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Editorial Feature

Novel and Fundamental Advances in Digital Technologies for Managing Information and Knowledge

Stephen Mutula
University of KwaZulu Natal
Pietermaritzburg, South Africa
mutulas@ukzn.ac.za

The novel and fundamental advances in digital technologies since the invention of the first electronic computer, the ENIAC by John van Neumann in 1943 has been the single most important driving factor in the emergence of the information society and the resultant explosion of information generated, processed, stored and moved around the world through electronic network environments such as wide area networks (public telephone systems, satellites, microwave systems and more). The novel and more recent advances in communication technology including but not limited to the invention of Ethernet in 1973 by Xerox, PCs, Web browser, Internet/World wide web, search engines, social media and now cloud computing have ushered in a new world order, which revolves around digital solutions. These novel technological advances and the consequent information explosion have in many ways made the work of information and knowledge managers more exciting and also more complex. More than before, information experts are now required to work closely with software and hardware specialists to develop solutions that facilitate data mining from the vast amount of information and data stored in high performance computing infrastructures such as clouds, online databases, government web portals, digital archives, institutional repositories, digital libraries, publishers databases, etc. The leadership role of information and knowledge experts in such areas as information

organisation (especially Internet-based resources that are largely managed by robotic agents), indexing, abstracting, and bibliometric analyses among others has been enhanced and made easier by digital technologies.

When the concept of information society originated in the Japanese social sciences in the 1960s by one Jiro Kamishima in a publication, *sociology in information societies,* it described a newly emerging socialeconomic entity (post-industrial society) (Karvalics, 2007) and had little to do with digital technologies that have become ubiquitous in society today and revolutionised the way information is collected, processed, stored and disseminated. The concept of information society was given impetus by World Summit on Information in 2003 and describes 'a social structure based on free creation, distribution, access and use of information and knowledge …). The information society as we understand it today is largely driven by revolution in digital and computing technologies.

With advancements in digital technologies has emerged sophisticated applications (e.g. social networking, digital scholarship, virtual research environments or collaboratories, data visualisation, online searching and online public access) processes (digitisation, self-archiving, digital imaging, library automation), electronic formats of storing and managing information (online journals; e-books, digital libraries, digital archives, government web portals, institutional repositories, social media platform, etc.) and information/knowledge management tools (search engines, high performance computing).

The information and scientific communities have been on the forefront of leveraging technological innovations to their advantage in such

areas as use of computers to index words of Latin to create concordances (as early as 1949 at IBM), use of automated library systems (progressively on mainframe, mini, PCs, and now clouds platforms), formation of automated library cooperative networks in the from 1970s in Europe, North America and other parts of the world; the use of Web 2.0 technologies (dynamic internet applications) to allow users to communicate with each other by creating, editing and sharing information using tools such as Blogs, Wikis, RSS feeds, social networking, podcasts and delivering library and information science education (Aharony, 2008).

With the continuing advancement and application of digital technologies for information and knowledge management, the information environment has become more complex to manage and ensure equitable and unhindered access to information as well as meet the divergent and competing interests of users, publishers, and authors especially with regard to cost and pricing of information, copyright and licensing regimes. The need for robust legal, regulatory, infrastructural, policy and practical framework is more imperative than before to help balance the interest of different stakeholders in the information industry including the supply chain. The information professional must remain at the forefront in advocating for equitable access to information by all in society as this is a basic human right. Advances in digital technologies must be seen as facilitating rather than as supplanting the traditional roles of library and information professionals.

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Visibility of University of Zululand and Moi University Researchers in Web of Science and Scopus from 2003 to 2013

Dennis N. Ocholla and Janneke Mostert
Department of Information Studies
University of Zululand
South Africa
ochollad@unizulu.ac.za
mostertb@unizulu.ac.za

and

Daniel C. Rotich
School of Information Sciences,
Moi University,
Eldoret, Kenya
dcrotich@hotmail.com

Abstract

This paper reflects on the representation of the University of Zululand (UNIZULU) and Moi University (MU)'s research publications in WoS (Web of Science) and Scopus between 2003 and 2013 as an indicator of active research engagement, quality, and international visibility. Research quality, visibility and collaboration theories were interrogated to inform this study. The research questions posed in this paper were: Do the researchers' publications appear in the databases and to what extent? How has the publication trend of the universities changed from 2003 to 2013? In which subject areas/ domains did they publish? What is the citation impact of their publications? What is the subject coverage of the publications? The study employed descriptive and analytical bibliometrics through content analysis as a research method. Data for the duration of 2003 - 2013 was downloaded from the two databases by author affiliation and captured in Excel by author, rank, discipline, title of paper, and source/type of the publication, and they were analysed by using relevant quantitative techniques. The results reveal that the publications of most of the researchers (approximately 70%) were not indexed in the databases. The publication subject coverage at MU was largely in the Health Sciences/Medicine, while Physical Sciences coverage was stronger at the University of Zululand. A strong research niche area emerged in the area of Medicine at Moi University. Citations and the h-index for both universities in the databases were largely low, but some impressive impact seemed to occur in the medical and biochemical research domain. There are possibilities for research collaboration and evidence of quality research emerging from the two institutions. A niche research area and collaboration in Medicine/Health Sciences is feasible.

Introduction

In academia, research visibility and quality research have largely been seen from the vantage point of research publications, particularly academic journal articles, that appear in peer refereed journals indexed by popular/reputable international databases such as Thompson Reuters Web of Science (WoS), Scopus, and Google Scholar to some degree. The Journal Impact Factor (JIF), Author Impact Factor (AIF), and Web Impact Factor (WIF) also contribute significantly towards measuring research quality and visibility if applied with caution (Bar-Ilan, 2008; Amin and Mabe, 2000; Kumar and Fortunato, 2014; Noruzi, 2006). A recent study by Thelwall and Kousha (2015) and Onyancha (2015) confirms the strong influence and impact from academic social media such as Research Gate. Internationally, research quality and visibility have largely been determined by the number of citations a journal (journal impact factor, JIF) and an author (author impact factor, AIF) accumulates

in WoS; but increasingly, the quantity of papers indexed in Scopus also counts considerably. In a study by Onyancha and Ocholla (2009), WoS, Scopus and Google Scholar (GS) were compared by using three indicators, namely the number of publications, the number of citations and the h-index, to measure the similarity or dissimilarity between the three databases in the coverage of South Africa's library and information science (LIS) documents. It was established that GS covers more publications and citations than ISI and Scopus. However, the study notes that GS should be used cautiously when evaluating research in the developing countries.

While there are many definitions of research, it is generally understood to entail an investigation into a problem arising from natural and/or artificial phenomena by using scientific methods of inquiry that are objective, logical, systematic, reliable, and verifiable. Research is conducted for many reasons that have been discussed at length by various authors (e.g. Ocholla, 2011). The reasons can be categorised into three: general, personal, and institutional/organisational. General reasons include confirming, contesting or refuting theories or hypotheses; developing scientific and professional practice; developing creative, analytical and rational thinking for informed decision making and finding solutions to challenges or problems afflicting humanity. Personal reasons include the fulfilment of learning; domestic and career needs such as promotion, tenure, and self-development; and egoistic reasons such as visibility, or to satisfy curiosity. Institutional/organisational reasons may include mandate – mission of a university, recognition; and visibility – university rankings, justification of existence, and accountability. Visibility is listed as both a personal reason and an institutional reason as to why research is conducted. Research visibility is essential for opportunistic/pragmatic reasons such as self-promotion for recognition and reputation/employment/appointment; for gaining competitive advantage over peers in terms of, for example, recruitment and attraction of better staff or students and outperforming others; enabling and fostering transparency and accessibility to resources and research output; gaining credibility and respect from peers or competitors and stakeholders; supporting research development or capacity building and

knowledge sharing; enabling access to information for benchmarking, for example, for university rankings; supporting scholarly communication; and attracting funding/sponsors/support. Rajkumar (2006) provides seven useful tips for enhancing research visibility that are worth considering as well.

The publication of research findings in a visible and accessible publication is crucial for research visibility and impact. In this paper, bibliometric methods are used through content analysis to quantify research visibility by counting and analysing the number of research publications produced by an individual and/or an organisation that is available in the public domain (e.g. OA repository, website, search engine, publication, etc.). Increasingly, research visibility is established via quantitative measures such as citation and impact factor analysis, as alluded to at the beginning of this paper (see Bar-Ilan, 2008; Amin and Mabe, 2000; Kumar and Fortunato, 2014; Noruzi, 2006). Self-archiving is increasingly popular as well (Ocholla, 2011). Altmetrics provide additional quantitative research visibility/output and web-based impact measurement indicators/tools, thus making research impact analysis and visibility analysis more complex but also rewarding (see Galigan and Dyas-Correia, 2013; Haustein et al, 2013; McFedries, 2012; Piwowar, 2013; Thelwall and Kousha, 2013; Onyancha, 2015).

Purpose of the Study

Research visibility is increasingly becoming important in the individual researcher's bid to build his or her research reputation and gain recognition within an institution and also nationally and internationally among peers. Recognition for scientific excellence, which is normally acquired over a prolonged period, is based on the social appreciation of an individual's performance (Gruber et al, 2008; Rehrl et al, 2014). Research visibility is normally enabled by many reasons highlighted in the previous section. In this study, we argue that while research visibility is important, it is not given sufficient attention in many universities in Africa.

This paper assesses the research visibility of academics and researchers at the University of Zululand and Moi University by analysing publications indexed in WoS and Scopus between 2003 and 2013.

The research questions that guided this study were as follows:

- Do researchers' publications appear in the databases and to what extent?
- How has the publication trend of the universities changed from 2003 to 2013?
- In which subject areas/domains did they publish?
- What is the impact of their publications?

Research Methodology

This study employed descriptive and analytical bibliometrics through content analysis as the primary research method. A critical literature review was conducted on research visibility to inform the study. Data for research visibility analysis was collected from the Web of Science's (WoS) databases (i.e. Science Citation Index (SCI), Social Science Citation Index (SSCI), and Arts and Humanities Citation Index (A and HCI)) and Scopus. The databases were searched for publications from Moi University and University of Zululand academics/researchers for the period of 2003 – 2013. Searches in the databases were done by institutional affiliation (e.g. the University of Zululand) and period/duration (e.g. 2003 – 2013), and indexed research publications were captured and downloaded by using the Endnote tool (reference management software produced by Thomson Reuters (TR) for managing references and bibliography). Not all research publications in the databases are considered by the scientific community to be research output (e.g. Department of Higher Education and Training (DHET, 2015). The number of academics/researchers from each university at the time of data collection was used to determine if their research publications were indexed by the two databases for the research period of 2003 – 2013.

Both Scopus and WoS provide readily available analysis that include the total number of papers, total number of citations, average number of citations per paper, average number of citations per author, average number of papers per author, and Hirsch's h-index, to name a few, making the analysis relatively quick once research questions are known. The focus of this paper was limited to the number of papers, citations, and author h-index. Author impact was determined for each of the top 20 authors with 10 or more publications from each university and

database through the number of citations and h-index. Their representations in the two databases and the influence of the researchers from the two selected universities were compared. The 20 authors' names were arranged by publication count in WoS (Table 3) followed by Scopus in the next column. We also replicated an analysis from a related study (Onyancha and Ocholla, 2009) that involved using descriptive statistics and the Pearson Correlation function in order to determine the relationship between the databases in terms of mean, median, standard deviation, sample variance, range, minimum and maximum values, and the sum total of papers and citations.

Findings of the Study

The findings of the study are presented below in sections 4.1 to 4.5.

Do the researchers' publications appear in the databases, and to what extent?

A search for the research period (2003 – 2013) revealed that 964 and 645 papers from Moi University (MU) were indexed in Scopus and WoS respectively, while 565 were indexed in WoS and 595 in Scopus for the University of Zululand. The variance between the papers indexed in Scopus and WoS at the University of Zululand was deemed to be insignificant.

A publication count of the researchers' output was conducted based on the number of known researchers in the two universities. Researchers affiliated with the two universities during the study period and indexed by the databases, including those who have since left, were included as affiliates. A researcher who published one or more papers that are indexed in the databases was included in the analysis. For the purposes of comparison with other researchers in the two universities whose publications did not appear in the databases, the authors counted academics/researchers in each university and calculated the proportion of those who published and were visible against those who were not visible. Also calculated, was the publication per capita (total number of publications divided by the number of researchers) in order to produce a weighted measure of the publication output (see Onyancha, 2013). For example, Moi University had more academics (780)

than the University of Zululand (329), and a per capita measure would normalise the disparity based on the whole count.

Of the 329 counted academics/researchers at the University of Zululand at the time of writing, 88 (26.7%) published at least one paper indexed in WoS (565) between 2003 and 2013. The number of academics whose papers were indexed in Scopus and TR-WoS (Thomson Reuter Web of Science) was similar. The per capita publication in TR-WoS for the University of Zululand was 1.7, and 1.9 in Scopus. Of the 780 academic/researchers at MU, 964 publications appeared in Scopus. The per capita publication in WoS for MU was 0.8, and 1.2 in Scopus. This implies that, on average, the University of Zululand's academics (1.7 and 1.9) had more papers indexed in the two databases than their compatriots at Moi University (0.8 and 1.2).

How has the publication trend of the universities changed from 2003 to 2013?

Growth is important for development; therefore, research visibility that increases over time is essential. The study captured publications from the two universities that are indexed in WoS and Scopus by year in Excel, and generated four graphs to show their growth over time. The authors expected more growth in Scopus than in WoS.

Figure 1 demonstrates an incremental growth of research indexed in Scopus from Moi University during the study period, with an insignificant rise and fall in 2007 – 2008, and 2010 – 2011. The growth of research indexed in WoS from Moi University was well below Scopus' growth, but continued to rise, nonetheless. The figure shows a marked margin in the comparative growth of MU publications in the two databases between 2009 and 2013. The growth of the University of Zululand's research indexed in Scopus and WoS for the period of study corresponded, as demonstrated in the two graphs. WoS indexed UNIZULU research more than Scopus in 2009, 2011 and 2012, and matched indexing in 2003, 2004 and 2010. There was an increase in the number of UNIZULU publications indexed in WoS between 2009 and 2012. Owing to the Department of Higher Education and Training's (DHET) (see *Policy and Procedures for the Measurement of Research Output of Public Higher Education Institutions, 2003)* research subsidy given to universities in South Africa, it was expected that most UNIZULU publications would be indexed in WoS rather than in Scopus as at 2015. This trend is likely to change from 2016 when DHET includes Scopus indexed journals in the subsidy list (DHET, 2015).

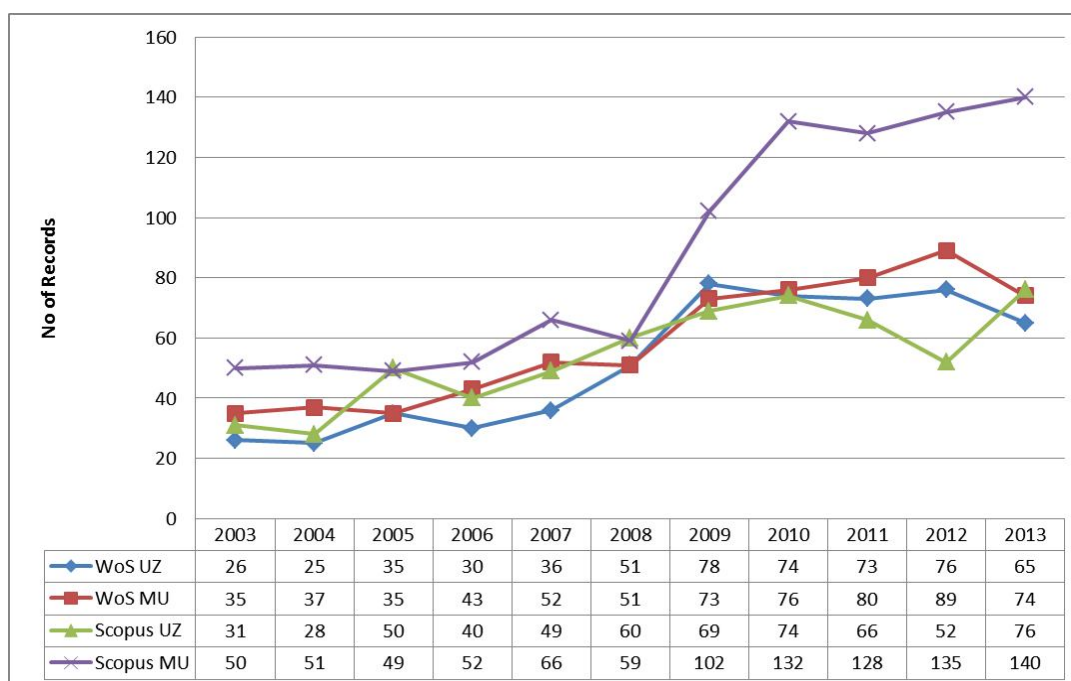|	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
WoS UZ	26	25	35	30	36	51	78	74	73	76	65
WoS MU	35	37	35	43	52	51	73	76	80	89	74
Scopus UZ	31	28	50	40	49	60	69	74	66	52	76
Scopus MU	50	51	49	52	66	59	102	132	128	135	140

Figure 1: Research visibility trend, 2003 – 2013

In which subject areas/domains did they publish?

A focus on subject areas aids in establishing: the research areas that most output stems from; possible areas of research collaboration; active and inactive research disciplines; and visibility for research evaluation and performance management. The most important research at Moi University from 2003 to 2013 was conducted in the field of Medicine, followed by the Environmental Sciences. The University of Zululand's research was more diversified and shared between the Natural (Chemistry, Physics, Plant Sciences) and Applied Sciences (Material Science), and the Social Sciences. Although Religion and Philosophy had more publication counts for the period of study, growth in the two areas at the University of Zululand declined in recent years; and more research at present is generated by the Departments of Psychology and Library and Information Science. Changes in research output in this case could have occurred due to staff mobility.

Table 1 shows the research visibility based on subjects/disciplines for the two universities in WoS and Table 2 in Scopus. The results reveal that visibility was greater in Scopus than WoS for both universities. However, visibility was more pronounced on the part of Moi University. The top ten visible subject areas in WoS– accounting for 69% at Moi University and 81% at the University of Zululand were almost similar in the two databases.

Table 1: Research Visibility by Top 10 Subjects/Disciplines in WoS

Moi University			University of Zululand		
Field: Research Areas	Record Count	% of 644*	Field: Research Areas	Record Count	% of 565*
Environmental Science Ecology	67	10.404	Chemistry	77	13.628
Public Environmental Occupational Health	63	9.783	Plant Sciences	66	11.681
Infectious Diseases	62	9.627	Physics	57	10.088
Agriculture	51	7.919	Religion	46	8.142
Immunology	44	6.832	Material Science	43	7.611
Tropical Medicine	36	5.590	Philosophy	43	7.611
General Internal Medicine	31	4.814	Information Science Library Science	35	6.195
Health Care Sciences Services	31	4.814	Psychology	34	6.018
Science Technology and other topics	30	4.658	Science Technology and other topics	31	5.487
Marine Fresh Water Biology	25	3.882	Meteorology Atmospheric Sciences	29	5.133

*Denotes number of publications indexed in WoS

Table 2: Research Visibility by Subject/Discipline in Scopus

Subject Area	MU (964)	%	Subject area	UZ (595)	%
Medicine	339	35.1	Agricultural and Biological Sciences	132	22.1
Agricultural and Biological Sciences	211	21.8	Social Sciences	92	15.4
Engineering	134	13.9	Chemistry	88	14.7
Social Sciences	119	12.3	Physics and Astronomy	83	13.9
Environmental Science	108	11.2	Materials Science	71	11.9
Physics and Astronomy	89	9.2	Earth and Planetary Sciences	70	11.7
Biochemistry, Genetics and Molecular Biology	88	9.1	Computer Science	66	11
Immunology and Microbiology	56	5.8	Environmental Science	61	10.2
Materials Science	49	5	Engineering	57	9.5
Computer Science	34	3.5	Biochemistry, Genetics and Molecular Biology	55	9.2
Chemistry	32	3.3	Medicine	45	7.5
Nursing	25	2.5	Psychology	29	4.8
Business, Management and Accounting	23	2.3	Pharmacology, Toxicology and Pharmaceutics	20	3.3
Earth and Planetary Sciences	22	2.2	Arts and Humanities	15	2.5
Pharmacology, Toxicology and Pharmaceutics	21	2.1	Chemical Engineering	15	2.5
Arts and Humanities	21	2.1	Immunology and Microbiology	15	2.5
Chemical Engineering	19	1.9	Mathematics	13	2.1
Health Professions	14	1.4	Health Professions	8	1.3

What are the citation and the impact of the publications?

Impact factor analysis enables the assessment of the influence, impression and effect of a journal or author that translates into the research visibility of an institution (Bar-Ilan, 2008; Amin and Mabe, 2000; Kumar and Fortunato, 2014; Noruzi, 2006). Through citation analysis, AIF (Author Impact Factor) and JIF (Journal Impact Factor) were established. Publication counts (number of papers), number of citations, and the h-index were used for this measurement/evaluation. The methods of calculating JIF and AIF are well known (see Amin and Mabe, 2000; Kumar and Fortunato, 2014).

Table 3: Author Impact Factor in WoS and Scopus for MU and UZ, 2003 to 2013

Author	Total Records		Times Cited		h-Index		Affiliation
	WoS	Scopus	WoS	Scopus	WoS	Scopus	
Revaprasadu, N.	64	72	458	562	13	13	UZ
Jury, M. R.	41	39	141	145	6	6	UZ
Braitstein, P.	31	38	438	544	13	14	MU
O'brien, P.	29	32	264	307	10	10	UZ
Kolawole, G. A.	28	30	312	378	11	10	UZ
Scogings P. F.	26	27	112	157	7	8	UZ
Kimaiyo, S.	26	42	531	945	11	15	MU
Wools-Kaloustian, K .	24	38	574	819	14	15	MU
Opoku, A. R.	22	21	101	27	5	2	UZ
Cyrus, D.P.	22	23	101	401	5	10	UZ
Esamai, F.	21	29	238	451	12	10	MU
Edwards, S.D.	19	20	13	164	2	7	UZ
De Wet, H.	18	15	90	134	6	7	UZ
Oyedeji, A. O.	18	16	51	79	4	6	UZ
Nyandiko, W. M.	18	32	239	514	9	15	MU
Tierney, W. M.	18	24	399	544	9	11	MU
Okalebo, J. R.	17	16	70	66	6	5	MU
Sidle, J. E.	17	35	282	986	10	15	MU
Vreeman, R. C.	16	26	146	258	7	8	MU
Were, E.	15	15	732	11	9	2	MU
Zobolo, A. M.	15	13	11	44	2	4	UZ
Beesham, A.	14	15	94	51	4	4	UZ
Khanna, K. M.	14	15	5	8	1	2	MU
Celum, C.	13	15	772	1077	10	12	MU
Lawal, O. A.	13	14	41	67	4	4	UZ
Ocholla, D. N.	13	30	41	112	4	6	UZ
Nejo, A. A.	12	13	82	110	5	6	UZ
Vivier, L.	12	14	88	151	6	8	UZ
Atwoli, L.	12	14	18	26	2	3	MU
Ayuku, D.	12	26	677	115	8	6	MU
Kiarie, J.	12	18	354	1099	9	12	MU
Othieno, C. O.	12	25	59	182	5	6	MU
Yiannoutsos, C. T.	12	18	354	476	9	11	MU
Ayaya, S.	11	30	112	246	4	6	MU
Baeten, J. M.	11	0	725	0	9	0	MU
Edwards, S.	10	38	71	25	3	4	UZ
Jerling, H. 1 .	10	12	63	90	4	6	UZ
Malik, M. A.	10	11	85	93	4	5	UZ
Yin, W.Y.	10	88	0	444	0	13	MU

Table 3 reveals all the authors who had a record count of over 10 publications in all or either of the two databases from the two universities. There were 20 researchers from Moi University and 19 from the University of Zululand who appeared in the Scopus database, and 18 and 20 from Moi and Zululand respectively in the WoS. More citations were recorded by Scopus than WoS across the board. The authors with the highest number of citations in Scopus from the two universities were Kiarie (1099), Celum (1077) and Sidle (986) of Moi University and Revaprasadu (562), Cyrus (401) and Kolawole (378) of the University of Zululand. The WoS database recorded less citations. The authors with the highest number of citations were Celum (772), Were (732) and Wools-Kaloustain (574) of Moi University, and Revaprasadu (458), Kolawole (312) and O'Brien (264) from the University of Zululand. In general, authors from Moi University received more citations. These findings indicate that Scopus captures more data from research publications than WoS. The highest cited research outputs from the two universities for the period of study were in the Biological and Physical Sciences and Medicine, an indication of the level of visibility of research outputs in the two fields of study.

