to ensure professional efficiency and quality of information service delivery. These include cataloguing rules, access guidelines and guidelines supporting digital environments like web access. Some policies referring to intellectual property rights and laws on the access of digital resources have been documented (Ngimwa & Adams, 2011). Other policies that are known to have an effect on library outcomes include: institutional policy statements and directives and the strategic plans guiding the operations of the library.

Implications of Using Digital Libraries

With the adoption and use of digital libraries, an individual is generally enabled to: access special collections of information such as institutional repositories. This section reviews the opportunities gained as well as the challenges faced in the implementation of Digital Libraries Technologies in institutions of higher learning.

Opportunities Acquired

The adoption of Digital Libraries Technologies ensures that the students are exposed to large collections of information resources that provide them with a variety of ideas and different viewpoints. Digital Libraries Technologies have been implemented to enable institutions provide library services to all its students and other stakeholders both in campus and off – campus. More so, Digital Libraries can be accessed from any location or work station making it easy to share digital information as well as available to everyone at any time. This technology also assists such institutions to reach new markets and new generation of learners with improved learning information resources both locally and globally (Kavulya, 2007). The use of Digital Libraries Technologies also facilitates the development and use of virtual learning environments, thus facing out the traditional lectures. The use of Digital Library Technology also aids in the improving of the quality of learning materials in the institutions of higher learning since it is easier to keep the information resources current.

Challenges Faced

For the Digital Library to be functional there is need for the creation of digital collection of requisite information and institutional repositories. This might require the purchase of some already prepared digital contents such as e-books, e-databases and e-journals. The universities

will also be required to put considerable amount of effort in the creation of their institutional repositories. The preservation and digital archiving of the collected information is also another challenge facing such institutions when implementing the technology. There is also the need of equipping the users of the Digital Library Technologies with information literacy skills and digital librarian competencies (Kavulya, 2007). The implementation of the technology is greatly dependent on the provision of the entire relevant Digital Library infrastructure. This requires quite some amount of financial resources to be invested which can pose a challenge to institutions of higher learning since most universities allocate only about 1% of their revenues to ICT (Aisbett et al., 2008). Another major challenge the institutions face involve the of copyright and rights management. This is because of the weak regulatory framework in the country and region as well as the unclear global copyright law on digital information (Kavulya, 2007). Moreover, local universities lack operational IT security policies and other security issues have not been addressed fully (Aisbett et al., 2008). The country and institutions of higher learning lacks a digital library strategy and framework as well as comprehensive ICT policies and strategies which is essential for spearheading the creation of various digital libraries both at a national level and in individual institutions (Aisbett et al., 2008).

Research Methodology

The research design utilized cross-sectional evaluation survey. The target population for this study included both the staff and users of library facilities in the institutions of higher learning to be studied. The statement “users of library facilities” refers to the students, staff of the institutions’ and any other individual who uses the library facilities; as well as any other members of the institutions’ departments which are involved with the implementation of Digital Library Technologies. The sampling technique employed for the survey was the stratified random sampling. Hence, all the individuals who are affected by the implementation of Digital Library Technologies and its implications were represented by the selected sample. The sample size consisted of at least 100 individuals, with at least 30 respondents being library staff and 80 respondents being the library users. The obtained data was analyzed using both qualitative and quantitative techniques. Descriptive statistics was used for the analysis of the collected data, and this included parameters such as measures of central tendencies and the measure of dispersion. Inferential data analysis techniques such as regression and correlation analysis were used to analyze the collected data. These parameters were used to determine and evaluate the relationships of the variables being measured. Data analysis and presentation of findings were carried out using statistical softwares including SPSS and Microsoft Excel. The quantitative data was presented in form of pie charts, tables and graphs. This was enhanced by an explanation of the figures. Qualitative data was presented in narrative form.