Table 4: Correlations of Total Cited Publications and Total Records for WoS and Scopus, Moi University

		Total Cited Wos	Total Cited Scopus	Total Records WoS	Total Records Scopus
Total Cited Wos	Pearson's Correlation	1	.283	.272	-.287
	Sig. (2-tailed)		.227	.246	.220
Total Cited Scopus	Pearson's Correlation	.283	1	.297	.284
	Sig. (2-tailed)	.227		.204	.224
Total RecordsWoS	Pearson's Correlation	.272	.297	1	-.105
	Sig. (2-tailed)	.246	.204		.658
Total RecordsScopus	Pearson's Correlation	-.287	.284	-.105	1
	Sig. (2-tailed)	.220	.224	.658	

The Pearson's correlation analysis of Moi University's output by the top twenty visible researchers, as shown in Table 4, indicates a coefficient of .283 between the total cited publications in WoS and the total cited publications in Scopus. The results further indicate a negative coefficient relationship of -.287 between the total cited publications in WoS and the total records in Scopus, and -.105 between the total records in WoS and the total records in Scopus.

Table 5: Correlations of Total Records and Total Cited Publications for WoS and Scopus, University of Zululand

		Total Cited Wos	Total Cited Scopus	Total Records WoS	Total Records Scopus
Total RecordsWoS	Pearson's Correlation	1	.726	.842	.768
	Sig. (2-tailed)	.000	.000	.000	
Total RecordsScopus	Pearson's Correlation	.726	1	.699	.604
	Sig. (2-tailed)	.000		.001	.005
Total Cited WoS	Pearson's Correlation	.842	.699	1	.845
	Sig. (2-tailed)	.000	.001		.000
Total Cited Scopus	Pearson's Correlation	.768	.604	.845	1
	Sig. (2-tailed)	.000	.005	.000	

The Pearson's correlation analysis of the University of Zululand's output by the top twenty visible researchers, as shown in Table 5, indicates a coefficient of .845 between the total cited publications in WoS and the total cited publications in Scopus. The results further indicate a coefficient relationship of .699 between the total cited publications in WoS and the total records in Scopus, and .726 between the total records in WoS and the total records in Scopus.

Table 6: Descriptive Statistics

University of Zululand			Moi University	
	Mean	Std. Deviation	Mean	Std. Deviation
TCWos	110.95	111.762	336.25	261.923
TCScopus	156.10	144.805	440.55	375.840
HIWoS	5.25	3.110	7.85	3.829
HIScopus	6.45	2.762	9.05	4.979
TRWoS	19.80	13.691	15.60	6.573
TRScopus	24.60	14.580	27.20	17.647

Descriptive analysis using Pearson's correlation analysis (see Table 6) indicates that there are some significant differences in the output of the two universities when considering the top twenty researchers with research publications that are visible. Moi University had a higher mean in the fields considered, except in the total records of WoS where the University of Zululand had a mean of 19.80 and Moi had a mean of 15.60. In the same database (WoS), the total cited publications produced a mean of 110.95 and 336.25 for the University of Zululand and Moi University respectively.

An analysis of the distribution of the h-index indicates a mean of 6.55 in WoS and 7.75 in Scopus for the study period for both universities (see Table 7). It was also observed that the range was not significant in the two databases; WoS had a maximum of 14 and Scopus had a maximum of 15 in the h-index of the forty authors in the list. The distribution of the total cited publications indicates a mean of 223.60 in WoS and 298.33 in Scopus. It was also observed that there was a significant difference in the range of the two databases in the maximum, but no difference in the minimum. The maximum was

772 in WoS and 1099 in Scopus for the period of study, while the standard deviation was 229.179 and 315.878 in WoS and Scopus respectively. A statistical analysis of the distribution of total records indicates a mean of 17.70 in WoS and 25.90 in Scopus (see Table 7). The maximum number of publications in the two databases for the research period was 64 and 88 in WoS and Scopus respectively. There was no significant difference in standard deviation in the two databases (10.811 and 16.032 in WoS and Scopus respectively), but the variance was slightly significant (116.882 and 257.015 in WoS and Scopus respectively).

Table 7: Descriptive Statistics, Moi University and the University of Zululand

	Total Recrods WoS	Total Records Scopus	h-Index WoS	h-Index Scopus	Total Cited WoS	Total Cited Scopus
Mean	17.70	25.90	6.55	7.75	223.60	298.33
Std. Error	1.709	2.535	.583	.662	36.236	49.945
Range	64	88	14	15	772	1099
Minimum	0	0	0	0	0	0
Maximum	64	88	14	15	772	1099
Std. Deviation	10.811	16.032	3.686	4.186	229.179	315.878
Skewness	2.212	2.028	.168	.287	1.138	1.298
Count	40	40	40	40	40	40
Variance	116.882	257.015	13.587	17.526	5.252	9.978

A search in Scopus and WoS for the researchers from the two institutions for the research period revealed that there was a significant difference in visibility. As shown in Table 7, the mean from all the fields was higher in Scopus, which indicates that more research output is captured by that database. The statistics further indicate a significant difference in the maximum total of records and times cited in the two databases. There was a maximum total of 88 records from the two universities in Scopus and 64 in WoS, and a maximum total of 1099 cited records in Scopus and 772 in WoS.

Conclusion

Notably, the publications of most of the researchers (approximately 70%) were not indexed in the databases for the research period, as noted in section 4.1. The approximate figure was determined by counting the number of academic staff in each university minus those who published one or more articles indexed by WoS or Scopus. For example, 88 (26.7%) of the University of Zululand's researchers/academics published at least one paper indexed in WoS (565) between 2003 and 2013.

The findings suggest the growth of research publication visibility in the databases, which is encouraging for international visibility and quality research output. At present, Moi University research is more visible in Scopus than in WoS, while the level of indexing of the University of Zululand's research publications in both WoS and Scopus is quite close. There is a strong incentive for academics from the University of Zululand and indeed in South Africa to publish in WoS indexed research outlets, as outlined by DHET (2015). But this incentive will include qualifying research publications in Scopus starting from 2016 (DHET, 2015) as well. Since most publications that are indexed in WoS are also indexed in Scopus, the duplication could have raised the number of UNIZULU indexed papers in Scopus. The publication subject coverage at MU for the period of study was largely in the Health Sciences, while Physical Sciences coverage was stronger at UNIZULU led by Chemistry. Although a strong research niche area emerged in the domain of

Medicine at MU, UNIZULU did not follow a similar pattern but produced more work in Physical Sciences. The two fields suggest areas of possible research collaboration between the two universities that could be explored.

Citations and the h-index for both universities in the databases for the research period were low, but some impressive impact seemed to occur in the Medical and Biochemical research domains. As pointed out by Bornmann and Dieter (2007), citing Anonymous, 'the h- index favours enduring performers that publish a continuous stream of papers with lasting and above average [e.g. 10 h-index] impact", suggesting that the higher the h–index, the more established a researcher would be. However, the principles of variability of impact factor must always be borne in mind as indicated in the 'bibliometrics ten commandments" outlined by Thomson Reuters (Pendlebury, 2008) that includes 'compare likes and likes'; limitations and impact factor vary from discipline to discipline, with some producing far less or more than others over time or citation 'window'.

Researchers also need to be encouraged to publish more in internationally visible research outlets/publications that are largely indexed either in Scopus or TR-WoS, or in both, in order to demonstrate and account for quality research and increase research visibility that can be used for the purposes alluded to earlier in the paper. The limited number of research publications reflected in WoS and Scopus requires further attention as the research reflected in the two databases does show quality research output. Further research could explore how academic social media such as Research Gate (see Thelwall and Kousha, 2015) is used by the two universities or among Kenyan and South African universities to replicate what Onyancha (2015) has produced on Researchgate research for South Africa. Research visibility in Google Scholar can also provide useful data for further comparison.

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Dennis N. Ocholla, is a Senior Professor in the Department of Information Studies and Deputy Dean Research and Internationalisation in the Faculty of Humanities and Social Sciences at the University of Zululand South Africa. He is also the Editor-in-Chief of Inkanyiso-JHSS. He is qualified with PhD and MLIS in Library and Information Science from Kiev/ St Petersburg/Leningrad in 1988 and Krasnodar 1983 respectively (both in the former USSR).

Janneke Mostert is a Full Professor in the Department of Information Studies at the University of Zululand where she teaches subjects in the Library and Information Science programme, and is also involved in Postgraduate supervision

Daniel C. Rotich is a Professor in the Department of Publishing and Media Studies, School of Information Sciences, Moi University Kenya and Research Fellow Department of Information Science at the University of South Africa. He is qualified with PhD in Information Management from Thames Valley University-London(2000), MPhil in Publishing Studies, Stirling University(1995) and BSc in Information Sciences, Moi University Kenya(1993).

Research Support and Open Access: Notes from Nigeria

Noah Oluwafemi Samuel
Graduate School of Library and Information Science, The University of Illinois at Urbana-Champaign, USA
Email: nosamue2@illinois.edu

Abstract

This paper examines the research environment in Nigeria in relation to the developing trends in the global research community and specifically regarding research funding by government as a viable way of ensuring access to research result. The paper is devoted to examining the support available for research and researchers and exploring the concept of open access to research articles by scholars in Nigerian institutions. Also, the paper examined the level of mobile device and Internet penetration in Nigeria. Using the conceptual approach, the paper started with a brief background and proceeded to examine research support in Nigeria. The remaining sections are on the World Wide Web and information sharing, Internet access in Nigeria, open access scholarly publications, and suggestions and conclusions, which synthesised the thoughts in the preceding sections. This paper argued that the current rate of mobile device and Internet penetration can only be seen as a benefit if access to scholarly work is freely available to all. The paper concluded on the need for increased funding for research by the Nigerian government as well as both for-profit and not-for-profit organisations within the country as a way to achieving any developmental objectives set by the government.

Introduction

In any academic setting, the primary activities revolve around teaching, research, and service with other peripheral functions (O'Banion, 2010). This applies to all the academic communities around the world, and the performance metrics used in the rating of institutions are usually around these parameters. Research, being the bedrock of innovation, is a critical area of emphasis for scholars in the university system, and major innovations around the world are products of research in the academe (Boulton and Lucas, 2008). Several countries are investing significant amount of resources on research, especially supporting research in the universities with diverse grants. The developed countries such as the United States, the United Kingdom, Canada, Australia and a number of European countries are investing heavily in research, and they consistently attract research students from different parts of the world, partly because they make resources available to the universities in a variety of ways (Ruiz, 2014; Fang, Roy, and Ortiz, 2015). Apart from government sources such as the National Science Foundation in the United States, National Research Council of Canada, Research Councils UK, several other non-governmental organisations are also involved in research funding in these countries.

In Nigerian institutions, however, there is concern on the type of support structures available for scholars in the country's universities and research institutes. Like any other academic settings, academic publishing is a major consideration in promotion of lecturers in the tertiary institutions in Nigeria. For example, in a recent promotion publication by the University of Ibadan, Nigeria's first university, it was expressly stated that "a candidate being put up for promotion to the grade of Senior Lecturer and up to the grade of Professor should have a reasonable number of journal articles published outside the country" (University of Ibadan, 2014). Another university, a private university, has the same criteria. One of Covenant University's rules regarding publication as a determining factor for promotion goes thus: "for promotion to the grade of Professor, not less than 70% of the articles shall be published in international journals" (Covenant University, 2010).

Based on these requirements therefore, it is easy to infer that majority of the scientific outputs from Nigeria are published in foreign or international journals.

Publishing in reputable international journals is a great thing, and it indeed places scholars alongside their colleagues in different parts of the world. However, this also has its own limitations which this article will consider alongside the merits. The remaining part of this paper will consider the structure and the support available for research in Nigeria and on open access to the result of scholarly works. In addition to the efforts of international organisations such as the World Health Organisation on making access to scholarly publications available to developing countries, the article will consider what should be done by Nigeria, as a country, to ensure that research is well funded and the results of are made available to enhance policy formulation. The next section will examine research support in Nigeria as it affects access to research output of scholars.

Structure and Support Available for Research in Nigeria

The research communities in the tertiary institutions serve a purpose: to provide novel results that will help in shaping policy for the wellbeing of the people (Shuttleworth, 2008). Hence, robust funding is a critical requirement for these scholars, especially for research It is evident today that majority of the support received by scholars in Africa and indeed Nigeria often come from foreign donors and organisations (Research Professional, n.d). Research support comes from agencies such as UK Department of International Development, World Health Organisation, MacArthur Foundation, United States Agency for International Development, and a number of other international bodies. Bako (2005)

wrote about the collapse of research in Nigerian universities, emphasising that there have been paradigmatic shift leading to teaching rather than research. Mention was made of the comatose nature of research funding within the Nigerian higher institutions of learning. According to the author, research has greatly been disconnected from the Nigerian economy, state, and the community at large.

The progress of the nation, according to Odia and Omofonmwan (2013), is a function of the efficiency of research administration in the nation's higher institutions of learning. Also, in their opinion, scientific and technological development requires that the country has in place a clear cut philosophy of national development, especially regarding research. Odia and Omofonmwan (2013) noted a few problems affecting research development in Nigeria, similar to what other researchers have considered which include mentoring, quality funding, functional leadership capacity of political leaders, competencies to drive innovative ideas, leaning towards consumption more than creation and a number of others. Despite current statistics showing over 30 research institutes in the country aside the higher institutions of learning (Okoruwa, 2013; National Bureau of Statistics, n.d; Nexus Strategic Partnership Limited, n.d), the low level of research output in comparison to other countries with similar attributes as shown in Table 1 and Table 2 depicts that the country requires tenacious act obviously by the government and other research funders within the country in order to scale up its investment in research.

In Table 1 for example, Nigeria is ranked in the eighth position in research expenditure among the world's top ten countries by population. Similarly in Table 2, among the four Countries named as the next emerging economies by O'Neill (2013) which referred to the acronym MINT, Nigeria is also third in research expediture.

Table 1: Top 10 Countries by Population Size and their Research Expenditure

S/N	Country	Polulation	Researcher (full-time equivalent per million people 2005 - 2014)	Scientific and technical journal articles (2011)	Expenditures for R and D		Ranking by Research Expenditure
					(% of GDP 2005 - 2014)		
1	China	1,393,783,836	1,089	89,894	2.01		2
2	India	1,267,401,849	157	22,481	0.82		6
3	USA	322,583,006	4,019	208,601	2.81		2
4	Indonesia	252,812,245	90	270	0.08		9
5	Brazil	202,033,670	698	13,148	1.15		4
6	Pakistan	185,132,926	167	1,268	0.29		7
7	Nigeria	178,516,904	39	439	0.22		8
8	Bangladesh	158,512,570	N/A	291	N/A		N/A
9	Russia	142,467,651	3,073	14,151	1.13		5
10	Japan	126,999,808	5,201	47,106	3.47		1

Table 2: The MINT Countries as Coined by Jim O'Neill in 2013

1	Mexico	123,799,215	383	4,128	0.5		2
2	Indonesia	252,812,245	90	270	0.08		4
3	Nigeria	178,516,904	39	439	0.22		3
4	Turkey	75,837,020	1,169	8,328	0.94		1

Data Source: worldometers.info and wdi.worldbank.org

Considering the sharing of research experience among researchers in the country and those from other countries, Okoruwa (2013) has reported that there is slow adoption of research materials and methods from already developed researches which could be a result of restricted access to such materials. Some of the drawbacks noted by Okoruwa include little value addition to industries and relevant fields in Nigeria by the current low level of research output, inadequate funding, and poor collaboration between and within relevant research agencies. Compare to Nigeria regarding support for research, South Africa has national bodies with research as sole concern. For example, The South African National Research Foundation (NRF) has its priorities stated on its website as follow: *The mandate of the NRF is to promote and support research through funding, human resource development and the provision of the necessary research facilities in order to facilitate the creation of knowledge, innovation and development in all fields of science and technology, including indigenous knowledge, and thereby contribute to the improvement of the <u>quality of life</u> of all South Africans* (National Research Foundation, n.d.). Additionally, in South Africa, there is another national body called the Medical Research Council with a *mandate to promote the improvement of the health and the quality of life of the population of South Africans through research, development and*

technology transfer (South African Medical Research Council, n.d.).

Other than the review of the preceding articles showing the drawback within the research community in Nigeria, a number of authors have written promising papers based on empirical studies to show that Nigerian scholars in spite of the challenges of funding and other impediments to their efforts are still making great contributions to the scientific community. For example, Chiemeke, Longe, Longe, and Shaib (2009) reported that some studies about declining nature of research in Nigeria lack empirical evidence and construct validity. Chiemeke et al (2009) concluded based on their empirical study that research output is still on the rise although more within the university system where research and publications are key component of the criteria for promotion. Their report however indicated that the polytechnics, a major component of the nation's higher education system, are still laden with low research output. In addition, the efforts of the universities toward building adequate capability for research funding have been reported by Opara (n.d.). According to Opara, some of the higher institutions in Nigeria have been able to receive support by using an online platform called Research Professional through which researchers are able to access funding for their research from different sources. Some other promising development was also reported by Evans (2014) about the agreement between Nigerian univeristies and Elsevier which gives 79 institutions first time access to research management and analytic tools. Through the agreement, it was reported that Nigerian scholars will have access to research, training workshops, research analytic tools and journal production and hosting. However, some of the progress and support reported here are foreign intervention, and it is expected that Nigeria as a country will put adequate support system in place towards the development of the research community in the country.

Current National Efforts Regarding Funding

The Tertiary Education Trust Fund (2015) was set up by the Nigerian government to meet variety of needs in the nation's tertiary education system. The 2011 TETFund Act imposes a two per cent education tax on the assessable profit of all registered companies in Nigeria, and this fund is disbursed to the tertiary institutions for various purposes which include research. The coverage area of this fund was stated on the agency's website as follow:

- *Providing essential physical infrastructure for teaching and learning*
- *Provision of instructional material and equipment*
- *Research and publication*
- *Academic staff training and development*
- *Any other need which, in the opinion of the Board of Trustees, is critical and essential for the improvement of quality and maintenance of standards in the higher educational institutions.*

The above stated objectives seem overwhelming considering the demand in the tertiary education system. Research on its own demands significant investments as seen by the commitment of many developed countries in setting up independent agencies for the sole purpose of providing support for research. It is obvious in the light of resource demand for world class research support that TETFund cannot support all the stated objectives and effectively provide support for research all over the tertiary institutions in Nigeria. In the past, some efforts have been geared towards creating separate agency for research support, in addition to the effort of TETFund within tertiary institutions in the country. For example, there was a research fund proposal in 2006 with a planned endowment of $5 billion from the proceeds of oil which was not a success. Additionally, another fund was announced in January 2012 called the National Science Research, Technology and Innovation Fund which was to be administered by an independent board headed by the President. This fund was to replicate the United State's National Science Foundation (*JohnKingsley, 2012*). The current status of this initiative cannot be verified at the moment due to the fact that it was an initiative under the former president of the country.

However it is needful to ask how research support and funding may significantly affect access to research results. This is a question that must be examined in order to provide the basis for the need

to provide adequate support for scholars within Nigerian tertiary institutions. In a number of the developed countries, scholars that are funded by national research bodies are mandated to make the result of their research available via open access platforms. For example, funded research by the National Institute of Health in the United States is made available on PubMed Central, an open access journal, as a matter of policy (National Institute of Health, 2014; Matheka, Nderitu, Mutonga, Otiti, Siegel, and Demaio, 2014). Also, in Africa, South African scholars are favoured to publish locally than in foreign journals largely because of the funding the research community receives from the government (South Africa Higher Education and Training, 2015).

World Wide Web and how it has affected sharing

It is unlikely that Berners-Lee in his 1989 proposal tagged *Information Management* would imagine the widespread effect the World Wide Web has generated today. Working with the European Organisation for Nuclear Research (CERN) at the time, Berners-Lee critically examined the changes that occur within the organisation regarding high turnover of staff; two years being a typical length of stay. Trying to see how technical details can be mapped and retained for successive workers, Berners-Lee came up with this idea that has now changed the world of information sharing. As part of the conclusion in the document, he asserts *"the aim would be to allow a place to be found for any information or reference which one felt was important, and a way of finding it afterwards."* A solution envisaged to help an organisation has now become the point of connections that breaks the boundary barriers between nations and makes sharing prevalent. The World Wide Web has made sharing of information and ideas possible on a very large scale. Its emergence has led to rapid increase in the amount of information available to an average individual. The impact of the Web on knowledge sharing has been well researched (see Engelbrecht, 2008; Kobayashi and Ari, 2006; Shaffer and Hussey, 1992; Tedd, 1995; Wang and Wei, 2011). The Web is a significant part of the Internet and hence the most widely used. The population of Internet users per country across the world is rapidly approaching the total population of individual countries as shown in Table 3. According to Internet live stats (2014), there has been tenfold increment in the number of Internet users from 1999 to 2013 with Internet users reaching the first billion in 2005, second in 2010, and third in 2014.

Table 3: Top 10 Internet Users by Country (2014)

	Country	Internet Users	Total Country Population
1	China	641,601,070	1,393,783,836
2	United States	279,834,232	322,583,006
3	India	243,198,922	1,267,401,849
4	Japan	109,252,912	126,999,808
5	Brazil	107,822,831	202,033,670
6	Russia	84,437,793	142,467,651
7	Germany	71,727,551	82,652,256
8	Nigeria	67,101,452	178,516,904
9	United Kingdom	57,075,826	63,489,234
10	France	55,429,382	64,641,279
	Total	**1,717,481,971**	**3,844,569,493**

Data Source: adapted from *Internet Live Stats (www.InternetLiveStats.com)*

While less than one percent of the world's population were on the net in 1995, there are about 40% of the world's population on the Internet today (Internet live stats, 2014). This rapid growth has enabled sharing of information across geographically dispersed boundaries. Social media sites such as Facebook, Twitter, Instagram and a whole lot of others have seen massive sharing of text, images and videos, and the growth is ongoing. Blogs and other platforms are used by individuals and organisations to propagate their interests, contributing to the world of digital content sharing. Google, one of the world's leading digital companies has made sharing mostly free, albeit for an intrinsic business value. Millions of videos are available through YouTube, while a great number of people are using Google Search, Google Scholar, Google+, Maps and deluge of other products and services by the digital giant. Obviously, sharing has been greatly multiplied through the instrumentality of the World Wide Web. But has the World Wide Web led to more sharing of scholarly work? More specifically, has the World Wide Web aided free access to scholarly publications?

The advent of the Internet has led to innovation on how research outputs are reported, and the Internet is now a strong medium (by all means the most popular medium) for sharing research findings. The general concern of late has been agitation surrounding open access to research results. These agitations have been mapped in a number of initiatives from Budapest to Bethesda, Berlin, and Lyon. These initiatives will be discussed subsequently. But of what use will great access to the Internet be if the contents of the Internet that will enhance productivity and human progress are not freely available to all? The next section takes a look at the Internet access in Nigeria vis-a-vis access to scholarly works.

Internet Access in Nigeria

Nigeria is currently the seventh largest country in the world with regard to population size and also ranked among leading consumers of digital and technological products in the world (Internet world stats, 2015). In the mobiThinking (2014) report, Nigeria was ranked tenth among the countries with the largest number of mobile subscription in the world.

With an estimated population of 178 million, according to World Bank (2014), the country has active mobile subscription of about 148 million (NCC, 2015). This implies that about 83% of Nigerians have active mobile subscription. This is an achievement over pre mobile era when access to telecommunication services was a luxury. Like access to mobile devices, Internet access in Nigeria is also on the rise. A few years ago, accessing the Internet was mainly through business-oriented cybercafés that provided timed access to Internet for the teaming populace. However, with increased improvement over the years, mobile Internet access has greatly increased, with the latest estimation of Nigeria's mobile Internet users being 93.4 million (Azeez, 2015).

If approximately 53% of Nigerian mobile users have access to Internet as it is currently being reported, what benefit is this figure to the country's development? What will be the benefit of increased Internet access without free access to scholarly works? How can the increased access to the Internet benefit the country if measures are not taken to ensure that the scientific community and business community have access to quality scholarly works whenever the need arises? Advancement in Internet access should definitely lead to critical evaluation of the benefit that such increase can present, most especially regarding free access to scientific information of which Nigerian institutions are contributors.

Academic institutions in the country continue to place demand on scholars to publish in international journals as a criterion for career advancement, but the works published are rarely available when needed without having to pay some level of subscription fees or outrightly buying the articles. While the business models of the organisations involved in the scientific publishing may not be faulted (for all it is, they are business minded), Nigeria as a country needs to put strategies in place that will ensure improved or increased access to scientific publications for a more robust growth and development. As was observed by Ghosh and Das (2007), majority of the top publishing organisations are located in the developed countries and access to the publications does not come cheap especially to developing countries that often need the results from scientific research for developmental planning. There have been worldwide call for increased access to scholarly materials, and

some of the initiatives are briefly explored in the following section as it relates to Nigeria and other developing countries.

The Drive towards Open Access to Scholarly Publications

Open access to scholarly publication has been an ongoing concern around the world. Several initiatives have been geared towards this cause and a number of them are receiving support on a daily basis. One of such earliest initiatives is the Budapest Open Access Initiative (BOAI) ratified on St. Valentine's Day, February 2002. The BOAI acknowledged that price is a barrier to accessing quality scientific results and made a few propositions. Price being a barrier as noted by the BOAI was initially a barrier conceived to be concerned with accessing scientific results – users' access. Today, price is still a barrier in two significant ways: to the population of research users and to the scientists looking for avenue to publish their findings. Though a number of open access journals are now available, price is still a major factor, especially to scientists who have no major funding for their research. Majority of researchers in Nigeria fall into this category. Yet, they would prefer to publish in top-notch open access journals in their fields that charge from a thousand US Dollars upward per article (Elsevier, 2015; Macmillan Publishers Limited, 2015; MDPI journals, 2008).

The Budapest Open Access Initiative (BOAI) made two critical suggestions in ensuring open access to scientific publications. The first was self-archiving of accepted manuscript, and this should be of significant interest to Nigeria and other developing countries. The second was a call for open access journals. In addition to business-oriented open access journals, there are also a few that make published articles accessible online without any cost to the users and the scientists who publish in them (Crotty, 2015; Suber, 2015). Major institutions around the world have also embraced the establishment of institutional repositories (Bepress, n.d.). Though a few Nigerian institutions have started this initiative as seen in Table 4, it is expected that more tertiary institutions in the country will follow in this stead by investing in the establishment of institutional repositories that will ensure that copies of the articles published by the scholars in international journals are also available locally through such repositories.

Table 4: Available Nigerian Universities' Institutional Repositories via Opendoar.org

	Name of Institution	Name of respiratory	Respiratory link
1	Ahmadu Bello University	ABU Zaria Research Publications	http://www.abu.edu.ng/pages/researchworks.php?pageNum_rsPaperSearch=422 andtotalRows_rsPaperSearch=8449
		Ahmadu Bello University Institutional Digital Repository	http://kubanni.abu.edu.ng:8080/jspui
2	Covenant University	Covenant University Electronic Theses and Dissertation Repository	http://www.covenantuniversity.edu.ng/~/clr_cu/library/readonline/docsExplorer/#
		Covenant University Repository	http://eprints.covenantuniversity.edu.ng/
		Theses and Dissertations	http://theses.covenantuniversity.edu.ng/
3	Federal University Ndufu-Alike Ikwo	dspace.funai.edu.ng	http://dspace.funai.edu.ng/
		Federal University Ndufu-Alike Ikwo Repository Archive	http://dspace.funai.edu.ng/xmlui/
4	Federal University of Technology, Akure, Nigeria	Institutional Repository of the Federal University of Technology	http://dspace.futa.edu.ng:8080/jspui/
5	Federal University, Oye Ekiti	Federal University Oye Ekiti Repository	http://www.repository.fuoye.edu.ng/
6	Landmark University	Landmark University Repository	http://eprints.lmu.edu.ng/
7	University of Jos	University of Jos Institutional Repository	http://irepos.unijos.edu.ng/jspui
8	University of Lagos	University of Lagos Institutional Repository	http://repository.unilag.edu.ng:8080/xmlui/
9	University of Ilorin	UILSPACE	http://uilspace.unilorin.edu.ng:8080/jspui/
10	University of Nigeria Nsukka	Open Resources	http://unn.edu.ng/chart/repo
		University of Nigeria Institutional repository	http://repository.unn.edu.ng:8080/jspui/

Source: University of Nottingham (2015). Directory of Open Access Repository

Institutional repositories and personal or self-archiving as suggested by BOAI will be a great way to enhance access to the result of findings emanating from Nigeria and other countries which are being published in peer-reviewed international journals that may be difficult to access when needed. As seen in Table 4, only a handful of tertiary institutions in Nigeria have institutional repositories and most of the repositories are hosted by the Directory of Open Access Repository (University of Nottingham, 2015). Christian (2008) reported a number of problems relating to putting such resource in place. Some of the drawbacks reported by Christian include lack of awareness of open access institutional repository, inadequate information and communication technology infrastructure to support such resources, inadequate funding and low level of advocacy in these directions. While Christian's report dates back seven years, it is expected that some of these hurdles are already or are in the way to becoming a thing of the past.

In addition to the BOAI, there have been other initiatives towards open access, some of which include the Bethesda Statement on Open Access Publishing endorsed on June 20, 2003; The Berlin Declaration on Open Access to knowledge in the sciences and humanities, October 22, 2003; and The Lyon Declaration on Access to Information and Development of August 2014. The Lyon declaration, being the latest, sought to engage the United Nations in the consideration of making access to information a major goal as it formulates the next developmental agenda for the world as the Millennium Development Goals come to an end. If the Lyon declaration gets the target support it is currently seeking from the United Nations, that can be a signpost to better days for both the developing and the developed countries in terms of access to information for development (IFLA, 2014; Max Planck Gesellschaft, 2003; Suber, 2003).

It is important to review a number of open access projects that are directed toward developing countries. Chan and Costa (2005) reviewed a number of these initiatives. Some of them include Access to Global Online Research in Agriculture (AGORA) by the Food and Agricultural Organisation of the United Nations; Online Access to Research in the Environment (OARE) by United Nations Environment Programme; Access to Research for

Development and Innovation (ARDI) by the World Intellectual Property Organisation; and World Health Organisation's Health Internetwork Access to Research Initiative (HINARI). These four initiatives are under the research4life (n.d.) umbrella, and they are providing countries in the developing region of the world with free or low cost access to academic and professional peer-reviewed content online. Other than these initiatives, other sources include the PubMed Central, World Digital Library, UNdata, Directory of Open Access Repositories, High Press, Directory of Open Access journals, African Journals Online, and so on (International Institute of Social Studies, n.d.). These sources offer some form of access to scholarly materials, majority offering free access while some access attract low cost than they would have attracted. As seen from the review of literature, there are a number of outside initiatives that provide the developing countries (of which Nigeria is one) with free access to scholarly works. As the next section will discuss, it is important that the Nigerian government makes it a duty to make resources available that will empower the academic communities in the country to put up their own support infrastructure, in addition to receiving foreign help.

Suggestion and Conclusion

In the preceding sections, this article has considered two main themes: funding for research in Nigeria and open access to research, believing that adequate funding of research can enhance access to research result. Based on the literature reviewed, this concluding section will make some recommendations regarding increasing research funding as a major way to achieving more access to scholarly publications. As it is at the moment, majority of the support in the tertiary education system is concentrated on a single agency of the government which is the Tertiary Education Trust Fund (TETFund) whose objectives cut across more areas than research. It is advised that the government sets apart an autonomous research agency with significant funding to provide research support for the nation's higher institutions which will in turn help with the country's developmental goals.

For example, for Nigeria to develop capacity in the area of putting together and managing such facilities as institutional repositories, the government

must be willing to invest significant resources in the research environment. As noted earlier, most organisations involved in research funding in the developing countries, especially, Nigeria are not-for-profit international organisations. It is important that both for-profit and not-for-profit indigenous establishments in Nigeria get involved in the research funding challenge. Support received from any of these sectors will definitely help with the backlog of resources needed in research support and take some burden off the government. There is the need to build active mutual relationship between the academic community and the business community. The business community can turn to research community to help with critical business need and in turn support the research community in the country with resources that could enhance their progress.

As seen in Table 4, just ten Nigerian institutions are currently having institutional repository on the Directory of Open Access Repository by University of Nottingham (2015) except for those who may already be building one in-house. Computing storage facilities are becoming cheaper as new technologies emerge, and so are the core technologies required for putting together such repositories. Hence, other universities may want to follow this lead. Institutions may also choose to develop and host their own in-house repository which may offer a form of local status to the stored resources unlike the ones hosted by the UK institution. On the other hand, an alternative to having institutional repository may include having a national research repository that will be managed by an independent body within the country that is commissioned by the government – a sort of national research clearing house. This national repository will act as a conduit for depositing referred articles and other published projects including students' theses and dissertation contents from the universities in the country. This centralised repository will enhance resource sharing among the nation's many tertiary institutions and ensure that the allocation of resources is centralised unlike when individual institutions try to put together their own disparate institutional repository. Cost will also be saved on manpower development through this centralized approach.

Librarians and information management professionals in tertiary institutions in Nigeria also need to be trained in the required skills to manage information in today's technology-driven information environment. Information management skills of yesteryears are inadequate in the conception and management of today's digital library environment. Efforts must be made towards training and retraining of these information workers, as well as researchers in core information literacy skills required for research effectiveness. As part of the institutional repository initiative, there must be a framework to ensure that scholars can easily archive their own work either on the institutional repositories or on their personal website for easy access. However, such institutional policy can be put in place only when the government is ready to be involved in committing resources to the research course of the scholars. Once such policy becomes a part of the promotion criteria and incentives are available for scholars to pursue their research, it becomes easy for these objectives to be achieved.

This paper concludes that the progress of the research communities across Nigeria's higher institutions is centred on the provision of appropriate funding. This obviously is a global problem, as funding is required in all research communities around the world. However, Nigeria as a nation of 180 million people needs to step up efforts towards supporting this course. Research and innovation are the bedrock for a country's development. Building the research capacity and developing infrastructure across Nigeria's higher institutions should be a priority for the country in order to meet any set objectives regarding the overall development of the country.

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Noah Oluwafemi Samuel holds Master degree in Information Science from the Africa Regional Centre for Information Science, University of Ibadan, Nigeria. He is currently a PhD Student at the Graduate School of Library and Information Science, University of Illinois at Urbana Champaign, USA.

Integrated Library System Implementation: The Bowen University Library Experience with Koha Software

Ayoku A. Ojedokun, Grace O. O. Olla and Samuel A. Adigun
Bowen University Library,
Iwo, Nigeria
aaojedokun2003@yahoo.co.uk
graceto2003@yahoo.com
akinomatics@yahoo.com

Abstract

The purpose of the paper is to share the Bowen University Library experiences running and administering Koha Integrated Library System (ILS) for about nine years. The paper describes the application of the software by the staff of Bowen University Library. The authors perused the library annual reports and the quarterly reports of activities as kept by sections and units. Clarification was also sought from the librarians, who daily run and maintain Koha software to gain an understanding of challenges they face and how these challenges were resolved. The users noted that Koha ILS helped tremendously with the library technical processes and services, and that the challenges encountered and their successful resolutions had also helped in the effective delivery of the library and information services and the development of staff IT skills. The authors noted from practical perspective that these experiences were useful for people who were evaluating open source ILSs, those already running ILSs, as well as those who were in the process of adoption. Unfortunately, to the knowledge of the authors, there has not been much of any existing literature on practical experiences of running and maintaining an open source integrated library system such as the Koha. The paper therefore could thus contribute to knowledge in this domain of ILS.

Introduction

Wikipedia, the free encyclopedia (2016), describes the integrated library system (ILS) as an enterprise resource planning system for a library, and it is used to track items owned, orders made, bills paid and patrons who have borrowed items. It is also known as library management system (LMS). It is made up of modules integrated with a unified interface e.g. acquisitions (ordering, receiving and invoicing materials), cataloguing (classifying and indexing materials), circulation (lending materials to patrons and receiving them back), serials (tracking magazines, journals and newspaper holdings) and the Online Public Access Catalogue (OPAC, public interface for users).

This system has made library materials' processing a lot easier compared to the old system of manually and independently processing of the same. In the old system, librarians ordered materials with ordering slips, catalogued materials manually and indexed them with the card catalogue system (in which all bibliographic data was kept on a single index card), collected fines using a designated staff, and users signed out books manually, with the book slip kept in the book pocket bearing the borrower's name kept at the circulation desk. Locating and retrieving items in this old system required that the patron knew either the call number or the book subjects indexed without which the user will be unable to locate and retrieve the needed material.

Library automation is growing at a fast rate as a result of the growth of the ILS market. The growth in the 1990s was attributed to the decline in the cost of hardware and software, addition of missing modules in the automation software (e.g. acquisitions and serials), and the creation of software that is machine independent i.e. can operate on a much wider variety of hardware (Gilliam, 1990). Further developments have again seen the ILS vendors

increasing the number of services offered, thus encouraging smaller libraries and smaller library systems to get into automation. Therefore, with the rapid, efficient computer services, particularly the Internet, and with the development in ILS, users no longer have to worry about call numbers and the subjects as ILS now allows users to more actively engage with their libraries through the web-based Online Public Access Catalogues (OPACs). Users could log into their library accounts to reserve or renew books, as well as authenticate themselves to library-subscribed online databases. Unfortunately, with the improvements come increases in ILS prices, leading to some dissatisfaction among many small libraries. This situation encouraged the development of open source software ILS.

Open Source Software ILS for Libraries

The literature is replete with the attributes of the open source software and reasons for the suitability of its use in libraries. According to Kumar and Jasimudeen (2012), open source software (OSS) makes possible the ability to run, copy, distribute, study, change, share and improve for any purpose, and thus enables libraries to have greater control over their working environment. In other words, they enable libraries have ownership of the computing environment (Morgan, n.d.). In addition, it allows for community participation, greater opportunities for innovation (Morgan, n.d.) and provides the capability to integrate or consolidate server, service, application, and workstation management for powerful administration (Randhawa, n.d.). Available support for open source is also said to be superior to proprietary solutions, the reason many technology companies are now supporting open source with free online and multiple levels of paid support (Randhawa, n.d.)

Other attributes/potentials of OSS include cost effectiveness, interoperability (open standard), user friendliness, reliability (devoid of 'bug'), stability, auditability (since source code is published), and flexibility/customisation (i.e. the possibility of software modification to suit a specific function desired by the user) (Muffatto, 2006; Tennant, 2007; Clark, 2008; Gonzale-Barahona, 2000 cited in Ukachi, Nwachukwu, and Onuoha, 2014; Chudnov, 1999 cited in Kumar and Jasimudeen, 2012; and Hall, Ames and Brice, 2013). According to Hall, Ames

and Brice (2013), the OSS potentials of reliability, the gain over the control of hardware purchases, and the customisation informed the Crawford County Federated Library Systems continued use of OSS. Randhawa (n.d.) noted that among the factors pushing libraries into adopting open source software are the opportunity provided for libraries to cut down budget on software, escape vendor lock-in, simplified licence management, scaling/consolidation potential, lower hardware cost, support, unified management, quality and opportunity for shared responsibility.

These are probably the reasons why the open source software is considered suitable for libraries and probably the reason Koha became the choice of the Royal London Homoeopathic Hospital (Gerhard, 2008). According to Gerhard, the GNU licence (open source) was considered more future proof than proprietary products, and more open to customisation to meet the special needs of the library.

Quite a number of OSS are said to be available today for library automation. These include Koha, Evergreen, ABCD, WinISIS, NewGenLib, Emilda, PMB (PhpMyBibli), and WEBLIS (Ukachi, Okechuku and Onuoha, 2014) among others. However, Müller's (2011) evaluation of 20 free open source ILS platforms offered to the library community, using such criteria as: their qualification as truly open source or freely-licenced software, evaluation of the community behind each open source or free ILS project, and the ILSs most suited to the needs of libraries identified three Open Source Software – Evergreen, Koha, and PMB, as having satisfied the criteria and so presented options from which librarians and decision makers can choose without worrying about how sustainable each open or free project is, as well as understanding which ILS provides them with the functionalities to meet the needs of their institutions.

However, among the many web based open source software in integrated library system, Koha ILS is one of two that have been found to support cloud computing, the other being NewGenLib (Kumar and Mandal, 2013). Cloud computing is completely new in technology, and is considered the 3rd revolution after Personal Computer (PC) and the Internet. Cloud computing according to Reddy (2012) is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly

provisioned and released with minimal management effort or service provider interaction. The cloud users do not manage the cloud infrastructure and platform on which the application is running. This, according to Hamdapa (2012) cited in Kumar and Mandal (2013) eliminates the need to install and run the application on the cloud user's own computers, thus simplifying maintenance and support.

Koha Integrated Library System

Koha is, however, the first open-source fully featured integrated library system in use worldwide. It originated in 1999 (Strathmore Research and Consultancy Center, n.d.; Breeding, 2002). The full-featured Koha, developed initially in New Zealand but currently maintained by a team of software providers and library technology staff from around the world, has the following key features: Web based, copy cataloguing and Z39.50, MARC 21 and UNIMARC for professional cataloguers, manage online and offline resources with the same tool, RSS feed of new acquisitions, email and/or text patron's overdue and other notices, print barcodes, serials management module, full catalogue, circulation and acquisitions system for library stock management, Web based OPAC system, simple, clear search interface for all users, simple and comprehensive acquisitions options, multitasking and enables updates of circulation and cataloguing and issues to occur simultaneously (Sheeja, 2009)

Koha, according to Kumar and Mandal (2013), supports cloud computing for identification, collection, organisation and dissemination of digital resources for the users, as well as library professionals. In other words, all modules in Koha and services can be accessed when placed on the cloud. Kumar and Mandal's twelve checklists (of new innovative features in library automation) found available in Koha software and working on the cloud include single point entry for all library information, state-of-the-art web interface, enriched content, faceted navigation, simple keyword search box on every page, relevancy, user contribution, RSS feeds, integration with social network sites and Persistent links.

Placing Koha on the cloud provides such advantages of cost saving, flexibility and innovation, user centric, openness, transparency, interoperability,

representation, availability anytime anywhere, connecting and conversing, and creating and collaborating (Gasavi, Shinde, and Dhakulkar, 2012). On the surface, it is believed according to Gosavi, Shinde and Dhakulkar, that the library would have some control over data and collection placed on the cloud.

Related Literature

Open source software integrated library systems (OSS ILS) have become a popular alternative to traditional, proprietary systems among library professionals. They are rapidly gaining attention of LIS professional community as they are found to have received positive perceptions from library professionals (Rafiq, 2009 cited in Sheeja, 2009). This is because they provide alternative, cheap and innovative technological solution for libraries. Bretthauer (2002) cited in Sheeja (2009) considered open source software an opportunity for libraries and with a "tendency to push innovations". In the study conducted by Keast, Koha ILS is seen as an example of open source technology which can be readily and successfully implemented, even in an environment where information technology is basic and funds are limited. Koha ILS has, as a result, expanded from serving as the integrated library system (ILS) at a single public library in New Zealand to more than 1000 academic, public, and private libraries across the globe (Willis, 2010).

Keast (2011), Kumar and Jasimudeen (2012) and Omezulor et al (2012) report some challenges with the implementation of Koha ILS. The study by Keast reports the challenges of poor Internet access, and slow speed and low bandwidth in the accessibility of Greater Western Area Health Service (GWAHS) library service in rural areas. Kumar and Jasimudeen (2012) in their study undertaken to explore the perceptions of the emerging library community that has taken to Koha in India revealed that difficulties were experienced in installation and maintenance (because of its complex installation procedure), data migration and network problems, although the nature of such difficulties and how they were resolved were not stated. Omezulor et al (2012) in their study revealed that erratic power supply and insufficient manpower were the bane for the smooth running of the software. These challenges have slowed the adoption of OSS ILS in a number of libraries.

Interestingly, other than the reasons of adoption, and the implementation/adoption challenges that have been reported in the literature, there has not been any literature to the knowledge of these authors that have reported on the practical experiences of the day-to-day running and maintenance of Koha ILS. Researchers and potential adopters/users would no doubt be interested in the actual experiences of the daily usage with regards to the challenges encountered and how they were resolved.

The experiences of librarians according to Singh (2013b) are useful for people who are evaluating open source ILSs, as well as those who are in the process of adoption. Learning from their experiences will help librarians not to reinvent the wheel. The experiences shared in this paper will therefore help the librarians by empowering them with the information they need; and also in understanding the current status of Koha ILS software.

Installation of Koha ILS at Bowen University Library

Bowen University Library, Iwo in Osun State is the first university library in Nigeria to install and fully utilise Koha ILS. It is currently the longest running Koha installation in the country. The Library commenced automation of the library functions in September 2007 using Koha ILS version 2.9. The commercial Koha service company that helped with the installation was ProjektLink, Nigeria Limited, Ibadan. The installation and the testing of the software as well as training of staff were completed in October 2007 but went live in November 2007. The Library upgraded to 3.0.01 version in 2008, 3.0.04 in 2011, version 3.12.03 in 2013, and to versions 3.18.00 and 3.22.00 both in 2015. The library maintains its local area network (LAN) within the institution's network, with a public Internet Protocol (IP) address. This is to ensure that any disturbance of the institution's network will not affect accessibility to Koha.

Bowen University Library's attraction to adopting Koha, like other libraries, was informed by its open source, i.e. free with no vendor lock-in, no hidden code, and no licence fees nor any other cost other than the cost of installation and customisation,

as well as the opportunity of participation in its development through the community of users' forum. Other considerations were: the ready availability of a reputable commercial Koha service company capable of installing, customising the software, and providing training support (in this case ProjektLink Ibadan, Nigeria), its MARC compliance, its compatibility with all hardware types (i.e. IBM, Apple, HP, Dell, etc), its user friendliness, regular revision to take care of suggestions, and the fact that it is web-based providing opportunities to login from remote locations. These considerations are considered germane to any successful automation project.

Indeed, library users' survey results of satisfaction in its first three years of use reported Koha as performing to expectations. The respondents also rated as good and very good. Koha's reliability (100%), Acquisitions module (53%), Cataloguing and Circulations module (73.3%), OPAC (73.3%), Patrons' authentication (93.3), Report creation (66.6%), and Interface with Internet (100%) (Otunla and Akanmu-Adeyemo, 2010). The study report further strengthened library management support for the success and sustainability of the automation project.

With over eight years of consistently running Koha ILS, the purpose of this paper therefore is to share Bowen University Library's experiences with implementing and consistently running Koha Open Source Integrated Library System.

Objectives of the paper

Specific objectives are to:
- Document the experiences with Koha implementation
- Document the experiences with the use of Koha modules
- Document the challenges with the daily usage of Koha and how those challenges were resolved
- Document the challenges with Koha systems maintenance and how those challenges were resolved
- Attempt to convince libraries of the suitability of open source software (OSS) integrated library systems for library automation projects.

This study is based mainly on the experience of using Koha ILS in the processing of library materials and administering it respectively in the last seven years. The authors perused reports of activities kept (i.e. the quarterly reports from sections and units of the library, and the library annual reports), with clarification from those using the software, on challenges and their resolutions. Quarterly reports, as the name implies, are produced every quarter to report activities for discussion at quarterly meetings. The annual reports are produced from the quarterly reports and other library documents. The annual report summarises all library and information delivery services and activities for the year.

The findings are reported as follows:

Bowen University Library's Experiences with Koha ILS

Bowen University Library had no prior experience in automation projects. In other words, it was automating for the very first time, and therefore, as a department, had no experience to fall back on. However, it benefitted from the experiences of the head of the Library who had had substantial experience in automation projects. Notwithstanding, every automation project comes with its peculiar challenges and so experiences differ.

Experiences with implementing Koha software modules

Securing competent staff

Every automation project needs an expert with a background in computer science and knowledge of programming languages to take charge of administration and the maintenance of the automated system. Bowen University recognised the need for this expertise and was thus faced with the challenge of getting such technical personnel. This was because at the time of Koha ILS adoption the three librarians in employment were graduates who had just a little above three years of librarianship experience without a background in computer science and/or knowledge of programming. The option before the library management was therefore to employ a graduate of computer science to work with the librarians so as to understand the library science llnguage as opposed to pure computer science language hoping that in future he/she could

be persuaded to obtain a master's degree in library science. Unfortunately, it was difficult at the time (and still is) to find library science graduates with computer science background or find graduates of computer science willing to work in the library, as many of them do not consider library work as challenging enough. The Library had to solicit the assistance of its commercial Koha service company. This yielded a good result about a month after completion of installation; and since then, the library had no challenge bordering on technical handling of the administration and maintenance of the system.

Power supply

The usual complaint is always erratic power supply. Bowen University Library had no challenge with power supply, with regular supply coming from university's power generating sets. The University Management considers the library a priority when it comes to power supply distribution. The Library, which has moved to its permanent building now, has its own power generating set.

Bandwidth

Koha is web-based and therefore enables provision of public services including providing access to the collection held by Bowen Library and other libraries, as well as e-resources available on the World Wide Web (WWW). However, this is only possible with the provision of adequate bandwidth which was (and still is) a major issue in many automation projects. The challenge therefore was making sure there was adequate bandwidth for optimal service delivery. Recognising this challenge, the library had to impress on the University Management the need to provide adequate bandwidth for uninterrupted service provision. Although the University Management acceded to the request, with the expansion of the university, there are still challenges with the bandwidth which the university continues to address. It is however not as pronounced as it was at the early period of automation.