Findings and Discussions

Response rate

The research was conducted on a sample of 30 staff and 80 students. However, out of the issued questionnaires, 85 were returned duly filled in making a response rate of 85%, which

was sufficient for statistical reporting. (Mugenda, 1999) stated that a response rate of 50% and above is a good response rate.

Distribution of Respondents by Age

In order to understand the respondents' age distribution, the respondents were asked to indicate the age category in which they fell. The Table below indicates an analysis of respondents' age distribution.

Table 1: Distribution of Respondents by Age

		Frequency	Valid Percent	Cumulative Percent
Valid	18 - 30	43	50.6	50.6
	31 - 40	31	36.5	87.1
	41 - 50	8	9.4	96.5
	Above 50	3	3.5	100.0
	Total	85	100.0	

From the findings, most of the respondents age 18 – 30 (50.6%) implying that majority of the respondents were young and energetic and thus “digital”.36.5% were aged 31 – 40, 9.4% were aged 41 – 50 while 3.5% were above 50. A cross tabulation between age and staff/student showed the following:

Policies and Strategies have been put in Place

The study asked the respondents to state if they were aware of policies and strategies in place, training on the adoption and use of Digital Library Technologies and also the specific areas of the training.

Policies and strategies

The study in this area asked the respondents to state if there were policies and strategies in place. The responses were as follows.

Table 2: Policies and strategies

		Frequency	Percent	Cumulative Percent
Valid	Yes	70	82.4	82.4
	No	15	17.6	100
	Total	85	100.0	

From the findings, respondents agreed that there were policies and strategies in place to guide the implementation of Digital Library Technologies. According to (Ngimwa & Adams, 2011) on

the impact of policies in the outcomes of digital libraries in African Higher Education established that the existing information related policy frameworks at all levels (that is national, institutional and departmental levels) have a direct or indirect impact on the design, development and implementation of the digital libraries. This implies that existing policy frameworks play a significant role in shaping the outcomes of the digital library services, whether in a positive or negative manner.

Training on the adoption of Digital Library Technologies

The study asked the respondents to indicate whether there had received any training on the adoption of Digital Library Technologies. This was important in determining if indeed training was a viable strategy towards adoption of Digital Library Technologies. The findings were as follows:

Table 3: Training and Adoption

		Frequency	Percent	Cumulative Percent
Valid	No	5	5.9	7.1
	Yes	65	76.5	100.0
	Total	70	82.4	
Total		85	100.0	

From the findings, 76.5% of the respondents agreed that they had been trained on the adoption of Digital Library Technologies. According to (Mutula, 2004) it's important for any organization to be prepared for the implementation of information system is vital for it to be a success. It is therefore necessary to equip the people with tools to aid in carrying out these unfamiliar processes. Policies and strategies should therefore be developed for capacity building to support the implementation of digital technologies for the librarians and the user fraternity. Further the respondents were asked to state the areas that they were trained on and below were the responses.

Table 4 Areas trained on

Some of the areas that you were trained on

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Digitization of information	70	82.4	93.3	93.3
	The use of computer networks/ information systems	5	5.9	6.7	100.0

Total	75	88.2	100.0
Total	85	100.0	

From the findings, digitization of information appeared to have been the area of training adopted and most likely preferred by many. This indicates the necessity of digitization skills for successful automation of the library. Working groups should be formed in areas of interest to develop guidelines for policy development, minimum technical requirements, adherence to standards, and best practice in the conversion of various media, including sound and audiovisual material (Peters & Pickover, 2001).

Conclusion and Recommendations

The integration of the digital library technology with the educational enterprise has come at a similar time when the student requirements for access to library resources also heightened. The development of policies, guidelines and standards has been a common practice in libraries to ensure professional efficiency and quality of information service delivery. Respondents agreed that there were policies and strategies in place to guide the implementation of Digital Library Technologies. They further agreed that they had been training on the adoption of Digital Library Technologies with particular emphasis on digitization of information.