IP addresses

Along with the issue of bandwidth was the poor service being provided by the university Internet Service Providers (ISP). There was always a

constant change of IP addresses already submitted to the database vendors without prior notification. The consequence was that the databases to which the library had subscribed became inaccessible until they were discovered, and the new IP addresses supplied by the ISP were sent to the database vendors. At some point, sending apologies to the database vendors for constantly changing IP addresses became embarrassing. So, working with the Directorate of Information and Communication Technology (DICT), the university succeeded in purchasing blocks of IP addresses from AFRINIC, South Africa from which a block of IP addresses was allocated to the library. This was given to the database vendors, thus the library was insulated from the erratic service provided by the ISP such that even when the ISP changes, it no longer affects e-resource service provision.

Experiences with working with Koha modules

The library has so far had positive experiences of Koha through the functionalities of the modules. The experiences are detailed below:

Acquisitions

Although most libraries prefer to manage the acquisitions process manually rather than using the Koha acquisitions module, it has been in use by the library since 2007 to acquire library materials, especially through purchases, as well as to track budgets/funds and all materials added to the library database. Koha acquisitions module has been used to create vendors and budgets, track budget/fund, manage purchase suggestions, perform acquisitions searches, place orders, receive ordered items, track late or missing orders, create invoices for ordered items, and claim late orders.

Librarians note that the module has great flexibility and is user friendly as it makes selection of item type e.g. books, audio cassettes, CD, DVD, etc., possible while the template displays the fields as appropriate for the chosen type; enables the librarian to set up a budget; and create suppliers/vendors and record orders, which are linked to specific suppliers and budgets. As orders are placed, the amount is subtracted from linked budgets. The module also makes it possible to perform both "simple" and "full" acquisitions as desired. *Simple* acquisitions, particularly makes it possible to acquire items and add directly to the library catalogue without managing orders placed with the suppliers and budgetary matters. However, with *Full* acquisitions, there is need to manage budgets, book funds and orders.

The module makes accounting (i.e. tracking of budgets and funds), very easy. Librarians are also able to perform searches within the library database to confirm the availability of a particular title in the library before ordering. This prevents duplication when purchasing items, and as such, helps the library save money.

Cataloguing

Koha's simple and advanced search helps tremendously in culling out existing records from acquisitions for editing. Koha makes use of MARC 21 and UNIMARC standard for cataloguing framework. With this framework, the cataloguers, working with the acquisitions staff, are able to create new records that do not exist in the database while the use of Z39.50 standard for downloading the cataloguing details from remote library server (e.g. Library of Congress) makes editing of records already created faster. Not only is the module simple, it is also flexible and user friendly. Koha helps maintenance of database integrity as it allows the cleaning of the database, thus removing the problem of incomplete record and duplicated barcode (accession number). Koha allows batch saving of items, deletion of duplicate records from the database, and time saving in material processing. It permits easy retrieval of items from the database through the use of access points such as barcode, ISBN, title, subject and author.

Circulation control

Unlike the traditional manual user registration, Koha ILS eases patron registration through the possibility of online self-registration. It also allows patrons to edit/modify account, create private/public reading list(s), tag, secure transaction through self-activated passwords, monitor fine imposition, place items of interest on hold, do self-renewal of items, and suggest useful titles for acquisition at the comfort of the patrons' office/hostel. Koha also allows generation

of overdue fines/notices, issuance of notices to defaulting patrons, restriction of patron's account to enforce compliance with library rules, easy de-activation of patrons' account as a result of graduation/disengagement from service, and setting of limit on overdue fine. The experience also shows that Koha is not susceptible to manipulation, as overdue fines are system generated and cannot be deleted without due permission.

Serials control

The Serials module of Koha has made tracking of journals and other materials that come in on a regular schedule, as well as monitoring branch of the library holding specific journal title much easier for the library. Through its use, receipt of multiple issues and editing of same at once has also been made possible. Koha serials module makes it possible to spot late issues at a glance from the subscription page, and make claims by sending a list of the missing issues via e-mail to the vendors selecting from the list of vendors.

Reports generation

Koha makes report generation less cumbersome. Koha has its own guided report and can also accommodate generation of reports using Structured Query Language (SQL) statements, which makes it compliant with modern day software. The library has therefore taken advantage of this facility to customise reports. This had allowed the library to generate management reports in shorter time than was possible using the manual process. For example, it has become easier for the library to generate list of holdings for the various departments of the university on demand, and for the National Universities Commission (NUC) teams during accreditation visitations, as well as produce other statistical reports whenever required.

Challenges in Running and Maintaining Koha ILS

Since the adoption of Koha, there has not been any major complaints about its versatility. However, there had been some hardware and software challenges, the latter of which can also be experienced on cloud

(e.g. duplication of barcode, wrong mapping, indexing problem, Koha's inability to send mail, double-charging of overdue fines and patron ID stamp not on overdue fines payment). These challenges are as discussed below:

Crashing of the operating system and the database

The library had experienced the following situations in the past: Koha inaccessibility, Koha displaying a message such as 'the server is down' or 'temporarily unavailable contact the administrator', and Koha stops functioning. It was discovered that these occur due to power surge/fluctuation, which led to the operating system or the database crashing. The latter occurred because the fault tolerance of MySQL used by version 2.9 was very low. It was also discovered that a normal uninterrupted power supply (UPS) could not trap sensitive power fluctuation and the library had to purchase an on-line UPS and an inverter to address the occurrences (Bowen University Library, 2015).

Wrong date on Koha

The library had also experienced situations where all modules were displaying wrong dates, which affected normal library services such as charging out of books, returning of books, and calculation of fines, acquisitions, cataloguing and reports generation. It was discovered that this was a result of low CMOS battery on the motherboard of the Koha server. The library had to change the CMOS battery and adjust the date on the operating system of the Koha server.

Non-booting of Koha server

The library sometime in 2009 experienced a situation when services could not be delivered to patrons. It was discovered that the motherboard of the server had been damaged as a result of thunderbolts passing through the network cable. The thunderbolts had before then occurred twice. This damage to the motherboard resulted in non-booting of the server. The library had to change the mother board to restore normal service, and in addition prevailed on the University Management to install a thunder arrestor in the building (Bowen University Library, 2009).

Koha server rebooting

In 2013, the library also experienced rebooting of the Koha server. While working Koha suddenly went off and rebooted. It was found to be a result of power fluctuation or outage, an indication that the inverter was not backing up. The library had to change the inverter batteries to batteries of higher capacity to resolve this occurrence (Bowen University Library, 2013).

Non-connection of client workstation to the server

In 2014, the library experienced situations in which the clients' workstations refused to connect to the server. It was discovered to be a result of faulty network switches. The switches had to be replaced with better network switches. It was also discovered, at some point, that the Law Library which is quite a distance from the main library could not connect to the server because the named server (DNS) on campus was down. This was resolved by using IP address instead of the domain name to access the server (Bowen University Library, 2014).

Mounting as read-only

There was, in 2015, a situation when Koha was found to be reverting to previous entries. It was discovered to be a result of the operating system (Linux) mounting the hard disk as a read-only file. Although Koha will function normally when this happens but once the server is shut down, all processes will be reversed. What, however, saved the situation was that the systems unit had cultivated the habit of backing up the database regularly, sometime thrice a day, and so the library was able to format and restore the whole server including the current database (Bowen University Library, 2015).

Koha allowing duplication of barcode

The library also experienced situations where Koha was found to be allowing duplication of barcode in the earlier versions of Koha (i.e., 2.9 and 3.0.1). This was discovered to be a result of a bug within the Koha software, which incidentally has been resolved by the higher version of Koha. But at the

time this was discovered, the library had to restrict the allocation of barcodes to acquisitions module only. This was possible because the library uses all modules in Koha, which implies that every item must pass through acquisitions (Bowen University Library, 2008).

Wrong mapping

Sometime in 2014, it was discovered that dates items that were accessioned were being presented as 'date last seen'. It was discovered that entries in Koha had been wrongly mapped into different fields in the database of the earlier version of Koha, and so when searching the catalogue a wrong impression was given such that 'date last seen' (i.e. date the item was checked out or returned) was seen as 'date accessioned'. The library resolved the challenge by re-mapping in the 'Koha to MARC mapping' under 'Koha administration' (Bowen University Library, 2014).

Indexing problem on Koha

There had been situations when Koha was returning wrong results whenever searches were conducted. This was discovered to be a result of zebra's partial indexing of the database, and the number of partial indexing carried out per day. It was resolved by formatting the server, restoring the database from the system backup, updating the database with current backup and running full zebra indexing (Bowen University Library, 2011, 2013).

Uninterrupted sleep by Koha

In 2011, the library experienced situations in which Koha was not allowing input or searches. It was discovered that Koha had triggered itself into a 'sleeping mode'. The server had to be rebooted by the Systems Administrator to solve the problem. The freezing mode was discovered to occur whenever Koha initiated some processes leading to "uninterrupted sleep" as shown by the systems log at the back end (at the backend in the log of the server, it would report Koha apache process number 'sleeping'). It was, however, resolved after upgrading Koha from the version 3.0.01 in use then to 3.0.04 (Bowen University Library, 2012).

Koha stopped sending mails to patrons

The library noticed, in 2014, that for some time, mails were not being sent to patrons. It was discovered that Google which was the mail agent used for sending mails had blocked the accounts as most of the mails sent were bouncing back. The Systems Administrator resolved the problem by creating another Google account and blocked all patron email accounts that were inactive by spamming the email addresses (Bowen University Library, 2014).

Koha stopped charging overdue fines

There was a time when Koha stopped charging overdue fines. It was discovered that this happened because the record of an item on loan was wrongly deleted. To resolve this problem, the database had to be reversed two weeks in order to stabilise the database, charge-in the loaned item and properly delete the record (Bowen University Library, 2011).

Koha not calculating overdue fines

There was also a time it was discovered that Koha was not calculating fines. Trouble-shooting revealed that this occurred because the 'cron job' (the scheduler) scheduled to calculate fines at 12:00am daily failed to do so as a result of shutting down the server earlier at about 9:00 pm daily, thereby preventing the system from running the 'cron job'. In order to prevent further occurrence of this, the library had to stop shutting down the server, which however had to be backed up by an inverter (Bowen University Library, 2011).

Koha double-charging overdue fines

Sometime in 2012, the library noticed double charging of the fines in patron's accounts. The library noted that this happened whenever patrons self-renewed items in an 'expired account'. The situation was very challenging; the library had to disable self-renewal to prevent double charging while trying to address the problem. Fortunately, upgrading of Koha from version 3.0.01 to 3.0.04 helped resolve the problem (Bowen University Library, 2012).

Patron identification stamp not on overdue fines payment

The library also experienced in 2012, a situation where the receiver of overdue fines paid by patrons could not be identified. This situation was experienced with versions 2.9, 3.0.01 and 3.0.04, but was resolved using 'permission' in the patrons' registration. However, version 3.12.03 has taken care of the challenge, as it now puts patrons' ID of both the borrower and the library staff that paid in the overdue fines, and date stamp on overdue fines payments record (Bowen University Library, 2012).

Inability of Koha to monitor patron transaction

Until recently, the library had experienced with the earlier Koha versions (i.e. versions 2.9, 3.0.1, and 3.0.04) situations where it was impossible to identify who processed an item, modified the item and what was modified. However, the setting up of the 'Log Viewer' in the 3.12.03 upgrade version of Koha corrected the observed lapses with searching guided by date. The setup required increased RAM size and processor speed (Bowen University Library, 2012).

Available items showing as 'not loanable'

The library has also had situations when some items in OPAC were showing status 'not available'. The reason was discovered to be because cataloguers were selecting 'not available' for item types that had been set as 'not loanable' from the system's back end, thereby nullifying the item's availability on OPAC. In order for this to be resolved, the Systems Administrator had to advise the cataloguers to always select 'available' for all items so that only 'item type' property from the system's back end would define the availability of items on the OPAC, and it worked (Bowen University Library, 2013b).

System error

The users sometimes see a 'system error' message. This was observed to appear whenever there was power surge or outage during work in progress. Attempt to open the work from where it stopped on the client PC then gives a 'system error' message. During this time Koha would be unable to run on the PC. This was usually resolved by leaving the system for some time in order for all the network switches to re-connect the network. This was the situation until the library introduced the on-line UPSs, which completely stopped the network switches from going down.

Gains from the Resolution of Challenges

In spite of the challenges experienced in running and maintaining Koha ILS, there have been gains as better service delivery and development of skilled manpower. The successful implementation of Koha ILS had resulted in the library becoming a reference point in Nigeria for other libraries intending to implement Koha or unable to make headway in the day-to-day running and maintenance of the software. The library has mastered Koha ILS usage and continues to master its use through interaction with members of the Koha Community forum. The library has, a number of times, received librarians from other university libraries in Nigeria coming to observe how Koha is being put to use and how challenges are resolved, and wishing to learn other things about the software. The experiences gained informed the successful organisation of the March 2015 training workshop, which attracted seventeen participants from more than nine tertiary institution libraries spread across the country–Elizade University, Ilara-Mokin, Ondo State; University of Ilorin, Ilorin, Kwara State; Federal University, Oye-Ekiti, Ekiti State; American University of Nigeria (A.U.N), Yola, Adamawa State; FCT College of Education, Zuba, Abuja; Ibrahim Badamosi Babangida University, Lapai, Niger State; Nigerian Institute of Journalism, Ogba, Lagos, Lagos State; Nigerian Institute of Social and Economic Research (NISER), Oojo, Ibadan, Oyo State; and Federal Polytechnic, Offa, Kwara State.

Conclusion and Recommendations

Of benefit to libraries is the coming of open source software ILSs, which has brought down the cost of automation, prevented vendor-lock in and payment of licence fee, and allowed participation in software development through membership of the user community forum. The availability of open source software ILS should therefore be an encouragement to libraries, which have always suffered from inadequate funding, to key into the automation project.

Running Koha ILS in Bowen University Library has made library technical processes and introduction of newer information services a lot easier than was initially possible. In other words, open source software integrated library systems are making technical processes easier and the introduction of newer services such as Online Public Access Catalogue (OPAC), self-renewal of library items, information sharing through social media, item reservation, putting items on hold and many more, possible. They are providing the easy option for managing newer information services.

There is, however, no doubt that there will be challenges of implementation and of consistently running the ILS, but because of the support available through participation in the open source software ILS user community forum, such challenges can be readily surmounted. The challenges and their successful resolutions such as detailed in this case study could help in the effective use of Koha ILS and delivery of information services, while also helping to increase the library visibility.

The Bowen University Library experience with Koha open source software ILS thus lent credence to the fact that open source ILS is promising to be the system of choice, over and above the proprietary solutions, for automation projects. They will continue to play a major role in the provision of effective library and information services delivery to library customers. The paper therefore encourages adoption of open source software integrated library systems in libraries.

Acknowledgements

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Computer Anxiety and Computer Self-Efficacy in Computer-Based Tests in Selected Universities in South-West Nigeria

Williams Nwagwu
*Africa Regional Centre for Information Science
University of Ibadan, Nigeria*
willieezi@yahoo.com

and

Olukunle Adebayo
*Documentation, Information and Communication
Centre Council for the Development of Social
Research in Africa (CODESRIA),
Avenue Cheikh Anta Diop CX Canal IV
BP 3304 CP18524
Dakar, Senegal*
adebayoolukunle@gmail.com

Abstract

This study was designed to examine the influence of demographic and personality factors on computer anxiety and computer efficacy among first -year students admitted into three universities (CBT) in southwest Nigeria through computer-based test strategies. Using a questionnaire, data was collected from 892 students who were willing to participate in the study. In terms of the demographic characteristics of respondents in the study, the student populations from the three universities are homogenous as Chi Square analysis showed no significant differences among them. Logistics regression analysis shows that computer self-efficacy and computer attitude are considerably high while computer anxiety is relatively low. However, the number of students reporting low self-esteem (33.91%) and low exposure (31.10%) can be considered relatively high. None of the demographic factors predicted computer anxiety but male (â=0.742, p=0.000) and semi-urban residential status (â=-0.542, p=0.001) significantly predicted computer self-efficacy. Also, self-esteem and computer exposure did not predict computer anxiety and high computer self-efficacy, but they did computer self-efficacy. Basically, dealing with computer anxiety and improving self-efficacy of students in respect of CBT will require students being pre-exposed to CBT type of examinations for relatively long periods prior to the examination.

Introduction

Computer-based tests (CBT) are tests or assessments that are administered through stand alone or networked computers, or through other technological devices linked to the Internet (Sorana-Daniela and Lorentz, 2007). CBT has now gained popularity over the traditional paper-and-pencil test (PPT), particularly because of the numerous advantages that it offers such as immediate scoring and reporting of results and reduced costs of test administration. It is also considered fairer, more accurate and comparatively more secured than the PPT technique (Kolen 1999-2000, Pomplun, Frey, Becker 2002).

Many tertiary institutions in Nigeria and examination bodies such as the Joint Admission and Matriculation Board (JAMB) which conducts matriculation examinations into the universities, as well as the West African Examination Council, are now using CBT. Also, many universities now use CBT for post-JAMB screening of students. Personal experiences with the strategy as well as interaction with prospective matriculants who took part in the 2014 JAMB examinations hinted that many students do not feel comfortable with mandatory use of a computer for assessment during their admission and screening processes. On a study on this subject matter, Adebayo, Abdulhamid and Fluck (2014)

compared the e-examination system in Nigeria with that of Australia in order to identify ways of developing more acceptable e-examination system in Nigeria. They justified their study on the observation that poor quality students often gain admission into the universities due to high rate of examination malpractices that obtain in the PPT system, and that these students thereafter become a burden to the university.

Obioma, Junaidu and Ajagun (2013) observed that parents and other stakeholders may be apprehensive that students' performance in automated assessments and examinations will be influenced by individual computer competencies or other systematic differences other than a true expression of knowledge of the subject matter. These authors also identified low level of computer education among students as a threat to the uptake of automated assessment. Generally, many school leavers in Nigeria are not computer literate, neither is computer education available in many of the schools. Abubakar and Adebayo (2014) have observed that migration from PPT to CBT may affect candidates' behaviour, and that it is possible for some testing programs to encounter brief reduction in demand as a result of apprehension about CBT.

The CBT test administrators assume that all participants can use the computer system with the same degree of psychological stability that will not significantly influence their performances. But while some participants are confident and find it relatively easy to use the CBT, some others appear jittery, uneasy and apprehensive using the same system for the same purpose. Factors such as demographic characteristics of the students, personality type, self-esteem, as well as level of exposure to computer technology could explain the way individuals adjust, use and cope with CBT systems. Herman (2005) has shown how these variables interrelate to influence various educational outcomes and behaviours.

Statement of the Problem

Many new users of computers face the challenge of anxiety induced by the computer, and this affects their performance in computer-based examinations. There is understanding that inadequate use of the computer can have adverse effect on the candidates'

performance in CBT (Ogunmakin and Osakuade, 2014). Abubakar and Adebayo (2014), while assessing the prospects, challenges and strategies of deploying CBT, observed that there had been a growing concern about the conduct, authenticity and reliability of examinations, especially during the process of selecting qualified prospective candidates into Nigerian universities. Their study and others on the subject matter did not examine the possible effects of demographic and personality factors, a difference this study is designed to address. For example, students from affluent homes might have prior exposure to the computer compared with the others, and this could be a source of influence adoption of CBTs.

Objectives of the Study

The main objective of the study is to investigate the influence of demographic and personality factors on computer anxiety and computer self-efficacy among computer-based test participants in three universities in south-western Nigeria. Specific objectives are to:

(i) determine the influence of demographic characteristics on computer anxiety and computer self-efficacy of the participants.

(ii) determine the influence of personality factors on computer anxiety and computer self-efficacy of the participants.

(iii) determine the influence of psychosocial factors on computer anxiety and computer self-efficacy of the participants.

(iv) investigate the relationship among the psychosocial, personality and demographic characteristics of the participants.

(v) compare the computer self-efficacy and computer anxiety levels of the participants.

Statement of Research Hypotheses

$H_0 1$: There is no significant relationship between demographic variables and computer anxiety (CA) among the computer-based test participants.

$H_0 2$: There is no significant relationship between demographic variables and computer self-efficacy (CSE) among the computer-based

H₀3: There is no significant relationship between personality variables and computer anxiety (CA) among the computer-based test participants.

H₀4: There is no significant relationship between personality variables and computer self-efficacy (CSE) among the computer-based test participants.

H₀5: There is no significant relationship between psychosocial variables and computer anxiety (CA) among the computer-based test participants.

H₀6: There is no significant relationship between psychosocial variables and the computer self-efficacy (CSE) among the computer-based test participants.

Literature Review and Theoretical Perspectives

This study is based on the body of knowledge on computer anxiety, self-efficacy and social learning perspectives. Self-efficacy and social learning lean significantly on the popular perspectives of Bandura in his series of papers on the subject matter (Bandura 1977, 1978, 1982, 1986a, 1986b, 1988).

Computer Anxiety and Computer Self-Efficacy

Anxiety describes series of disorders that are often associated with nervousness, fear, apprehension, and worrying, among others, and these disorders affect human feeling and behaviour (Allgulander, Jorgensen Wade 2007). Anxiety is frequently used as a construct for personality, learning theory, and psychopathology. Three types of anxiety have been identified: trait, state, and concept-specific. Trait anxiety is a general anxiety that is experienced by a person over the entire range of life experience. People who exhibit trait anxiety are chronically anxious and constantly under tension regardless of their situation. Trait anxiety may be inherited (Howard and Smith, 1986). On its own part, state anxiety is that anxiety that fluctuates over time and arises due to a responsive situation. State anxiety is related to a person's learning background. A person

may have experienced some anxiety in a situation and that anxiety is transferred to a similar situation. Concept-specific anxiety is anxiety that is associated with a specific situation anxiety; it is midway between the trait and state anxieties.

In information systems study, anxiety has been viewed as a personality variable that influences system use (Agarwal and Karahanna, 2000). A number of information science studies are consistent with the view that the relationship between anxiety and behaviour is mediated by personal beliefs (Schlenker and Leary, 1982) and anxiety is incorporated as an antecedent to the beliefs of usefulness and ease of use (e.g., Igbaria, 1993; Venkatesh and Davis, 2000). It is interesting to note that the classical view of anxiety is that it mediates the relationship between beliefs and behaviour (Spielberger, 1972). Thus, anxiety can be viewed as a result of the beliefs an individual has, rather than as an antecedent to them.

Computer Self-Efficacy

Bandura (1986b) has described self-efficacy as one's ability to judge how well he/she can execute a task to achieve a desired goal. It is an individual's belief about his/her ability to successfully execute a behaviour required to produce a desired outcome. Bandura (1986b) also highlighted the difference between component skills and the ability to perform actions. According to him, self-efficacy consists of three dimensions: magnitude, strength and generality. Magnitude is the level of task difficulty an individual believes that he or she can attain; strength is the confidence one has in attaining a particular level of difficulty; while generality is the degree to which the expectation is generalised across situations. One can therefore assert that the concept of self-efficacy is context specific, that is, specific situations influence people's valuing of their capacities to mobilise the motivation, cognitive resources and courses of action needed to meet situational demands (Bandura and Cervone, 1986).

Computer Anxiety and Computer Self-Efficacy

The use of technology sometime has unpleasant side effects, which may include strong, negative emotional states that arise not only during interaction but even

before, when the idea of having to interact with the computer begins (Klein, Moon, Picard (2002). Frustration, confusion, anger, anxiety, and similar emotional states can affect not only the interaction itself, but also productivity, learning, social relationships, and overall well-being (Saade and Kira, 2009).

There are a number of studies explaining what computer anxiety is. Leso and Peck (1992) defined computer anxiety as a feeling of being fearful or apprehensive when using or considering the use of a computer. Computer anxiety is a concept-specific anxiety because it is a feeling that is associated with a person's interaction with computers (Oetting, 1983). Howard and Smith (1986) defined computer anxiety as the tendency of a person to experience a level of uneasiness over his or her impending use of a computer. Evidently, factors such as the context in which an individual was first introduced to the computer (Brosnan, 1998a, 1998b; Rosen and Weil, 1995), past failure and successes with hardware or software, and the current tasks being attempted, including the use of a new computer application (Saadé and Otrakji, 2007), are all determinants of the state and type of anxiety the individual is experiencing. In their study, Saadé and Otrakji (2007) have attempted to predict people who would experience computer anxiety by identifying factors that correlate with its occurrence.

A number of studies have provided evidence supporting a direct relationship between computer anxiety and computer use (Chau, Chen and Wong 1999; Howard and Mendelow 1991; Igbaria, Parasuraman and Baroudi, 1996, Ogunmakin and Osakuade 2014). These research works clearly show that a highly computer anxious individual will be at a significant disadvantage compared to his/her peers who do not have the anxiety. One example of such an environment where this could be experienced is the e-learning and assessment systems offered by many higher institutions.

Factors Influencing Computer Anxiety and Computer Self-Efficacy

Researchers have identified factors that influence computer anxiety and computer self-efficacy in different communities and environments. We provide a description of some of the factors below:
Computer exposure

There is evidence that experienced computer users have higher computer self-efficacy and lower computer anxiety (Thatcher and Perrewe 2002). Also, computer experience has been found to have a negative relationship with an individual's computer anxiety (Beckers and Schmidt 2003). Individuals who have computers at home or have used computers have lower computer anxiety than those who do not (Chu and Spires 1991). Chu and Spires (1991) found that college students who had taken two or more computer courses were less anxious about computers than those who had taken fewer than two courses. Chu and Spires (1991) and Leso and Peck (1992) have also shown that after taking a computer course, students who had previous high computer anxiety experienced a great decrease in their anxiety.

In his own study, Broos (2005) found that computer use and self-perceived computer experience have a positive impact on decreasing computer anxiety. There also exist some studies that reported that individuals' previous computer experience was not associated with their computer anxiety and that experienced users suffered from computer anxiety as much as novice users (Marcoulides, 1988; Rosen, Sears and Weil, 1987). In further support of this finding, Beckers and Schmidt (2003) found that it is not the amount of computer experience that affects people's anxiety but rather that positive experiences reduced the anxiety.

Computer attitude

Attitude is a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour. Computer attitude is concerned with the observation that computer-based activities may influence human attitude (Larbi-Apau and Moseley, 2012).

Gender

Many recent studies suggest that there are no significant differences between males and females in respect of computer attitude and efficacy, and that gender difference in computer skill is diminishing (Schumacher and Morahan-Martin, 2001; Nwagwu, 2012). In the same way, there is evidence that computer anxiety significantly influences computer and Internet self-efficacy for both male and female

respondents. User attitude significantly influenced computer and Internet self-efficacy for male respondents. Also, user attitude significantly influenced computer self-efficacy, but not Internet self-efficacy for female respondents. Further studies have found that females are more anxious about computers than males (Broos, 2005; Schottenbauer, Rodriguez, Glass and Arnkoff, 2004).

Socioeconomic background

The socioeconomic background of students also relates with their computer anxiety and self-efficacy. People who are socio-economically privileged have low computer anxiety (Bozionelos 2004). This can be explained by the fact that "individuals who have been raised within higher socioeconomic status families are more likely to have a computer available at home, to attend schools with better computer equipment, and to have teachers with better computer skills" (Bozionelos, 2004).

Methodology

Research Design, Location, Population of Study and Sampling

The study adopts a structured survey design and makes statistical inferences about the population based on a sample. The study covered three universities in the South-West Nigeria, namely: University of Lagos, Federal University of Technology Akure and Babcock University (BU) Ilishan-Remo. These universities were purposively selected. The population of the study comprised first-year students of the selected institutions who have participated in the 2014 CBT screening examinations into the universities. The three universities have an estimated combined population of 13,683 first-year students comprising University of Lagos (6557), FUTA (4139) and BU (2987). The selection of participants for the study was based on availability and willingness of the students to participate in the study. Owing to difficulty in obtaining the sampling frame, we arbitrarily intended to collect data from 1000 respondents, ensuring that males and females are equally represented.

Data Collection Instrument and its Structure

The data collection instrument that guided the study was a structured questionnaire. The questionnaire is structured into 7 sections (A-G): demographics, self-efficacy, computer attitude, computer anxiety, self-esteem, personality type, and computer exposure. All the items in the questionnaire were adapted from related previous empirical studies.

Section A: Demographics: age, sex and residential status.

Section B: Computer self-efficacy scale adapted from the computer attitude scale (CAS) developed and validated by Nickell and Pinto (1986). It used a five-point Likert-type scale type where 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree.

Section C: Computer attitude: a 20-item self-report inventory, rated on a five point Likert type scale (1=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree).

Section D: Computer anxiety: a 19 items self-report inventory designed and validated by Heinssen et al. (1987). The subjects responded on a five-point Likert type scale (1=strongly disagree, 2=disagree, 3=undecided, 4=agree and 5=strongly agree).

Section E: Self-esteem: was measured using the Rosenberg Self-Esteem Scale (Rosenberg, 1965). The scale has ten items measured on a four point scale - from - strongly agree, disagree, agree and strongly disagree.

Section F: Personality type: based on Anjum Khalique Type a Scale (AKTAS, Anjum and Khalique, 1991), consisting of 10 pairs of items measured as in Section F.

Section G: Computer exposure: This study uses a peer-reviewed computer experience measure developed by the authors. The instrument measures the level of familiarity the respondent has with the computer in completing tasks.

The questionnaire was handed to respondents who were willing to participate in the study during

January and February 2015 in their classrooms, and collected back at dates agreed with the respondents. At UNILAG, FUTA and BABCOCK, 377, 365 and 353 were distributed and 309 (82%), 274 (75%) and 309 (88%) were returned respectively.

To plan for the analysis, we wanted to establish whether the three universities from which we collected data were homogenous in terms of the variables under study, namely computer anxiety, self-efficacy, computer attitude and computer exposure, as well as demographic characteristics. To achieve this, we ran a Chi Square analysis and found: computer anxiety = (N=892, X^2=0.002, p=0.999), computer self-efficacy (N=892, X^2=2.056, p=0.358), computer attitude (N=892, X^2=3.009, p=0.209) and computer exposure (X^2=42.12, p=0.0905), faculty (N=892, X^2=0.2333, p=0.189), age (N=892, X^2=0.5192, p=0.0941) and residential status (N=892, X^2=0.1102, p=0.0570). We infer therefore that the three populations were largely homogenous, as there was no difference among the universities in respect of the variables under study.

Computer self-efficacy, computer anxiety, attitude and exposure were recoded into three categories of low, undecided and high; while self-esteem and personality were re-coded in to two categories of the low and high categories. Binary logistic regression was used to examine how demographic and personality characteristics of the respondents relate to their computer anxiety and self-efficacy in CBT.

Findings

Socio-Demographic Characteristics of Respondents

Table 1 shows that respondents aged 16 years and below constituted 5.5% of the respondents while those between 17 and 19 constituted 66.9%. About one-fifth of the respondents (20.2%) were aged between 20 and 22. Respondents within the age bracket 23-25 years constituted 4.9% while those aged 26 years and above constituted the least number of respondents, 2.5%. The mean age of the students is 18.22 years.

Table 1: Socio-demographic characteristics of respondents

	Frequency	Percentage
Age (years, N=892)		
16 and below	49	5.5
17-19	597	66.9
20-22	180	20.2
23-25	44	4.9
26 and above	22	2.5
Sex (N=892)		
Male	455	51.0
Female	437	49.0
Residential Status (N=892)		
Rural	25	2.8
Semi Urban	221	24.8
Urban	646	72.4

Table 2: Computer self-efficacy, computer anxiety, and computer exposure and computer attitude

Factor	Low	Undecided	High
Computer self-efficacy	10.22%	29.26%	60.52%
Computer anxiety	59.08%	11.75%	29.17%
Computer exposure	31.10%	11.88%	58.02%
Computer attitude	17.63%	11.78%	52.60%

Of the respondents, (29.17% reported high computer anxiety whereas 59.08% were reported to have low computer anxiety. The results in respect of computer attitude were similar to that of self-efficacy, with 17.63% reporting low computer attitude while 52.60% had high computer attitude. The number of those reporting low computer exposure (31.10%) is much higher than those with low computer attitude just as those that reported high exposure (58.02%)

to computer is also higher than those in the same category for computer attitude.

In respect of self-esteem, 33.91% of the students reported having low self-esteem while 66.90% had high self-esteem. Also, 43.82% reported falling into personality type A category while 56.18% were of personality type B. These results conform in pattern but in varied degrees of magnitude with those of Herman (2005) and Achin *et al* (2015).

Table 3: Means, standard deviations and inter-correlation coefficients of the variables

	Computer anxiety	Computer self-efficacy	Personality	Self esteem	Computer attitude	Computer exposure
Mean	3.46	4.01	1.41	2.79	3.44	3.56
SD	1.06	2.23	0.47	0.80	1.89	1.53
Cronbach Alpha	0.72	0.65	0.69	0.72	0.73	0.68
Computer anxiety	1					
Computer self-efficacy	0.482	1				
Personality	0.650	0.622	1			
Self esteem	-0.352	0.643	0.602	1		
Computer attitude	-0.306	0.711	0.599	0.801	1	
Computer exposure	-0.271	0.652	0.519	0.649	0.677	1

The relationship between computer self-efficacy and computer anxiety is considerably low (r=0.482). Achim and Al-Kassim (2015) obtained the same type of result in their study that collected data from military ranked officers. The relationship with personality is however somewhat high (r=0.650), a result consistent with Herman (2005). Self-esteem (r=-352) and computer attitude (-0.306)

respectively have low relationship with computer anxiety, but the relationship between computer anxiety and computer exposure is much lower (r=-0.276). Computer self-efficacy relates positively and relatively highly with personality (r=0.622), self-esteem (r=0.643), and computer attitude (r=0.711) and computer exposure (r=0.652). Personality, on its own part, relates positively with self-esteem

(r=0.602), computer attitude (r=0.599) and computer exposure (r=0.519) while self-esteem also has high and positive correlation with computer attitude (r=0.801) and computer exposure (r=0.649). Computer attitude and computer exposure have a relative high correlation (r=0.677).

The Result of the Hypotheses Testing

Hypothesis 1: There is no significant relationship between demographic characteristics of the respondents and computer anxiety

Table 4 shows the result of the binary logistic regression analysis of the relationship between demographic variables and computer anxiety. The table shows that sex does not significantly explain computer anxiety among the respondents.

Table 4: Binary logistic regression analysis of demographic factors and computer anxiety

	Computer anxiety				
	B	S.E.β	Wald χ²	Sig. (p)	e^β
Sex	0.117	0.223	0.275	0.600	1.124
Age (Ref =>26 years)					
16 years and below	1.461	1.119	1.705	0.192	4.310
17-19 years	1.084	1.050	1.066	0.302	2.957
20-22years	1.110	1.062	1.092	0.296	3.034
23-25years	1.054	1.134	0.864	0.353	2.868
Residential status (Ref=Urban)					
Rural	0.365	0.647	0.318	0.573	1.441
Semi-Urban	0.301	0.246	1.499	0.221	1.351

Across the age groups ≤ 16 to 25 years, there is also no significant relationship between age and computer anxiety, although it could be noted that the odds ratio was higher for those respondents who are 16 years and below than for the other categories of respondents. Interestingly also, there is no significant difference in computer anxiety between students whose dwelling type is rural and urban.

Hypothesis 2: There is no significant relationship between demographic variables and the computer self-efficacy of the computer-based test participants.

The result in table 5 shows that sex (β=0.742, p=0.000) and semi urban residential status β=-0.542, p=0.001) significantly predict computer self-efficacy.

Table 5: Binary logistic regression of demographic factors and computer self-efficacy

Demographic factors   Computer

Demograhic Factors	Computer self-efficacy				
	B	S.E.β	Wald χ^2	Sig. (p)	e^β
Sex: (Ref cat = female) Male	0.742	0.143	26.989	0.000	2.101
Age (Cate ≥ 26 years) 16 years and below 17-19 years 20-22 years 23-25 years	0.666 0.551 0.298 0.787	0.539 0.457 0.469 0.112	1.526 1.454 0.404 2.864	0.217 0.228 0.525 0.146	1.946 1.735 1.347 2.197
Residential status: (Ref cat=Urban) Rural Semi-Urban	-0.467 -0.052	0.428 0.163	0.318 1.499	0.573 0.221	0.627 0.582

The age of the respondents did not predict their computer self-efficacy.

Hypothesis 3: There is no significant relationship between personality variables and computer anxiety of the computer-based test participants.

From the result in table 6, it is shown that high self-esteem (β=-1.243, p=0.000) significantly influences computer anxiety, while Type A personality type does not have a significant influence on test participants' computer anxiety (β=0.102, p=0.657), controlling for Type B.

Table 6: Binary logistic regression of personality and computer anxiety

Personality Factors	Computer anxiety				
	B	S.E.β	Wald χ^2	Sig.	e^β
Personality type: (Ref Cat=Type B) Personality Type A	0.102	0.230	0.197	0.657	1.108
Self-esteem: (Ref Cat=Low Self-Esteem) High Self-Esteem	1.243	0.223	31.029	0.000	3.465

Hypothesis 4: There is no significant relationship between personality and computer self-efficacy of the computer-based test participants.

The result in table 7 reveals that high self-esteem (β=-0.457, p=0.004) significantly influences computer self-efficacy, while personality type A does not have a significant influence (β=-0.099, p=0.475).

Table 7: Binary logistic regression of personality factors and computer self-efficacy

Personality Factors	Computer self-efficacy				
	B	S.E.β	Wald χ²	P	e^β
Personality type: (Ref Cat=Type B) Personality Type A	-0.099	0.139	0.510	0.475	0.906
Self-esteem: (Ref Cat=Low Self-Esteem) High self-esteem	0.457	0.160	8.155	0.004	1.579

Hypothesis 5: There is no significant relationship between psychosocial variables and the computer anxiety of the computer-based test participants

The result in table 8 reveals that good computer attitude (β=1.063, p=0.001) significantly influences computer anxiety, while high computer exposure does not have a significant influence on their computer anxiety (β=-0.134, p=0.807).

Table 8: Binary Logistic Regression of psychosocial factors and computer anxiety

Personality Factors	Computer anxiety				
	B	S.E.β	Wald χ²	Sig.	e^β
Computer exposure: (Ref Cat=low computer exposure) High computer exposure	-0.134	0.548	0.060	0.807	0.875
Computer attitude: (Ref Cat=poor attitude) Good attitude	1.063	0.318	11.131	0.001	2.894

Hypothesis 6: There is no significant relationship between psychosocial variables and computer self-efficacy of the computer-based test participants.

Based on the results from table 9, computer exposure did not significantly explain computer self-efficacy.

Table 9: Binary Logistic Regression of psychosocial factors and computer self-efficacy

Personality Factors	Computer Self-Efficacy				
	B	S.E.β	Wald χ²	Sig.	e^β
Computer exposure: Ref Cat=Low Computer Exposure High computer exposure	0.413	0.350	1.389	0.239	1.511
Computer attitude: Ref Cat=poor attitude Good Attitude	0.037	0.151	0.059	0.008	1.037

Discussion of Findings

This study was designed to investigate computer anxiety and computer self-efficacy among computer-based matriculants in three universities in South-West, Nigeria in 2014. On a five-point Likert scale, computer anxiety, computer efficacy, computer attitude and computer exposure are all considerably high, but self-esteem is very low (on a four-point scale).

As would have been expected, computer self-efficacy and computer attitude are considerably high while computer anxiety is relatively low. However, the number of students reporting low self-esteem (33.91%) and low exposure (31.10%) can be considered relatively high. Besides the result on self-esteem and computer exposure, many studies involving these variables have been conducted in many different communities, and the results vary in magnitude according to the circumstances such as subject and respondents under study. For example, the studies of Herman (2005), Achim and Al-Kassim (2015) had produced similar results; but Herman studied loneliness and depression, while Achim et *al* studied military officers. In respect of CBT, it should be recognised that even if the computer itself no more causes anxiety among the students, examination situations would always raise some anxiety among students. Some studies, for instance, Vella, Caputi and Jayasuria (2003), decomposed computer anxiety into their various elements and examined these elements, an approach that could probably reveal why the number of students reporting low anxiety is not as low as would be expected.

The demographic factors in the study, namely age, sex and residential status, did not predict computer anxiety. Unlike the observations of Miura (1987), Jorde-Bloom (1988), Carlson and Grabowski (1992) which underpinned differences in computer access and use by gender, the result of this study supports recent observations that this gap is closing (Schumacher and Morahan-Martin 2001, Nwagwu 2012).

Participants in the study are generally relatively young – with an average age of 18 years; they fall in the category of people born at the expansion of information technologies often dated around the 1990. The inability of residential status to predict computer anxiety could be explained by the fact that information technologies in their various forms have penetrated the urban and the rural populace alike. For example, mobile services cover many rural communities in the areas of study, and this is a global development. By implication, therefore, children in the rural areas have sufficient knowledge and access to the computer and related devices to relieve them of computer anxiety when they are confronted with CBT.

The result is different with respect to the relationship between demographic factors and self-efficacy - males explained self-efficacy, when female was controlled for. It is inferred here that although females reported not to be anxious in respect of computer anxiety, they may not be as efficacious as the males in respect of efficacy in the use of computers. This result supports the earlier one by Schottenbauer, Rodriguez, Glass and Arnkoff (2004). When we controlled for urban, semi urban predicted computer efficacy, but rural did not. Hence, while the rural youth might not suffer anxiety in respect of use of the computers, they are definitely less efficacious in the use of the computers than those who dwell in the semi urban areas. Observations in related studies also uphold our finding (Bozionelos, 2004; Aikens and Barbarin, 2010).

The result in respect of personality and computer anxiety shows that there is no significant relationship between personality type and computer anxiety. Computers appear to be becoming personality-friendly, capable of meeting people's needs, irrespective of their type of personality. However, the result in this study shows that it is only those people that have high self-esteem that use the computer without any anxiety, and this is irrespective of their personality type (Sam, Othman and Nordin 2005).

Personality and self-efficacy repeat the previous result - personality type does not predict self- efficacy, but self-esteem does. Computers are becoming ubiquitous and their presence and use for various purposes are not personality type sensitive. But self-esteem remains a very important attribute required to exploit the absence of the influence of personality type, a result supported by Cooper-Gaiter (2015).

Psychosocial factors represented by computer exposure and computer attitude present another interesting result in respect of computer anxiety and computer self-efficacy. Students' level of computer exposure, whether high or low, does not explain

computer anxiety. How do we understand this result? Many devices such as the mobile phones that mimic the characteristics of the computer exist, and their use for most purposes that the computer can serve may diminish the anxiety of using a computer. Also, there may be several other factors that could explain computer anxiety other than students being exposed to the computer. Several people could use the computer without any anxiety outside the examination hall, but the same people could be struck by computer anxiety under examination condition.

Furthermore, some researchers have reported that individuals' previous computer experience was not associated with their computer anxiety and that experienced users have also been found to suffer from computer anxiety as much as novice users (Rosen, Sears and Weil 1987; Marcoulides, 1988). Despite the seeming non-existence of anxiety among the students on account of computer exposure, individual attitude remains an important explanation. In several studies about human behaviour, attitude is a significant explanatory variable (Venkaesh and Davis, 2000). In the same way, students whose attitude to the computer is good will encounter no anxiety in using the computers. This result in respect of computer anxiety is exactly the same in respect of self-efficacy – good attitude to the computer will result to higher self-efficacy in the use of computers (Saade and Kira, 2009).

Conclusion and Recommendations

The demographic variables did not explain computer anxiety, but residence type and sex of respondents explained computer self-efficacy. Basically, almost everyone is in one way or the other exposed to either computers or computer-like devices but not everyone is adept in its use. The variables that guided this study did not provide explanations for the 29% of respondents who reported high computer anxiety. But for all the respondents, high self-esteem, high computer exposure and good computer attitude explained both computer anxiety and computer self-efficacy.

Basically, dealing with computer anxiety and improving self-efficacy of students in respect of CBT will require students being pre-exposed to CBT type of examinations for relatively long periods prior to the examination. What obtains in many universities in Nigeria at present is the pre-JAMB test, which holds a few to the real JAMB examination, an approach that will not reduce the anxiety faced by students who are not very adept in using computers. Furthermore, exposure of students to CBTs in schools should be part of the assessment criteria for enlisting students to take part in CBT-based examinations. In respect of research and theory, it may be necessary to expand the scope of psychological theories and variables that guided the study in order to increase the chances of explaining higher computer anxiety among some students. Resort to other than psychological variables and theories such as sociotechnical systems, among others, may be very useful. Finally, this study was constrained by the use of non-random sampling technique to use binary statistical method in the analysis of the data, thus compelling psychological variables to be viewed as discrete observations.

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Williams Nwagwu, a graduate of the University of Ibadan holds Ph.D degree in Information Science. He is Senior Leecturer at the Africa Regional Centre for Information Science of the University of Ibadan Nigeria. He is a Visiting Professor in the Department of Information Science of the University of South Africa, and currently on leave of absence at Documentation, Information and Communication Department of the Council for the Development of Social Science Research in Africa based in Dakar, Senegal. He is the Head of Programme
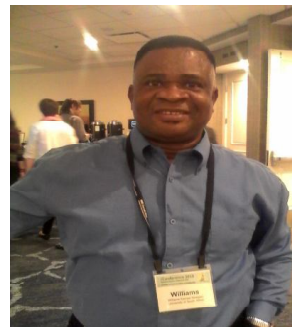
Adebayo Olukunle is budding scholar with interest in technology use in education. He just concluded his master's degree under the supervision of the first author.

An Evaluation of a Donor Funded Information and Communication Technology Centre in a South Africa Indigenous Community: Reflections on the Bhamshela Telecentre

Ken Chisa and Ruth Hoskins
Library and Information Science Programme,
University of KwaZulu-Natal,
Pietermaritzburg Campus
Private Bag X01
Scottsville 3209, South Africa
chisa@ukzn.ac.za; hoskinsr@ukzn.ac.za

Abstract

This study investigated the role of donors in the establishment, implementation and sustainability of information and communication technology centres in indigenous communities. This was achieved by looking at success factors and challenges experienced at the Bhamshela donor-funded telecentre in South Africa. The objectives of the study included determining the mission of the telecentre, identifying the services offered, the factors that affected the use and non use of services and identifying challenges that the telecentre encountered in the course of providing services to its users. The study used both secondary and primary sources of data. The population of the study consisted of senior representatives of the organisation that facilitated financial and technical support to the telecentre. The study showed that the success of the telecentre enterprise in indigenous communities can only scale up if donors comprehensively review the current implementation and management model for these initiatives, taking into account the diverse political and socioeconomic realities existing in different communities.

Introduction

There is a direct link between the socioeconomic disadvantages experienced by indigenous people and their access to information and communication technologies (ICTs). These social disadvantages, directly related to marginalisation and characterised by poverty and powerlessness, are reflected in measures of education, employment and income (Carson *et al*, 2007). Significantly, these social disadvantages also inform the so-called 'digital divide' phenomenon (Digital Divide Network, 2004).

The 'digital divide' refers to inequalities in access to computer-based ICTs such as the Internet, and in the capabilities required to utilise these effectively (Digital Divide Network, 2004; Lester and Koehler, 2003; National Office for the Information Economy (NOIE), 2002). The fundamental cause of the digital divide lies in the patterns of socioeconomic stratification that shape access to all social services (Norris, 2001). In South Africa, the digitally disadvantaged predominantly include indigenous communities living in peripheral areas and other vulnerable groups such as those on low incomes, the unemployed, those without tertiary education, those from non-English speaking backgrounds and the physically challenged (Burton, 2002; DiMaggio and Hargittai, 2009; Etta and Parvyn-Wamahiu, 2003; Chisa and Hoskins, 2013).

The significance of the digital divide lies in the increasing importance of ICT access to economic, social, and political opportunities in the current global information society (Hendry, 2000; Horrigan, 2003; NOIE, 2002). For example, information-based goods, services, and employment represent increasingly significant sources of wealth in an information-driven economy (NOIE, 2002). Governments and private

sectors are also increasingly shifting to online information and service delivery (Holloway, 2002; NOIE, 2002). Moreover, the Internet has emerged as a new site for economic empowerment, education, social interaction and political engagement (Curtin, 2001; Norris, 2001; Page and Katitjin, 2000). Thus, as opportunities become synonymous with ICT access, there is concern that existing social inequalities constraining ICT access for the disadvantaged will be perpetuated or even exacerbated (Curtin, 2001; Holloway, 2002; Horrigan, 2003; Norris 2001). While commercial ICT centres such as cybercafés and Internet kiosks are now prevalent in the urban areas of many sub-Saharan African countries (Acheampong and Dzandu, 2012), rural areas still remain relatively underserved (Internet World Stats, 2012). One of the answers to the problem of the digital divide in rural and other marginalised communities, therefore, has been the diffusion of donor-funded information and technology centres, commonly known as telecentres (Etta and Parvyn-Wamahiu, 2003; Chisa, 2006; Chikumba, 2011).

Telecentres are known by different names in different places. Some of the names commonly used include: telecottage (Europe), community technology centre (US), multipurpose community telecentres (Africa) and public Internet cabin (Cuba) (Menou, 2003). For the purposes of this study, a telecentre will be understood as: an integrated information and communication facility that houses a combination of both new and not-so-new ICTs (e.g., television, video, facsimile, telephone, computers with Internet connectivity, printer, newspapers and sometime books). This type of facility, according to Etta and Parvyn-Wamahiu (2003), is called a multipurpose community telecentre

Harris (2001) explains that multipurpose community telecentres (MCTs) provide an alternative to the model of one-to-one individual access to ICTs that is common in the 'developed' world. As community resources, MCTs offer opportunities for development that are based on improved access to information for whole communities. Thus, telecentres have become increasingly important to promote widespread access to and use of ICTs in peripheral areas, as evidenced in both academic and industry literature on ICTs and development (Heuertz *et al* 2003; Kamssu, Siekpe and Ellzy, 2004; Selwyn, 2003; van Dijk, 2005; Bertot,

McClure and Jaeger, 2008; Kuriyan and Toyama, 2007; Wilson, 2004).