Recommendations

Based on the findings of this study, there is need to have in place necessary legal framework be in order to care of copyright issues and enhance confidence in making these materials public.

Suggestion for Further Studies

Further research is necessary as the findings were based in public universities. It is necessary to conduct such a study in the upcoming colleges where the infrastructure is wanting and where policies may not be in existent.

Acknowledgement

I take this opportunity to express my profound gratitude and deep regards to my guides Professor Kanali and Dr. Iravo for their exemplary guidance, monitoring and constant encouragement throughout. The blessings, help and guidance given by them time to time shall carry me a long way in the journey of life on which I am about to embark.

Lastly, I thank almighty, my parents, brother, sisters and friends for their constant encouragement without which this assignment would not be possible,

Prof. Christopher Kanali (Information and Communication Technology Directorate, Jomo Kenyatta University of Agriculture and Technology, P.O Box 62000 -00200, Nairobi-Kenya),

Dr. Amuhaya Iravo (The School Of Human Resource Development, Jomo Kenyatta University of Agriculture and Technology, P.O Box 62000 -00200, Nairobi-Kenya)

References

Aisbett, J., Gibbon, G., Rodrigues, A. J., Kizza, J. M., Renardel, G. R., & Ravi, N. (2008). Special topics in computing and ICT research: strengthening the role of ICT in development.

Anderson, S. (1995). A framework for assessing cost management system changes: the case of activity based costing implementation at General Motors. *Journal of Management Accounting Research*, 7(1), 1–51.

Arms, W. Y. (2001). *Digital Libraries*. MIT Press.

Borgman, C. L. (1999). What are digital libraries? Competing visions. *Inf. Process. Manage.*, 35(3), 227–243.

Candela, L., Castelli, D., Ferro, N., Koutrika, G., Meghini, C., Pagano, P., ... Dobрева, M. (2008). The DELOS Digital Library Reference model. Foundations for digital Libraries (Version 0.98).

Chen, L., Gillenson, M. L., & Sherrell, D. L. (2002). Enticing online consumers: an extended technology acceptance perspective. *Information & Management*, 39(8), 705–719.

Definition and Concept of Technology. (n.d.). *Blog Lingkungan Ekonomi Bisnis Indonesia*. Retrieved September 8, 2013, from <http://businessenvironment.wordpress.com/2006/11/07/definition-and-concept-of-technology/>

Etim, F. E. (2006). Resource sharing in the digital age: prospects and problems in African universities. *Library Philosophy and Practice*, 9(1), 8.

Fichman, R. G. (1992). Information technology diffusion: a review of empirical research. In *ICIS* (pp. 195–206).

Gay, L. R., & Airasian, P. W. (2000). Educational research: Competencies for analysis and application.

Jayaprakash, A., & Venkatramana, R. (2006). Role of Digital Libraries in E-learning.

Jayaweera, U. (n.d.). CentOS 5 Repositories | CentOS / RHEL / Fedora. *CentOS 5 Repositories | CentOS / RHEL / Fedora*. Retrieved from <http://daddy-linux.blogspot.com/2012/02/centos-5-repositories.html>

Karahanna, E., & Straub, D. W. (1999). The psychological origins of perceived usefulness and ease-of-use. *Information & Management*, 35(4), 237–250.

Kavulya, J. M. (2007). Digital libraries and development in Sub-Saharan Africa: A review of challenges and strategies. *Electronic Library, The*, 25(3), 299–315.

Klein, K. J., & Sorra, J. S. (1996). The challenge of innovation implementation. *Academy of Management Review*, 21(4), 1055–1080.

Kwon, T. H., & Zmud, R. W. (1987). Unifying the fragmented models of information systems implementation. In *Critical issues in information systems research* (pp. 227–251). John Wiley & Sons, Inc.

Markus, M. L., Tanis, C., & Zmud, R. W. (2000). Framing the Domains of IT Management: Projecting the Future Through the Past. *The Enterprise System Experience—From Adoption to Success*, Pinnaflex, Cincinnati, OH.