The Telecommunications Act was enacted in 1996 and the government declared universal access to telephony as the cornerstone of this policy (Benjamin *et al,* 2000). The Telecommunications Act created the Independent Communications Authority of South Africa (ICASA) in 2000 as the telecommunications regulator. The Act also established the Universal Service Agency (USA) as the primary vehicle for the provision of ICT access throughout the country. The USA has largely focused on setting up MCTs mainly in rural areas of the country (Burton, 2002; Benjamin *et al,* 2000). According to Benjamin *et al* (2000), twelve of the MCTs set up by the USA were with financial and technical assistance from the International Development Research Centre (IDRC). One example of the USA/IDRC funded telecentres in the country is the Bhamshela MCT (IDRC, 2002).

Contextual Information of the Bhamshela Telecentre

Bhamshela is a rural area about 90 km east of Pietermaritzburg. It is in an area bedevilled by high illiteracy and unemployment levels (Burton, 2002; Schreiner, 2006). According to Burton (2002), the process of establishing the MCT arose from a call of expressions of interest by the USA to which the community responded by forming an organisation to take the initiative forward. Two community groups owned the telecentre, namely the Bhamshela Arts and Cultural Group and the Open Window Network. The building housing the ICTs was donated by the local community. It was expected that the telecentre would work as a small business enterprise whereby clients would pay for the use of services such as telephone, fax, photocopying, printing, email and Internet at a rate that would generate income for the initiative (Burton, 2002). It was projected that this income would enable the telecentre to become viable after a year, and that future profits would be ploughed back into the telecentre to upgrade and develop services. The telecentre officially opened in April 1998. The operating hours were 08h00 to 18h00 every day of the week, with flexible hours applicable during weekends and public holidays. The MCT started with six telephone lines, a fax machine, a photocopier, a printer, six computers and a scanner.

Its two managers, one of whom was a woman, received basic training in ICTs and management from the donors (Schreiner, 1998).

However, what had begun as a promising information resource centre soon became a technological and financial burden to the community. According to Schreiner (1998), the Internet facility was only successfully installed at the end of 1999, one year after the MCT's inception. The printer stopped working almost immediately and staff members had to walk a long distance to print at an alternative facility since they were unable to raise enough funds from the telecentre services to repair or replace the printer (Schreiner, 1998). Schreiner (1998) adds that services such as scanning, email and the Internet were underutilised due to lack of ICT skills and low literacy levels amongst users. Moreover, the telecentre was unable to keep service rates affordable in a community where unemployment was rampant. The telephone was the largest source of revenue. However, the revenue realised by the phones was not sufficient to ensure financial security. By March 1999, prices for telephone services had increased exponentially, rising from 40 cents per phone call unit to one Rand per unit (Schreiner, 1998). The telecentre was closed in late 2001 mainly after experiencing problems with Telkom resulting from a large bill it could not pay (Schreiner, 2006).

Statement of the Problem

The typology, the sociology and the politics of MCTs suggest that it is established and operated to meet the needs of the "geographically disadvantaged, economically weak and infrastructurally poor majority" (Etta and Parvyn-Wamahiu, 2003). This group is demographically diverse and prevalent across all sub-Saharan Africa. The first issue then is to determine the actual role, donors play in the process of establishing and implementing MCTs in such heterogeneous and challenging environments. It is clear from the literature that various problems have plagued donor-funded telecentre initiatives in Uganda, Senegal, Malawi and Mali amongst many other countries on the continent (Benjamin *et al*, 2000; Etta and Parvyn-Wamahiu, 2003; Chisa, 2006; Chikumba, 2011; Chaputula, 2012; Chawinga, 2014).

In the case of Bhamshela MCT, some researchers have alluded to donor policies for its

poor performance. For example, Benjamin *et al*, 2000) observe that the USA "was unable to get crucial information from the ground that would allow it to map out [relevant] services and … effectively monitor progress". In addition, the Agency, "partly in response to political pressure", moved quickly towards implementing the project without other supporting institutions such as schools, hospitals and other government departments which could have formed a strong supporting base (Burton, 2005). Schreiner (2006) also claims that a community needs assessment that could have reconciled the requirements of the community with the services offered by the MCT was never carried out. Significantly, Khumalo (2001) cites the underutilisation of Internet and email services as a reflection of poor project planning by the donor.

The above suggests that although donor assistance has acted as a seedbed for the diffusion of ICTs in marginalised communities, future use and development will largely depend on whether the donors themselves have embraced policies that guarantee the sustainability of these initiatives (Harris, 2001). Since donor support is always time bound and limited (Harris, 2001), this study intends to determine the role donors can play in creating a dynamic sustainability framework that would ensure continued and effective service delivery after the termination of donor support.

Objectives of the Study

The objectives of this study, therefore, are to:

- assess donor policies on telecentre incubation in an indigenous context by looking at key areas of success and failure (if any) at the Bhamshela telecentre;

- determine the extent to which the donor-funded telecentre model can engender indigenous community ownership;

- explore whether donor-funded MCTs provide a sustainable way of providing indigenous access to ICTs and determine the conditions that must be met to make them sustainable;

- explore the dynamics of strategic partnerships between donors, the indigenous community and other stakeholders; and

- assess the monitoring and evaluation process of donor-funded MCT services in light of the Bhamshela case.

Research Framework

This study adapted Gomez's (2010) Access, Capacity and Environment (ACE) framework, and structured it as a tool to understand a range of cultural, socioeconomical and technological issues that affect the way in which indigenous people use ICTs in community telecentres to access information.

The three pillars of this framework are:

- **Equitable access**: This embraces the physical access of the telecentre, the suitability and affordability of telecentre services as well as the technological access therein;
- **Human capacity**: This pertains to the training of both users and staff of the telecentre in order to meet indigenous needs and ensure social appropriation; and
- **Enabling environment**: These are the socio-cultural factors, political will and policy framework which bear on the sustainability of the telecentre
.

This holistic approach is well suited to evaluate the role of donors in the diffusion of ICT interventions in indigenous communities, considering that a key characteristic of ICTs is their multi-sectoral dimension. This means that ICTs can affect people's lives simultaneously in the economic, social and political spheres (Heeks, 1999). This approach stands in contrast to the majority of existing ICT evaluations which have focused primarily on the issue of 'access', 'usage' and 'dissemination' (Heeks, 1999). This assumes that the mere improved access to ICTs will have a direct positive impact on the lives of the poor. These evaluations focus on measuring more immediate and quantifiable output indicators, such as the increase in total numbers of Internet hosts or increases in number of computers per capita (Heeks, 1999).

However, Gomez's (2009) ACE framework is in favour of going one step further by placing individual and collective capabilities of indigenous people at the centre, with information and ICTs playing a supportive role. This underscores the fact that ICTs are not a means to an end by themselves. Although it is argued that the right to information and knowledge is an important entitlement and its absence can be a contributing factor to poverty, this notion needs to be balanced against the broader context of existing socio-economic inequalities which may reinforce themselves through the ICTs (Castells, 1997; Howitt, 2001).

Literature Review

The digital divide experienced by indigenous communities in South Africa can be considered historical in origin, but perpetuation of the disadvantages owes much to contemporary structural and social factors, embodied in what have been termed as the 'social determinants' of access to information (Howitt, 2001). In broad terms, economic opportunity, physical infrastructure and social conditions influence the way in which individuals, communities, and societies can have access to information. These factors are specifically manifest in measures such as literacy levels, employment, income, access to ICTs, social networks and even racism (Chisa and Hoskins, 2013). On all these measures, indigenous communities in South Africa suffer substantial disadvantage (Carson *et al,* 2007; Marmot, 2004).

In recent years, two concepts have been used with regard to community access to ICTs: universality and usability (Chisa and Hoskins, 2013). Universality means that all human beings are entitled to access information, and usability is the potential of a device or service to be utilised to meet the user's needs. Threats to equitable access to ICTs prevent equitable social and economic empowerment (Kamssu, Siekpe and Ellzy, 2004). Moreover, the unequal access to ICTs among groups due to differences in demography, economic status and locations has been seen as a hindrance to globalisation through Internet connectivity (Kamssu, Siekpe and Ellzy, 2004). The findings of this study uncovered distinct patterns underlying the global disparities that ICT access carries. These disparities increase in developing countries such as South Africa where indigenous communities abound (Kamssu, Siekpe and Ellzy, 2004). The United Nations (UN) in its statement on Universal Access to Basic Communication and Information Services observes as follows:

The information and technology gap and related inequities between industrialised and developing nations are widening: a new type of poverty, information poverty, looms. Most developing countries, especially the least developing countries are not sharing in the communications revolution ... (United Nations, 1998).

Due to the relative novelty of access to ICTs in telecentres and the shortage of guidelines for establishing and implementing MCTs in indigenous contexts, many questions remain unanswered as to how this innovation can bring about sustainable equitable access to information resources amongst the most disadvantaged sections of the population, especially in sub-Saharan Africa (Gomez and Ospina, 2001).

Telecentre Models

The literature shows that there are three main telecentres models: private owned, non-governmental organisation (NGO) owned and trusteeship owned. Bhamshela telecentre, the focus of this study, falls under the category of trusteeship. In this arrangement, the telecentre "is... held in trust by the executing agency [i.e. the funding institution] for a specified period until the owner, i.e., the community, is ready to take over" (Etta and Parvyn-Wamahiu, 2003: 163).

The main-donor funded telecentre programmes in Africa have been a partnership between such bodies as the International Telecommunication Union (ITU), the United Nations Development Programme (UNDP) and the IDRC, amongst others, in collaboration with local executing agencies (Benjamin *et al,* 2000). This partnership has seen the establishment of telecentres in Mali, Uganda, Mozambique, South Africa and many other sub-Saharan African countries. Donor-funded telecentres tend to be more expensive, costing well over US$250,000 each, and can offer a range of technologies such as telephony, word processing, faxing, printing, photocopying, scanning, Internet, e-mail and sometime library services (Benjamin and Dahms, 1999). Moreover, donor-funded telecentres stress community participation and sustainability, which is why they are also known as MCTs.

According to Chikumba (2011), however, no donor-funded telecentre in Africa had, at the time of his study, shown that it could be self-sustaining after the external funding had ceased.

At best, donor-funded MCTs have so far only covered operating costs, sometime not including phone bills and salaries (Burton*,* 2002; Chisa, 2006; Chikumba, 2011). Moreover, no major donor-funded telecentre has been able to set aside funds for depreciating equipment, let alone generate enough revenue to repay the initial capital. In most cases, there have been greater technical problems than anticipated as attested by the Bhamshela experience (Schreiner, 2006). Many of the donor-funded telecentres have been top-down enterprises, certainly with some community participation, but within the strict precincts of the external funders' policy provisions (Etta and Parvyn-Wamahiu, 2003; Jensen and Esterhuysen, 2001). As a result, Chikumba (2011) warns that while there is some evidence regarding the usefulness of ICTs in marginalised communities, none of the existing donor-funded telecentres in Africa can be rolled out on any large scale as they do not represent a model that is sustainable for universal access.

The Donor-Funded Telecentre Model and the Indigenous Context

Even though there appears to be general agreement on the basic needs and the functions of donor-funded MCTs in rural areas, there seems to be little understanding regarding the effect of donor policies in the establishment, implementation and sustainability of these initiatives in such challenging environments (Webb, 2002). This could be due to the general lack of literature on this subject. However, it has been suggested that the establishment of donor-funded MCTs in marginalised communities has so far tended to evolve over time by following a rigid vertical trajectory. In this regard, Etta and Paravyn-Wamahiu (2003) make reference to three important stages in the metamorphosis of these initiatives in which donors play a crucial role, namely "the investment stage, the contract stage and the user fee stage".

- The **investment stage** is seen as characterising the early stages of the project. This is where donors form partnerships with local stakeholders in an attempt to build

community capacity by encouraging them to participate in the project. At this stage, the donor finances the project, as well as providing equipment and training for local partners, key persons and staff.

- In the **contract stage,** the telecentre has gained autonomy from the 'parent' agency. It then starts to make contractual agreements with other agencies and government organisations such as hospitals or schools while also building up the clientele to which it provides services and from which it derives support.

- By the time the telecentre gets to **the user fee stage,** donor dependency is a thing of the past. By this time, the communities are well aware of the products and the benefits of the telecentre and are, therefore, willing to pay for services.

The implication of an evolutionary perspective is that it is only a matter of time before an MCT becomes independent and self-sustaining. However, Etta and Paravyn-Wamahiu (2003) warn that this outlook is at best idealistic and has rarely been realised. According to the two researchers, the evolutionary thesis gives little attention to the political, cultural and socioeconomic realities on the ground that weigh heavily on the trajectory of all donor-funded development projects in marginalised communities. Harris (2001) observes, for example, that very few examples at the user fee stage have been reported in the literature, and this is perhaps proof that few projects of this nature have advanced to that stage.

Methodology

The purpose of the study was to examine the role of donors in the establishment, implementation and sustainability of donor-funded telecentres in indigenous communities. The nature of this study is applied research, meaning that emphasis was placed on providing information that can be used in addressing practical telecentre establishment, implementation and sustainability issues. To attain the objectives the study**,** the exploratory research design, utilising the case study methodology, was employed to gather data.

The population of the study was selected purposively mainly because the individuals would be knowledgeable about the research questions. The population, therefore, consisted of three senior officials from USA, the local organisation that oversaw the implementation of the project with funding from IDRC. By virtue of their high-ranking positions, these individuals were able to answer questions concerning their organisation's involvement with the project. An e-mail questionnaire was sent to the three people. One of the researchers also had the privilege of conducting face to face interviews with S. Burton in 2005 and H. Schreiner in 2006, in view of their previous involvement with the Bhamshela MCT. However, these two researchers were not part of the population of the study. The researchers decided against interviewing local community users and staff of the telecentre because it was deemed unfair to expect them to make any meaningful comment on donor policies regarding project implementation and sustainability.

In addition to collecting the data through interview and questionnaire, data was also collected from the literature (both online and print). The collected qualitative data was then analysed by thematic content analysis. In order to identify major themes, the labelling and categorising of phenomena was done as indicated by the analysed data. The methodology used does not allow results to be generalised (Ngulube, 2002) but it provides an in-depth insight into critical issues relating to the establishment, management and sustainability of donor-funded MCTs in an indigenous community in South Africa.

Findings and Discussion

It is clear from the literature that the socio-economic disadvantage of indigenous communities as a marginalised group has resulted in a weak community infrastructure for digital information access both technologically and economically and in terms of skills-based capabilities (Etta and Parvyn-Wamahiu, 2003, Chikumba, 2011; Chisa and Hoskins, 2013). However, this study has also shown that the success of ICT initiatives in an indigenous community in South Africa is not limited to physical or socio-economic factors only. Success can be impacted by donor policies on issues such as:

- the indigenous context**;**
- community ownership of the project;
- project sustainability;
- partnerships between the donor and other stakeholders; and
- monitoring and evaluation of services

These important factors are described and illustrated in detail below, aided by specific examples from the case study under review.

Indigenous Socioeconomic Context

This study has identified that one of the barriers affecting indigenous access to ICTs is the geographical distribution of the indigenous population, many of whom live outside major cities. For example, Bhamshela MCT was located in a remote and impoverished area making cost-effective implementation of technological infrastructure difficult. Similar communities in many parts of sub-Saharan Africa continue to lack basic access to ICTs due to high implementation and maintenance costs related to rural geographic location of the communities. The finding is supported by ((Institute of Africa Development, 2010; Asia Development Bank, 2008; Burton, 2002; Etta and Parvyn-Wamahiu, 2003; Schreiner, 2006).

This study has also shown that rural or remote Internet users often experience higher costs, inadequate bandwidth and poor or unreliable services as attested to by the Bhamshela case (Burton, 2002; Etta and Parvyn-Wamahiu, 2003, Schreiner, 1998; Schreiner, 2006). Crucially, the study has shown that although some form of Internet access can be made physically available to indigenous communities through MCTs, many people would be unable to afford the services due to low levels of income existing in these communities as was the case at Bhamshela. With that in mind, donors need to realise that limited exposure to ICTs constrains awareness of the benefits of Internet access and the development of basic computer literacy, barriers compounded by indigenous lack of ICT training as was the case at Bhamshela..

Community Ownership

The role of donors in identifying and moulding local 'champions' or what Rogers (1995) calls

'innovators', who can mobilise others in the community to accept the vision of the telecentre initiative is important. This is critical for the project's sustainability once the external funding has ended. This study has shown that ownership can be promoted if the beneficiary community contributes to the decisions made leading up to project implementation. At Bhamshela, respondents from the donor organisation reported that laid down guidelines were followed for the preparation of community champions at the site. These included invitation and selection of representatives of community organisations, validation of the champions after confirmation had been done with stakeholders, as well as champions' awareness training. The respondents added that the outlining of the expectations, roles and responsibilities of the champions during both the pre- and post rollout periods were part of the champion identification and moulding process in order to encourage community ownership of the project.

Mayanja (2001) explains that for the innovators to be from the community itself increases the credibility of the telecentre initiative. The professional literature on the diffusion of innovations also underlines the importance of the innovator: "the innovator," says Rogers (1995), "plays an important role in the diffusion process - that of launching the new idea in the system by importing the innovation from outside the system's boundaries and igniting early adopters." According to Mayanja (2001), this requires the zeal of individuals who can translate and demonstrate the relevance and application of these kinds of concepts to the realities of the community.

Project Sustainability

This study shows that when selecting telecentre locations, donors need to take into account the level of potential demand for ICT services from a large number and a wide range of users and the viability of the project in the particular area. This ensures maximum utilisation of the facility and through cost sharing reduces the expense to individual users. In this regard, one respondent explained that donors for the Bhamshela MCT appointed provincial coordinators (PCs) nationwide whose brief was to keep the organisation up to date regarding these critical issues. The inference is that, based on the

expert advice from the PCs, the donor was satisfied with the user demand, the surrounding infrastructure and the viability level of the Bhamshela project. Yet, evidence from the literature as well as comments from both S. Burton and H. Schreiner suggest otherwise.

The study has shown that no community needs assessment was carried out at the Bhamshela telecentre. This inference is apparent when one notes that a collaborative needs assessment at the MCT could easily have identified the lack of demand for some services which it was offering. The result was that some irrelevant services offered at the MCT computer classes and Internet service were being subsidised by a service very much in demand, the telephone, which in turn affected the pricing of the latter. Ernberg (1998) observes that good techniques for needs assessment can be easily developed and used according to specific situations. The time required for the assessment will vary depending on factors such as the availability of existing information about the proposed telecentre location, the depth of information required in the planning stage of the telecentre, and the level of use of ICTs at the proposed location (Ernberg, 1998).

The study has also shown that no basic training was incorporated as a central component in the general management model of the project. Yet, some of the problems experienced by the telecentre clearly point to inadequate training both for the telecentre staff and its users. In fact, one of the reasons why computer classes failed at the Bhamshela MCT was that its staff did not have the necessary skills to offer this service in the first place. The sad scenario at Bhamshela MCT highlights the fact that the provision of ongoing training for users of the telecentres and training, on an as-needed basis to upgrade staff skills is required to meet the changing technology and content requirements of community telecentres.

Finally, while the literature acknowledges some growth in online content creation by some telecentre donors in collaboration with indigenous communities and other stakeholders (Chisa and Hoskins, 2013), there was no evidence at Bhamshela to suggest that local content was ever discussed or used. Yet, as Ernberg (1998) advises, telecentres are not just technology centres; they can also be 'living laboratories', which facilitate local sharing of information and ideas, especially when relevant local content is created and used to enhance local social development.

Strategic Partnerships

The literature shows that to ensure project sustainability, donors need to consider the proximity of other organisations and institutions that can play roles in using, supporting, maintaining or operating the telecentre. Such organisations might include: health centres, schools/colleges, community and cultural centres, religious centres, libraries, organisations of farmers/fishermen/craftsmen, post offices, local/national government administration offices, NGOs and community-based organisations, among others. However, this was not the case at Bhamshela MCT which did not have the benefit of these organisations in its vicinity due to its isolated position. As a stand-alone project, the telecentre had a very narrow clientele base, which meant donors had to raise the cost of services quite high in order to keep it on its feet (Burton, 2002; Schreiner, 2006).

Other donor considerations that can enhance sustainability highlighted in the literature include: a location that is easily accessible to potential users (for example, near public transport or within walking distance); the availability of an existing structure (for example a school building, library, extension office and so on) or a new structure which is suited to use as a telecentre (appropriate layout, secure); access to electricity; and connection to telephone lines and the Internet. At the Bhamshela MCT, the building housing the ICTs was donated by the community and renovated to an acceptable level for the project to work in keeping with the above-mentioned purpose. However, evidence from the collected data and the literature shows that problems regarding telephone connectivity and electricity supply severely affected the Bhamshela project. In fact, when the MCT was finally closed, it was mainly due to the disconnection of phone lines by Telkom owing to huge unpaid bills. These problems suggest that, in some situations, the development of MCTs may be inappropriate, and other types of communication solutions, electronic or otherwise, should be explored by donors.

Finally, the study has shown that, to ensure project success, donors need to consider the socio-cultural aspects that may affect the utilisation of the

telecentre. This is important because, to be effective, telecentres need to be integrated into communities so that they lessen, instead of widen the communication gaps between the information rich and the information poor (Ernberg, 1998; Subedi and Garforth, 2001). Donors need to realise that in the face of widespread interest in the 'digital divide' debate, broad-based community participation should become part of the telecentre's mandate. This is important in order to reach out to ethnic minorities, women, children and the elderly who are often on the wrong side of that divide. In this context, it is noteworthy that one of the two managers at Bhamshela MCT was a woman (Schreiner, 2006). To their credit, Bhamshela donors paid attention to the communication gaps based on gender that often exists, and sought to incorporate into the telecentre management structure the different communication patterns that exist between men and women, especially in rural patriarchal communities.

Monitoring and Evaluation

Finally, the study has underlined the importance for donors, in collaboration with all stakeholders and the local community, to monitor and evaluate the process of telecentre development and implementation. The literature observes that the evaluation of telecentre projects in Africa is still a donor-driven exercise, which remains external to beneficiary communities. Even if institutions specialised in conducting evaluations may represent a different industry, the fact is that by contracting private evaluators, donors keep firm control over telecentre evaluations . Typically, beneficiaries are cut off from the entire exercise and are seen only as the objects of the study and not subjects that can contribute to the evaluation process (Khumalo, 2001). Etta and Paravyn-Wamahiu (2003) advise that the elements monitored should not only include the number of users and the telecentre services that are most utilised, but also the impact of the telecentre on the quality of life in the community.

At Bhamshela, an internal evaluation carried out by Khumalo (2001) cites the underutilisation of the Internet and email services. Khumalo attributes this to three main things: firstly, staff/user incompetence in using these services; secondly, poor bandwidth; and thirdly, access to ICTs was expensive and the content irrelevant to many users.

Conclusion

Evidence from the literature and from the data collected for this study shows that telecentre management is also improving at community, government and donor levels by way of policy formulation, planning, management, evaluation and monitoring. Despite the noted progress, the study has revealed that donor-funded telecentres remain fragile. This is because most sub-Saharan African countries still depend on external funding and expertise to establish and implement such expensive projects. Consequently, they have sometime tended to bear the full burden of top- down management policies used by some donors. Operational problems experienced at Bhamshela telecentre can be largely ascribed to such poor management policies by the donor.

The various experiences from the case study clearly demonstrate that donors cannot apply a single model of implementation uniformly across the board due to varying political and socio-economic realities on the ground. On the contrary, relative success stories in some donor funded initiatives reported in the literature have largely been based on factors such as collaborative and participatory mechanisms. These enabled the beneficiary community and other role players to have a strong input into the establishment and management of the telecentre; and as a result, project heroes were identified and incorporated by the donors. This type of community involvement corresponds with, and contributes to the achievement of the social goal of donor-funded telecentres, namely to address the information needs of the community, and to undertake actions based on the use of ICTs to improve the quality of life of the local population.

Finally, the study has also highlighted the fact that if project sustainability is to be achieved, donors need to constantly improve the training and management components of telecentres. The study has shown that the training of staff at Bhamshela telecentre was essential not only for the general management of the telecentres but also for the transfer of knowledge and information to the local community. Similarly, the training of users was also necessary to ensure the effective appropriation of that knowledge and the purposeful use of ICTs such as the Internet.

Recommendations

Experience gained from the examination of the Bhamshela MCT and pointers from the literature, assisted the researchers to make the following recommendations to those who wish to fund future MCTs in Africa:

- The development of open and proactive donor policies is critical as they can make telecentres avoid basic problems such as those encountered at Bhamshela. Good donor policies can also inspire a considerable expansion of telecentre services across Africa. However, these policies need to drive this expansion within a social accountability framework and in awareness of the needs of the target community. In turn, there is a need for donor policies to stimulate local demand, thereby reducing investment risk for telecentres in rural areas.

- Another critical factor that has emerged from this study is the need for donors to court the community at large and make them aware of the different benefits from the telecentre services. Thus, identifying and training local people interested in telecentres will nurture the telecentre project in the long term can make the success of such a service. It is advisable for donors to have local stakeholders from areas such as health clinics, municipalities, political parties and teacher training colleges. People from these institutions are most likely to become the core users of the services and will most likely diffuse the technologies widely.

- Donors need to recognise that the buildings and the technology provided cannot be a measure of project success. Success must be measured by the project results delivered to the telecentre users and the sustainability of the telecentre itself. Donors should also note that an abrupt ending of donor assistance is often detrimental to the sustainability of the project. This is attested by the Bhamshela case which lasted only for three troubled years. Small financial support in a transitional phase should, therefore, be viewed as a valuable way to phase out the project. The most successful assistance instances are achieved when the project continues to run smoothly after external

funding has stopped. In other words, a phasing out mechanism should be built-in when establishing (designing) the project.

- Donors should ensure that greater attention is given to the training and management components of the project. Thus, village seminars, workshops and training programmes for both the user community and the telecentre personnel must be integrated in the implementation strategy and should be followed up periodically. For example, ongoing training will be necessary for the users of the telecentres and periodical training will be required on an as-needed basis to upgrade staff skills as the technology and content requirements change. Moreover, rural colleges and schools, as well as extension services, can use MCTs for professional training, and as a facility for distance learning. Thus, when designing training programmes, donors should consider the users' requirements and learning preferences, which means that the content and the method of delivery should be developed in collaboration with the community

- The assessment of user needs and their translation into services and content was clearly an issue at Bhamshela. It is important at the earliest stage to articulate the core service (that which is most critical to the community or will most quickly attract users) and then structure other services around it. Thus, the study recommends that donors need to develop telecentre strategies and investments for rural areas while taking into consideration differences in languages, culture, socioeconomic conditions and infrastructure. This should be reflected in participatory needs assessment and the development of both the telecentre itself and the forms taken by information content and linkages to more conventional communication media such as radio.

- Finally, this study has shown that partnerships will offer benefits to grassroots telecentre networks, especially in social investments and support services. Social investments include funding the development of the telecentre network, workshops, training programs, online information sharing services, and innovative new community services. Support services

include business planning, which was conspicuously lacking at Bhamshela, facilitation, and an online community platform, all of which are designed to help telecentre networks succeed quickly (Roman and Colle, 2000). Strategic partnerships can also facilitate networking, content creation, applications and the mobilisation of users.

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Ruth Hoskins is Professor and the Academic Leader, Teaching and Learning in the School of Social Sciences at the University of KwaZulu-Natal. She holds a PhD in Information Studies from the University of KwaZulu-Natal and coordinates the Bachelor of Library and Information Science Honours Programme.

User Perceptions about Archives at the Lutheran Theological Institute Library, Pietermaritzburg, South Africa

Francis Garaba
Department of Library and Information Science,
University of Fort Hare Alice (Main campus)
King Williams Town
Alice 5700
South Africa
fgaraba@ufh.ac.za / garaba@ukzn.ac.za

Abstract

This paper reports on the findings of a study that was carried out in 2014 at the Lutheran Theological Institute (LTI) Library on user perceptions about archives in the library. Archival registration data in the form of user statics, library membership statistics, annual reports and a questionnaire were the primary sources of data. The study established that users were generally aware of what archives are, that the most consulted archival materials were church and diocese minutes and that amongst the recommended strategies to promote visibility for the archives were exhibitions, guided tours, an open day on archives and the establishment of a friends of the archives group. The key important recommendations of the study were that frequently consulted materials had to be prioritised for digitisation as it was prone to damage due to the continuous handling. Another key recommendation was the need to streamline curricula to incorporate induction on archival instruction to help raise awareness about archives thereby promoting their importance and use within the Lutheran community. Lastly, the input of stakeholders as part of the friends of the archives group will help to champion the cause for religious archives, especially for the Pietermaritzburg Cluster of Theological Libraries (PCTL).

Introduction

Outreach remains one of the fundamental responsibilities of an archivist. Millar (2010) pointed out that outreach is not only about making archival materials available but also involves raising awareness of the existence of the archival repository and the nature of its holdings and services. The need for archivists to take the lead in promoting awareness and appreciation of archives as advocated by Millar (2010) reaffirms why this task is so sacrosanct to the profession, and was one of the drivers of this study. Outreach refers to that group of activities that are designed to raise the profile of the archives thereby promoting the visibility and the use of archives.

Mnjama (2009) noted that access to records and archives is a very important part of their function in society, and there is a need for the general public to be made aware of the treasures the archival institutions are holding on their behalf. The transfer of this message to this general public was referred to by Dearsytne (1993) as promotional marketing. An assortment of terms has been used to refer to those activities in which the archival institution seeks user response to its services or in its bid to raise the profile of the organisation either internally or externally. Educational programmes, external programmes, advocacy, developmental services, public programming and public service are other synonyms used as substitutes for the broad term "outreach". Outreach has been defined as those activities whereby archival institutions ensure responsiveness to users, secure user participation and promote the use of archives (Harris 2000). Outreach is an extension of reference work and, as Roe (1988) highlighted, while the purpose of archives is to preserve and make available historical resources, that goal lacks substance if the resources remain unused. This view has been shared by (Harris ,2000; Pederson

1983; Freeman, 1984a; Blais and Ennes, 1990-91) who stated that public programming is arguably the clearest manifestation of archivists having embraced the notion that use is indeed the ultimate goal of all their endeavours.

Pearce-Moses (2005) defined outreach as the process of identifying and providing services to constituencies with needs relevant to the repository's mission, and tailoring services to meet those needs. What can be discerned from these foregoing definitions is that outreach has a dual purpose as it is focused on users in an effort to endear them to the institution and on raising the profile of the organisation as well. As noted by Pederson (2008), outreach is about relationships with people, with influencing people to change their attitudes and behaviours. In the same vein, Theimer (2014) argues that reframing our mission entails not only focusing on our collections but also on our constituencies, the people that is. Ericson (1990-91) also noted that opening up the holdings of an archival institution generates their increased usage and he stated that:

> ... if, after we brilliantly and meticulously appraise, arrange and describe archives and nobody comes to use them, then we have wasted our time.

Hunter (2003) pointed out that one of the frustrating things for an archivist is to know that the collections have great research value, but that they are underutilised. In fact, information gains value when utilised (Ngulube, 1999). Hence, this paper therefore attempts to establish inter alia whether there was awareness by users on what archives are, their importance, usage, if any, in their quest for knowledge.

Contextual Setting

The Lutheran Theological Institute (LTI) is owned by a Trust, the South African Lutheran Theological Training Trust (SALTTT) which is a common venture of the Evangelical Lutheran Church in Southern Africa (ELCSA) and the United Evangelical Lutheran Church in Southern Africa (UELCSA). The LTI is linked to the School of Religion, Philosophy and Classics (SRPC) at the University of KwaZulu-Natal, Pietermaritzburg. The mission of the LTI is to train men and women for leadership,

ministry and service. The LTI Library is endowed with primary and secondary materials from its consolidated former institutions that is Umphumulo Lutheran Theological Seminary, the Marang Lutheran Theological Seminary and the Lutheran House of Studies. The LTI library is a member of the Cluster of Theological Institutions together with the Evangelical Seminary of Southern Africa (ESSA), the Catholics at St Joseph's Theological Institute, the Methodists at Seith Mokhitimi Methodist Seminary (SMMS), the Anglicans at the Anglican Diocese (AnHouse), the SRPC at the University of KwaZulu-Natal, Pietermaritzburg and the Congregationalists at the Congregational House of Formation (CHoF). These institutions inter alia share library and staff resources. Students come from South Africa and from various African countries and other parts of the world. Averagely, the annual library membership is around 140+- registered users and this is made mostly of diploma, ministerial, undergraduate, postgraduate students, staff and retired members of the Lutheran Church.

Within the institute, there is archival repository that serves as an adjunct to the theological library, thereby serving as a rich resource of primary material on the history of the Lutheran Church in South Africa. At the LTI Archives documents relating to individual staff members, students, pastors, and their papers and research, as well as to institutions, associations, curricula, conferences, student bodies, applications, welfare etc, minutes of meetings, reports, societies, committees, records of appeal and adjudication, interoffice memos, appointment books, registers, charters, constitutions and bylaws, legal papers, deeds, articles of incorporation, agreements, financial ledgers, and various other papers pertaining to the different churches or missions are included in the files. In addition, the archival repository also maintains a historical depository of denominational journals, periodicals, convention proceedings or transactions pertaining to the Lutheran Church in South Africa (Garaba and Zaverdinos, 2014).

The documents housed at the LTI Archives came from the Lutheran Theological Seminary (LTS) at Umpumulo, the Marang Lutheran Theological Seminary and the Lutheran House of Studies. As noted above, the papers that came to the LTI from Hermannsburg/Evangelical Lutheran Church in Southern Africa (ELCSA) from Northern Transvaal

(N-T)/United Evangelical Lutheran Church in Southern Africa (UELCSA) as well as the documents that have been in the LTI since it began to be administered by the South African Lutheran Theological Training Trust (SALTTT) are a valuable resource for the institute's corporate memory. In a nutshell, the importance of scholars using primary materials cannot be overstated for the simple reason that these documents bring one close to the originating experiences. More importantly, these primary materials enhance research and scholarship, enables one to appreciate the value of archives when deployed in the parishes for congregational service and inculcates a general awareness about archives.

Justification of the Study

Access and utilisation of archives were deemed fundamental to this study for the simple reason that collections that remain sequestrated from the public serve no purpose. Apparently, use remains the ultimate goal of all archival endeavour (Harris, 2000). The aim was to establish whether there is awareness by users on what archives are, their importance, usage, if any, in their quest for knowledge and their suggestions on how best to raise the profile of the archives with regard to publicity. In a nutshell, this was an attempt to assess the breadth of our potential constituency and the findings of the study may be beneficial to the LTI Archives as this will assist in outreach plans to raise the profile of the archives and also assist in identifying areas that the material can be used for the students' academic needs. In addition, the awareness so generated may also assist in safeguarding the Lutheran heritage when pastors are deployed in the parishes after completion of their ministerial training in view of the fact that they may be knowledgeable about the importance of religious archives.

Problem Statement

Access to and utilisation of archives is a fundamental human right. However in many archival repositories, access and usage of archives is significantly low simply because the importance of archives and their use are relatively unknown. This is because the identity or the image crisis tag that has haunted the profession since time immemorial has proven difficult to eradicate.

The International Archives Day (2014) observed that the public's image of the archives is foggy: often confused with libraries, archives continue to be perceived as documents for internal use only, which are difficult to access and are of interest only to historians. The perception of records and archives by the public and the organisations that create them are not clear. The repellant effects of Jenkisnson's (1965) treatise that the primary duty of an archivist is the physical and moral defence of the archives have been a curse and very detrimental to the archival profession. That gatekeeping mentality has been contagious with regards to the perception that people have about archives hence clarion calls by Williams (2006) for the need for a cultural change of the place of archives within communities, whether large or small. In consequence, this means that there is need to conduct user studies to determine the needs of clients and to enable archivists to effectively relate to the public (Ngoepe and Ngulube, 2011). Duff and Cherry (2008) concurred and stated that archivists have begun to conduct more formal evaluation studies to ensure their services and systems meet users' needs.

Be that as it may, little research has been done in theological libraries with religious archives about access and utilisation of archives and general assessment of archival awareness by users. Kamatula's (2011) study on state archives revealed that collections in public archival institutions are not fully utilised as evidenced by the low number of researchers consulting archives especially within the eastern and southern African region. The same could be said about private archives with regards to their consultation. At the LTI Archives for example, whilst administrative statistics on the number of users consulting the archives shows a 27% increase between the years 2012 and 2014, much can be done to improve usage considering the annual membership for the library as illustrated in Table 1. The average annual membership at LTI is around 140. Consequently, this research was thus borne out of the need to assess archival awareness and consultation, suggest how curriculum improvement could be integrated with the use of archives by users thereby enhancing research and scholarship and identify strategies peculiar with users to raise the profile of archives.

Table 1: Users of Archives at LTI Library 2012-2014
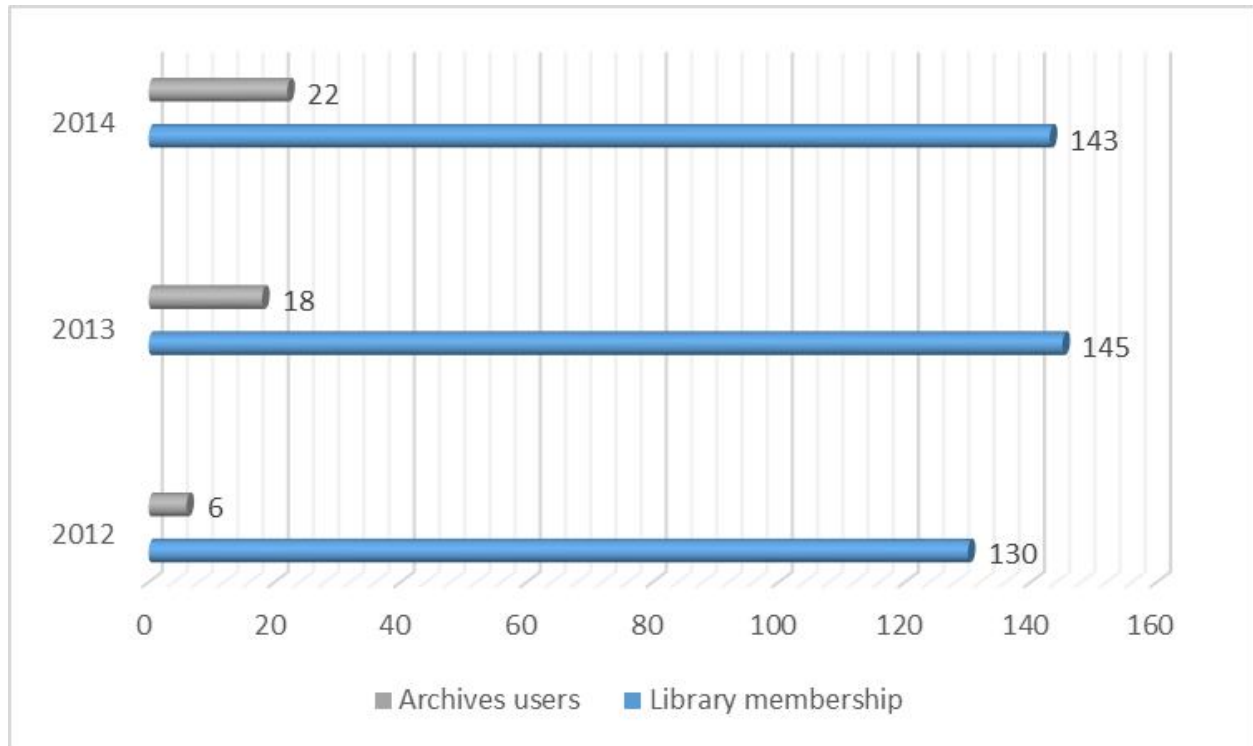
Research Purpose and Objectives of the Study

The general purpose of this study was on access to religious archives in the LTI library with the primary aim of trying to establish whether there was awareness on what archives are, their importance, usage, if any, in users' quest for knowledge and identify their preferences on how best to raise the profile of the archives with regard to publicity. The specific focus areas were as follows:

- Establish the users' understanding of archives and identify frequently consulted materials;
- Assess whether users were aware of the constitutional provisions on the need for them to keep accurate records in parishes as specified by the ELCSA constitution;
- Determine awareness about the existence of an LTI Archives brochure in the library;
- Identify popular strategies recommended by users that the library should adopt to raise the profile of archives; and

- Make recommendations on curriculum improvement by advocating the integration of archives into their studies.

Review of Related Literature

Within the field of archival science, there is expanse literature on outreach or public programming though limited on the subject of religious archives. Kamatula (2011) carried out a survey of public repositories in Tanzania and pointed out that the decline in researchers consulting archives within the East and Southern African region was because of ineffective advocacy strategies. However user studies on public programming that focused on users and access to archives provided the foundation for this study. These include a case study by Borteye and Maaseg (2012) which focused on the use and users of the records at the Manhyia Archives of the Institute of African Studies, Kumasi, Ghana. An important recommendation emanating from this study was the need to intensify efforts to promote the existence, availability, and potential use of the records.

Similarly, Ngoepe and Ngulube (2011) carried out a study at the National Archives and Records Services of South Africa (NARS) in which they concluded that there was a need to promote NARS public image and use of archival holdings through robust outreach programmes. Kilasi, Maseko and Abankwah (2011) carried out a comparative study on expectations and behaviours of users in the national archival institutions of Swaziland and Tanzania. An important recommendation from this study was the need for both institutions to market their services aggressively to attract potential users. Murambiwa and Ngulube (2011) carried out a baseline study on the National Archives of Zimbabwe in which they attempted to develop an access index for the institution. Their study established that access can be objectively quantified at the National Archives using parameters such as accessioning and processing volumes, reader figures, finding aids, publications and access carrying capacity.

To reiterate the importance of outreach, Chute (2000) concluded that outreach must be central to what all archivists do, because it can solidify the archives' position within an academic community. Ten Cate (1989) and Freeman (1984b) urged archivists to adopt an action-oriented philosophy when undertaking a public relations programme of any description. A significant finding synonymous with these studies was the need for advocacy to raise the profile of archives. On the other hand, the need to encourage the use of primary sources by users thereby promoting information literacy also formed the basis of this study. Yakel and Torres (2003) (See also Duff and Cherry 2008), proposed a model of researcher expertise and discuss how this model might be incorporated into archival user education to create information literacy for primary sources. Carini (2009) and Nimer and Daines (2012) concurred and stated that archivists need to become educators and teach research methods more akin to information literacy for primary sources.

Methodology

This was case study research that employed the use of archival registration data and a questionnaire to collect quantitative data. This was an archetypal case study that created a category for analysis based on user perceptions of archives by an academic community. The 9th of June of each year is internationally recognised as Archives Day by the International Council on Archives (ICA) and the LTI Archives mounted an exhibition inside the library of its archives and other memorabilia for the whole month of June 2014. During the course of this promotional display, viewers were handed a questionnaire for completion in attempts to assess their general understanding of archives. The number of users recorded in our daily register who visited the stand during this month was 35, and each was a given a questionnaire for completion during their own spare time.

Enclosed in the questionnaire was a poem on religious archives as a token of appreciation for them participating in this exercise and as a form of advertisement In addition, users were also given a link on a live feed about the International. Archives Day for them to click and see the LTI Archives' pictures and other activities happening around the world on the International Council on Archives (ICA) website. An orientation tour of the repository scheduled for Fridays in the month of June failed to materialise due to logistic challenges. Despite this downside, a total of 29 copies of the questionnaire were returned by users which represented a response rate of 83%. This high response rate is attributed to the fact that the researcher had personal contact with the study population and was thus able to explain the purpose, relevance and importance of the study. The breakdown of the study population was as follows:

Research Findings

Characteristics of Respondents

The breakdown of the study population was as follows:

Table 1: Education level of users (N=29)

Education level	Total	%
PhD	4	13.8
Master's degree	3	10.3
Honours degree	4	13.8
Bachelor's degree (General)	3	10.3
Diploma	4	13.7
Higher certificate	5	17.2
Staff	4	13.8
Ministerial	2	6.9

On gender, the study found out that there were more male (65%) than female (35%) participants who participated in the study.

Establishing the Users' Understanding of Archives and Frequently Consulted Publications

Library users at the LTI were generally aware of what archives are, as 18 (62%) of the answers were in the affirmative compared to 11 (32%) who were unaware. The archival materials largely familiar with users were minutes, diocese and church council minutes that are shown in Figure 1, and these were the frequently consulted as well.
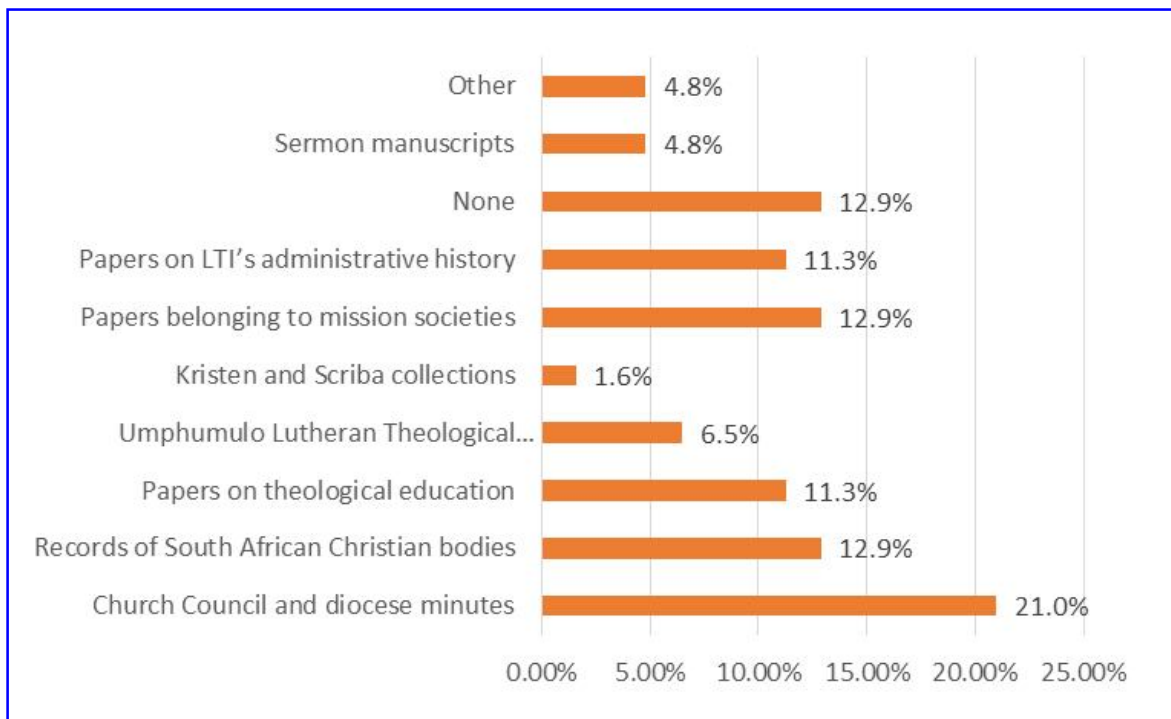

Figure 1: Material Familiar with Users

Users' Awareness of the Constitutional Provisions on the Need for them to Keep Accurate Records in Parishes as Specified by the ELCSA Constitution

Respondents were asked whether they were aware of the constitutional provisions of ELCSA with regards to records keeping requirements. Majority of the respondents, 18 (62%) were aware compared to 11 (32%) who were not.

Determining the Awareness about the Existence of an LTI Archives Brochure in the Library

Publications in the form of brochures provide a medium of communicating with users of the archives. In the LTI library, an archives brochure is filled with library guides at the front desk and users were thus asked whether they were aware of its existence. Majority of the users 17 (59%) were aware of the LTI brochure in the library. The remaining users 12 (41%) were not aware.