Miner, E. A., & Missen, C. (2005). “Internet in a Box”: Augmenting Bandwidth with the eGranary Digital Library. *Africa Today*, 52(2), 21–37.

Mugenda, O. M. (1999). *Research methods: Quantitative and qualitative approaches*. African Centre for Technology Studies.

Mutula, S. (2004). IT diffusion in Sub-Saharan Africa: implications for developing and managing digital libraries. *New Library World*, 105(7/8), 281–289.

Ndemo, B. (2006). Improving access to technology for economic development.

Ngimwa, P., & Adams, A. (2011). Role of policies in collaborative design process for digital libraries within African higher education. *Library Hi Tech*, 29(4), 678–696.

Nürnberg, P. J., Furuta, R., Leggett, J. J., Marshall, C. C., & Shipman III, F. M. (1995). Digital Libraries: Issues and Architectures. In *DL* (p. 0–).

Patton, R., Johnson, D., Bimber, B., Almeroth, K., & Michaels, G. (2004). Technology and plagiarism in the university: Brief report of a trial in detecting cheating. *AACE Journal*, 12(3), 281–299.

Peters, D., & Pickover, M. (2001). Insights of an African model for digital library development. *D-Lib Magazine*, 7(11), 1082–9873.

Rogers, E. M. (2003). *Diffusion of innovations/Everett M. Rogers*. New York., NY, Free Press.

Rouse, M. (2005). Information and Communication Technology. *TechTarget*. Retrieved from <http://searchcio-midmarket.techtarget.com/definition/ICT>

Santos, J. R. A. (1999). Cronbach’s alpha: A tool for assessing the reliability of scales. *Journal of Extension*, 37(2), 1–5.

Schreibman, S., Siemens, R., & Unsworth, J. (2004). *Companion to Digital Humanities (Blackwell Companions to Literature and Culture)* (Hardcover.). Oxford: Blackwell Publishing Professional. Retrieved from <http://www.digitalhumanities.org/companion/>

Sharifabadi, S. R. (2006). How digital libraries can support e-learning. *Electronic Library, The*, 24(3), 389–401.

Statnikova, K. (2005). *Information Technology Implementation: What Works and What Does Not*. Vanderbilt University.

Tao, H., Kumar, R., & Sawhney, H. S. (2005). *Method and apparatus for tracking multiple objects in a video sequence*. Google Patents.

Wawire, O. F., & Messah, O. (2010). Challenges faced in establishing university libraries in Kenya. *International Journal of Library and Information Science*, 2(8), 148–154.

Thong, J. Y. L. (1999). An Integrated Model of Information Systems Adoption in Small Businesses. *Journal of Management Information Systems*, 15 (4), pg. 187-214.

Zhu, K., & Kraemer, K. (2002). E-commerce metrics for net-enhanced organizations: Assessing the value of e-commerce to firm performance in the manufacturing sector. *Information System Review*, vol. 13, pg. 7-10

Chen, L., Gillenson, L., & Sherrell, L. (2002). Enticing online consumers: an extended technology acceptance perspective, 39(8), 709–719. doi:10.1016/S0378-7206(01)00127-6

Elena Karahanna, & Detmar Straub. (1999). The psychological origins of perceived usefulness and ease-of-use. *Information and Management*, 35, 237–250.

Chen, L., Gillenson, L., & Sherrell, L. (2002). Enticing online consumers: an extended technology acceptance perspective, 39(8), 709–719.

Davis, F. (1989). Author(s): *Journal of Management Information Systems Quarterly*, 13, 319–340.

Taylor, S., & Todd, P. (1995). Assessing IT Usage: The Role of Prior Experience. *Management Information Systems Research Center*, 19(4), 561–570.

Venkatesh, V., & Davis, F. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, 46(2), 186–204