Identifying Popular Strategies Recommended by Users that the Library Should Adopt to Raise the Profile of Archives

A host of mechanisms are available in attempts to reach out to the community on the existence of archives. Figure 2 shows that exhibitions (19.2%), Open day on archives (14.4%), guided tours (13.5%) and friends of the archives (10.6%) were some of the popular strategies that users recommended in efforts to raise awareness about archives.
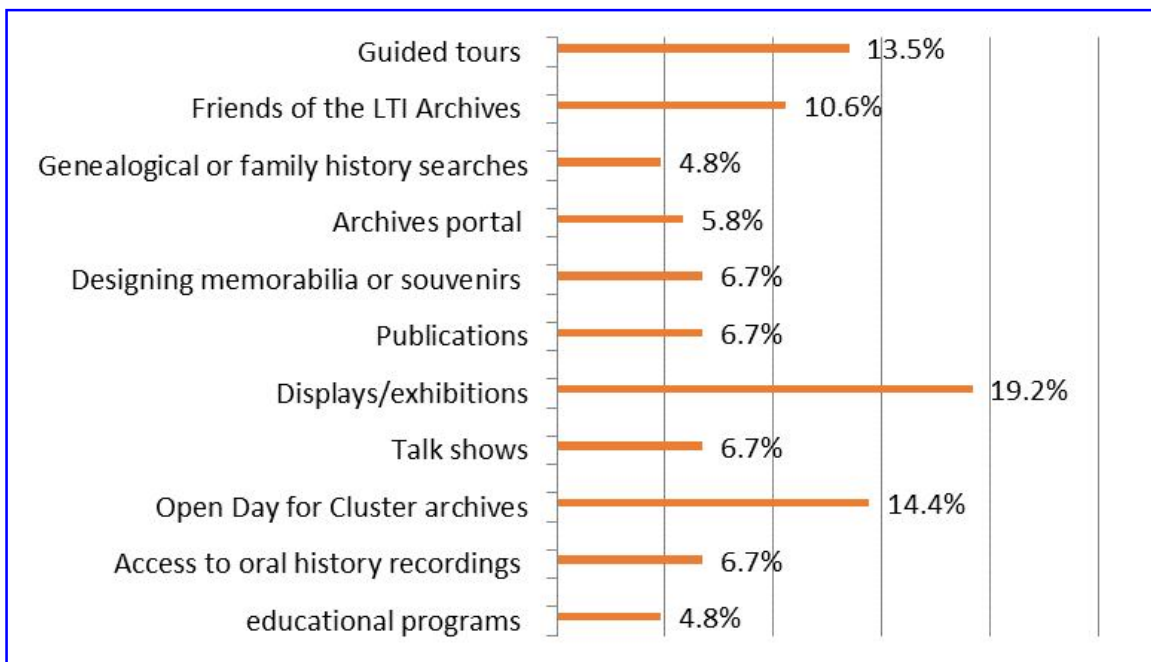

Figure 2: Recommended Advocacy Strategies by Users

Suggestion by Users on Curriculum Improvement

Instructional programmes provide the foundation for users to be made aware of what archives are, to be able use this primary material and also enable them to appreciate the value of archives and their use. From Figure 2 above, it is discernible that 5 (4.8%) of the surveyed population proposed instructional programmes as a method of raising awareness about archives. Such a suggestion is significant in that incorporating a basic archival course in the students' curriculum particularly for the Lutheran history module would go a long way in raising awareness about archives.

Discussion of Results

The need to identify who users were, remains one of the fundamental requirements of the archival profession. Overall, the findings reveal that the environment in which the LTI Archives is functioning is structured for a predominantly academic clientele. The LTI Archives is thus an in-house, private archive with a theological focus whose sole mandate is to keep the institution's corporate history and provide access to this material to its members. Firstly, the findings revealed that there was a general understanding of what archives are and this is evidenced by the use of church and diocese minutes which remain the frequently consulted material. The reason why minutes are popular is because of the currency of information they contain as these are usually up to date with policy issues and decisions concerning the church. User statistics at the LTI Archives and annual reports between the years 2011 and 2014 confirm that minutes are the most consulted of all archival material.

Secondly, the ELCSA constitution (2012), Chapter 2, Section 2.10 stipulates that pastors should keep accurate records and make annual and other reports of activities within their respective parishes available when needed. The study found out that the majority of library users were aware of this provision but more should be done to raise awareness in an effort to promote best practices in records keeping in parishes. Reference is made to church and diocese council minutes, popular with users but the series of minutes is incomplete due to inconsistencies in transferring these minutes from the dioceses to the LTI library. There are so many gaps in the minutes, and users are made to be aware of this, and clarion calls made to the user that when they get back to their dioceses they need to remind those in charge of records to timeously transfer these to the LTI library.

Publications in the form of brochures remain one of the most effective mechanisms of raising the profile of an archive. Roe (1988) noted that archives use publications to provide impetus and information about their resources. The findings revealed that the bulk of users were aware of the LTI brochure in the library because it is easily accessible. A variety of strategies can be employed to raise the profile of an archive. At the LTI Archives, the recommended public programming activities by users were exhibitions, an open day on archives, guided tours and friends of the archives. Exhibitions will always be popular with users because they are eye-catching; and as noted by Pederson (2008), they provide a vehicle for the archives to show off its collections. More importantly, as noted by Bradsher and Ritzenthaler (1988), archival exhibits are mounted to interest, inform, stimulate, entertain and educate viewers.

The downside of exhibitions notwithstanding, the fact that they are naturally short-term is the attendant challenges with regards to the conservation and security of material. It was in this light that Pederson (2008) remarked that while public interest, enthusiasm and contact with original sources is to be encouraged, it should however not be at the peril of records.

Nonetheless, having an open day on archives is significant in that it enables the user to take pride in the collections and identify with the heritage, as this makes the user feel special and have that sense of belonging. Guided tours in archives enable users to be familiar with their archives in terms of their housing and special stewardship needs. Stakeholders' input calls for archivists to be activists in order to endear influential people to the cause of archives and this explains why users recommended the LTI Archives to establish a friends of the archives group.

Conclusion and Recommendations

The study established that library users at the LTI Library were generally aware of what archives are. Frequently consulted materials are minutes which

usually deal with policy and other matters pertaining to the Lutheran church. Users were also generally aware of the ELCSA constitution with regards to the section on the need to maintain best practices in records keeping. The LTI Archives brochure's existence in the library is known to users as it is available at the front desk where users can pick it up. The study also found that users preferred displays, an open day on archives and stakeholders' input as strategies for advocacy. The following recommendations are thus made based on the findings of the study:

- The heavy usage of church council and diocese minutes calls for archivists to prioritise these for digitisation to prevent wear and tear. Digitisation can either be access or preservation oriented or both. Once digitised, the use of surrogates as substitutes will mean that the originals can be safely tucked away in the repository thereby prolonging their usable life span through passive storage. Access can be guaranteed by the provision of digital copies and not photocopies as is at present the case. Ngulube (2002) observed that photocopying in Sub-Saharan Africa is primarily done for user convenience. However, photocopying is not a recommended reformatting strategy because the heat and light that the material is subjected to during the copying process only hastens the chemical degeneration of paper.

- Much needs to be done to raise awareness about good records keeping practices as stipulated by the ELCSA constitution. Records keeping in parishes remains shambolic, and this is confirmed by a study carried out by Garaba (2015) and gaps in minutes housed in the repository evidently points to a lack of a properly structured records management system. LTI lecturers need to streamline their modules to incorporate the archival component particularly for the Lutheran history module and the input of manuscript librarians to help with archival instruction is mandatory. Information literacy of primary sources goes beyond consulting minutes as it is at present the case hence the need for the input of manuscript librarians in archival induction in collaboration with lecturers especially with regards to identifying archival materials related

to course curricula. Pederson (2008) correctly noted that students should have some exposure to the riches of contemporary and original sources as part of their general education and in so doing avoid perpetuating community ignorance about archives.

- Displays remain an integral aspect in showcasing the holdings of an archival repository and the International Archives Day in June every year should help in this endeavour. In view of the fact that there was so much enthusiasm from users generated by the displays in 2014, much needs to be done in this regard to endear the Lutheran community to their archives. Consequently, the rich photographic heritage of the institution's corporate history in digital form should be used to create an interactive exhibit in an effort to raise awareness about archives. Using digital instead of analogue photographic copies as it was the case in 2014, will help in safeguarding their useable lifespan with regards to handling issues. In addition having an open day on archives for the theological cluster as recommended by users will also help in this cause. This open day could be done biennially on a rotational basis by the theological institutions affiliated to the cluster just like the popular Cluster Sports Day which promotes recreational collegiality in true ecumenical spirit.

- Pederson (2008) noted that the purpose of friends group is to rally and focus community support for the archives, and the LTI Archives needs this support for its growth. Some of the areas that this group can look into which urgently need attention at the LTI Archives include:
  - Fundraising for the repository which needs a major facelift;
  - Purchase of specialised equipment; and
  - Sponsorships during exhibits and having a reception after the exhibition to engage with the LTI community and generate that excitement about archives.

- To bring the holdings of the LTI Archives to public attention, guided tours of the repository should be done regularly so that the community recognises the importance of historical

documentation. Curricula need to be streamlined to make it compulsory for LTI diploma and ministerial classes to use primary materials in their courses and tours arranged with manuscript librarians to this effect. Roberts (2014) could not have put it better when he noted that archivists have a unique understanding of their collections and are expert at identifying those records that contain adventure, mystery, intrigue, humour, surprise and the unexpected.

• The study needs to be replicated for the Pietermaritzburg Cluster of Theological Libraries (PCTL) to facilitate better understanding of user perceptions about archives to enable advocacy planning and strategies thereby raising the profile of archives.

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Francis Garaba is Senior Lecturer in the Department of Library & Information Science, University of Fort-Hare, South Africa. He holds a Bachelor of Arts Honours degree in history from the University of Zimbabwe, an MIS degree and a doctorate from the University of KwaZulu-Natal, South Africa. He has worked for the National Archives of Zimbabwe as an archivist and as a Manuscript Librarian at the Lutheran Theological Institute Library, in Pietermaritzburg, South Africa.

SHORT COMMUNICATION

A Comparative Analysis of Library and Information Science Master's Degree Programmes in Uganda and USA

Dianah Twinoburyo Kacunguzi
Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign, USA
kacungu2@illinois.edu

Abstract

In the wake of technological developments, taking a pragmatic approach towards continual library and information science (LIS) curricula revision becomes inevitable. This paper analyses the existing LIS curricula both in the United States of America (USA) and Uganda. Specific focus is on a comparison between the master's programme in library and information science (MLIS) at the Graduate School of Library and Information Science (GSLIS), University of Illinois at Urbana-Champaign (USA) and the master's programme in information science (MIS) at the East African School of Library and Information Science (EASLIS), Makerere University (Uganda). Both programmes are aimed at training librarians and information professionals to meet society developmental needs. This paper does not only focus on an analysis of the courses being taught at GSLIS and EASLIS in USA and Uganda respectively but also proposes a model for effective LIS curriculum revision in Uganda in the changing job market.

Introduction

Today's environment is characterised by information explosion, technological developments, changes in the demand for service delivery by LIS professionals and increasing challenges in LIS education (Okello-Obura and Kigongo Bukenya, 2011; Okojie, 2013; Siddiqui and Walia, 2013). As a result, LIS schools across the globe have to compete in the job market, which calls for training of LIS professionals with a relevant set of competencies (Siddiqui and Walia, 2013). Hence, there is need to improve the existing LIS curricula both in the developed and the developing world in order to maintain the relevance of the LIS profession. A curriculum is considered as a guide to student activities and instructional procedures in realisation of educational objectives (Singh and Shahid, 2010). LIS curricula must be able to guide students towards meeting the requirements of the job market. This can be achieved by reviewing and revising LIS curricula continually.

This paper attempts to evaluate the LIS master's programmes at GSLIS in USA and EASLIS in Uganda respectively with the aim of proposing a model for effective LIS curricula revision for Uganda. The two schools were selected for study because the author has been exposed to both of them academically and thus has good potential of analysing the two programmes. The similarities between the two programmes in terms of the target group further motivated the choice of selection of schools. One of the outstanding schools with distinct LIS curricula is the Graduate School of Library and Information Science (GSLIS), University of Illinois. According to Hu (2013), GSLIS was ranked as the top LIS

School in USA. This is the school selected for discussion in this paper. The East African School of Library and Information Science (formerly the East African School of Librarianship (EASL) was established in 1963 at the then Makerere University College (now Makerere University). EASLIS is the only university offering postgraduate degree programme in LIS. Others offer the programme at the undergraduate level. As the only school that provides postgraduate education, EASLIS is the focal point of this discussion (alongside GSLIS) with particular focus on the master's curriculum. This is a literature-based study drawing from a pool of existing literature by experts in LIS education. The author's experience as a LIS educator at EASLIS as well as a doctoral student at GSLIS serves to inform this study. More still, the websites for the two schools were utilised to obtain factual information about the schools, including information about courses being taught.

A Comparison between the Master of Science in Library and Information Science at GSLIS and Master of Science in Information Science at EASLIS

GSLIS is one of the oldest graduate schools (founded in 1896) in the US, is located at the University of Illinois –Urbana Champaign and is at the forefront of LIS education in the country (GSLIS, 2015). The school's mission is to "lead the way in understanding the use of information in science, culture, society, commerce, and the diverse activities of our daily lives" (GSLIS, 2015). It offers a number of degree programmes including a PhD in Library and Information Science; Master of Science in Library and Information Science; Master of Science in Bioinformatics; Certificate of Advanced Study in Library and Information Science; Certificate of Advanced Study in Digital Libraries; Master of Science in Library and Information Science for media specialists in K-12 schools; and other degree specialisations (GSLIS, 2015). In addition to these programmes, GSLIS proposed the establishment of a Master of Science in Information Management following a proposed name change of the school to

'the School of Information Sciences' (GSLIS, 2015).

The master's programme at GSLIS dates back to 1926 (GSLIS, 2015) whereas the one at EASLIS started in 1997 (Makerere University, 2010). Interestingly, the programme at GSLIS is under continual revision where the curriculum review committee convenes every semester to review the programme whereas at EASLIS, the programme has only been revised twice since its inception and was to be revised for the third time in 2015. EASLIS could adopt continual review of its curricula as a best practice from GSLIS in order to maintain relevance of the programme in the current competitive professional environment.

The MLIS at GSLIS is offered on campus through face-to-face lectures or through an online option called Leep Online Learning (GSLIS, 2015), whereas the MIS at EASLIS is only offered as a full time day and evening on campus programme (EASLIS, 2015).

In terms of duration, the programme at GSLIS requires 40 hours of coursework (GSLIS, 2015) whereas the one at EASLIS has both Plan A and Plan B students of which plan A students are required to complete 60 credit hours of coursework and a dissertation that carries 10 credit hours while Plan B students are required to complete 60 coursework hours and a project worth 10 credit units (EASLIS, 2015). This means that the programme, at GSLIS can be completed in a shorter period of time than the one at EASLIS, thus giving the students a quick way to get into the job market with a good blend of skills and knowledge or to even pursue further studies at doctoral level.

The MLIS programme at GSLIS has only two core courses covered over two semesters (GSLIS, 2015) while the MIS at EASLIS has twelve core courses, five of which are done in the first semester, five in the second semester, and two in the third semester.

Tables 1 and 2 explicitly reveal that EASLIS offers way too many core courses compared to GSLIS. This implies that students at EASLIS are limited in terms of specialisation within the first two semesters and are simply mandated to pursue areas that may be of less interest to them.

In terms of elective courses, GSLIS offers over 40 courses found in a course catalogue, which students can pursue from the very first semester

(GSLIS, 2015). Alternatively, students at GSLIS can customise their studies to suit different areas of specialisations with suggested core and elective courses, along with details of experimental learning projects, professional associations as well as sample job titles (GSLIS, 2015). The table below shows professional areas of specialisation at GSLIS.

Table 1: Core Courses for MS. in LIS at GSLIS

Code	Core courses	Semester and credit hours
LIS 501	Information Organisation and Access	1st Sem (4 hrs)
LIS 502	Libraries, Information and Society	2nd Sem (2 or 4 hrs)

Table 2: Core courses for MSc. Info. Science at EASLIS

Code	Core courses1st Sem	Semester and credit hours
MSC7105	Information Gender and Society	1st Sem (3 hrs)
MSC7106	Knowledge Organisation and Management	1st Sem (3 hrs)
MSC7107	Information Technology for Library and Information services	1st Sem (3 hrs)
MSC7108	Information Systems Analysis	1st Sem (3 hrs)
MSC7109	Information Sources and services	1st Sem (3 hrs)
MSC7204	Management of Information Systems and Services	2nd Sem (3 hrs)
MSC7205	Information Systems Development and Applications	2nd Sem (3 hrs)
MSC7206	Technical and Scholarly Communication	2nd Sem (3 hrs)
MSC7207	Information Legislation and Policy	2nd Sem (3 hrs)
MSC7208	Info-Entrepreneurship	2nd Sem (3 hrs)
MSC7101	Research methods	3rdSem (3 hrs)
MSC8104	Bibliometrics	3rdSem (3 hrs)

At EASLIS, the master's programme provides for only 8 elective courses under four areas of specialisation from which students can choose only one elective course in the third semester (EASLIS, 2015) as seen in Tables 3 and 4. From the elective courses shown in Table 3, there is an implication that GSLIS students are able to tailor their study areas to meet their professional goals in terms of areas of specialisation, which is very different from EASLIS where students are limited to one area of specialisation and only in the third semester. This derails achievement of students' professional targets and goals and limits their creativity in the areas they may be most passionate about.

Table 3: Professional Areas of Specialisation at GSLIS

Area of Specialisation	No. of Core Courses	No. of Elective Courses	Experimental Projects
Research and Analysis: Business Research, Competitive Intelligence, Knowledge Management and Prospect Research	4	17	3
Archival Information Services	3	10	6
Data Management and Curation	3	14	6
Research and Information services	5	41	4
Information Organisation and Management	5	18	6
Digital Libraries and Asset Management	5	14	5

Table 4: Elective Courses for MSc. Info. Science at EASLIS

Area of Specialisation	Course Name	Credit Hours
Information Organisation	– Information Storage and Retrieval – Knowledge Organisation – Classification and Cataloguing	3 3
Records Management	– Record Management – Conservation and Preservation	3 3
Publishing and Printing Science	– Publishing Management and editing – Multimedia production	3 3
Information and the Community	– Social Informatics – Indigenous Knowledge Management Systems	3 3

Furthermore, the programme at GSLIS includes specific library subjects as well as a wide variety of IT related courses whereas the programme at EASLIS has less IT courses. With the profusion of information technologies in the professional environment, the EASLIS curriculum leaves a lot to be desired in terms of equipping its students with the required skills to operate and manage IT initiatives or projects in the job market. Introduction of courses such as Digital Archiving, Digital Preservation, Community Informatics, Digital Libraries, Information Modeling, E-Resources Management, Design Information Interfaces, Digital Media Ethics, Health Informatics, and Web Technology Techniques would be relevant for students at EASLIS in the era of digital technologies in the 21st Century.

In addition, widening the selection base of elective courses at EASLIS to include non-IT courses such as Project Management for LIS–Memory Media and Institutions, Administration and Use of Archival Materials, Community Archives, and Information Learning Spaces and Pedagogies, Management of Libraries and Information Centres, Literacy, Reading and Readers, Youth Services Community Engagement, and Business Information, would enable EASLIS students to a wider variety to choose from to suit their professional interests.

Despite the disparities in curriculum design in the two schools, GSLIS and EASLIS programmes have some courses in common such as Information Organisation, Information Storage and Retrieval, IT for LIS, Systems Analysis, Research Methods, Information Policy, Records and Information Management, and Conservation and Preservation. This shows that both schools are concerned with important aspects of managing information and promoting research. Both programmes require a research output as the final product where for GSLIS, students are required to write a thesis while EASLIS requires a dissertation.

Limitations of the Master of Science in Information Science Curriculum at EASLIS

There is a wide chasm between the two programmes in question due to the limitations inherent in delivery of MIS curriculum at EASLIS. These limitations include the following:

- *Lack of LIS curriculum specialists consultants*: According to Kigongo-Bukenya and Musoke (2011), Uganda has only one LIS curriculum consultant meaning that curriculum development and review work have been done on freelance experience. This is a problem for EASLIS because any revision done in the absence of such specialists may result in an unbalanced curriculum.

- *Infrequent revision of the curriculum*: EASLIS has revised its MSc. curriculum only twice since 1997 which is a reflection of inadequacy in responding to the changing professional environment. This affects the quality of LIS graduates who are often ill – prepared for the job market. A study carried out by Lutwama and Kigongo-Bukenya (2004) reveals that 55% of LIS professionals in the job market were dissatisfied with EASLIS curriculum and called for its revision in light of the emerging information needs.

- *Limited knowledge of the job market*: Only one study has been carried out by Kigongo Bukenya and Lutwama in 2004 to trace EASLIS alumni 1995-1999 and establish the relevance of their knowledge and skills in the job market (Kigongo-Bukenya and Musoke, 2011). This means that the two times the master's curriculum has been revised at EASLIS, it was done with limited knowledge of the job market, thus missing out on invaluable changes to the curriculum.

- *Less involvement by professional associations*: According to Ocholla, Dorner and Britz (2013), there is less involvement of professional associations in LIS education in Africa and other developing regions largely due to lack of a legislative mandate. This can be said for Uganda where the Uganda Library and Information Association has interest in LIS curricula (Rugambwa, 2008) but has not been proactive in the revision of the LIS curricula which probably explains why the MIS has not been revised frequently.

- *Inadequate IT facilities/old technologies*: Okello-Obura and Kigongo (2011) observe that most LIS schools in Uganda are limited in terms of IT infrastructure. The same can be said for EASLIS and thus, affects delivery of the MIS curriculum. However, this problem may be overcome by sharing IT facilities available at the College of Computing and Information Sciences, Makerere University.

Proposed Model for Effective LIS Curricula Revision in Uganda

No doubt, highlighting the limitations of the MIS curriculum at EASLIS as seen above is essential for proposing a model for effective LIS curricula revamping in Uganda. There are several models and theories that have been related to LIS curriculum. Kigongo-Bukenya as cited in Kigongo-Bukenya and Musoke (2011) highlights three theories related to LIS curriculum including the Ecology Theory. These theories all emphasise working towards effectively responding to the changing environment. This is what is required for the LIS curricula in Uganda and thus a proposed model for effective LIS curricula revision in Uganda as seen in figure 1.
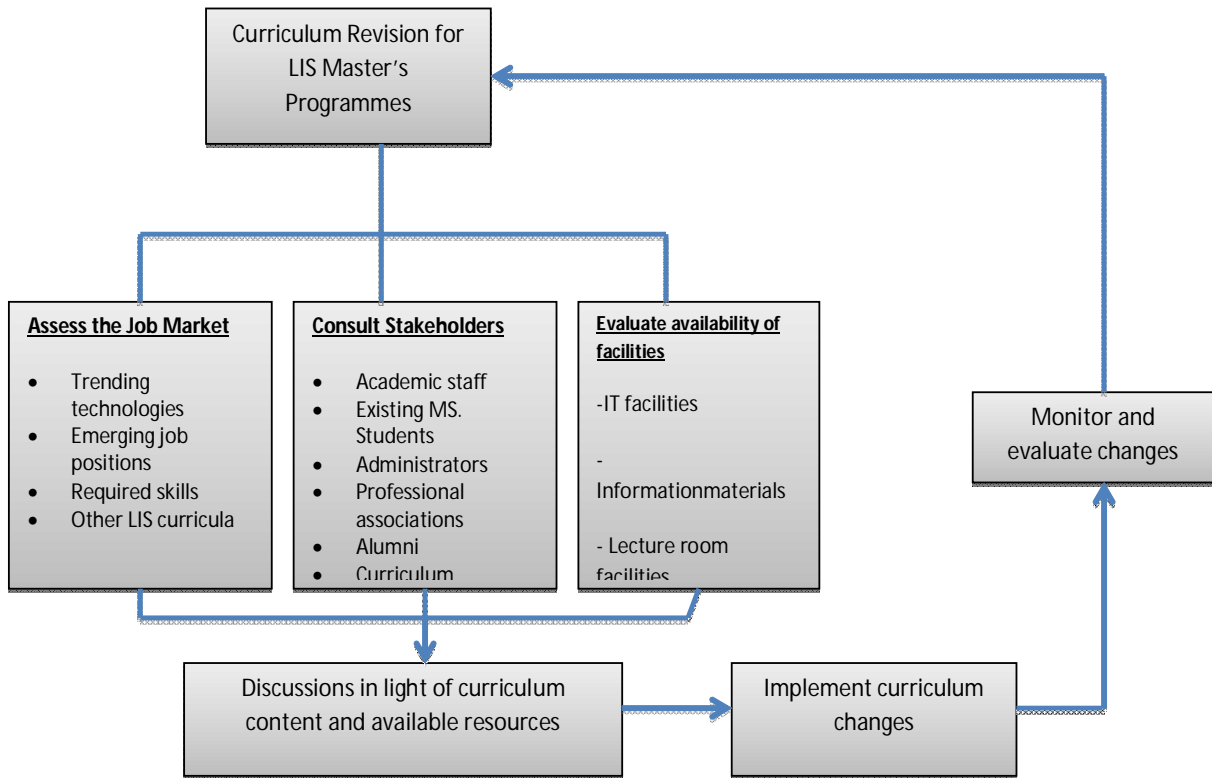
Figure 1: Proposed Model for Effective LIS Curricula Revision in Uganda

This model is based on three key facets that LIS schools in Uganda such as EASLIS should put into consideration when revising the LIS curricula. One of the key considerations is the job market. Knowing the job market in terms of the trending technologies is important in order to balance the technology focus when revising the curriculum. Wallace (2002) notes that knowledge of the job market is important in directing course content in the era of rapid technological developments. Other key issues to consider in the job market are emerging job titles/ positions, required skills in LIS jobs, and analysis of other LIS curricula. If revision of LIS curriculum is done without knowledge of the job market, it may exacerbate the existing situation and further create incoherence with the requirements of the changing LIS profession.

The second key facet in the model is consultation with stakeholders who should include academic staff, existing students, alumni, concerned administrators, professional associations, and curriculum consultants through workshops and meetings. Noll and Wilkins (2002) observe that such

consultations are critical for curriculum development in the changing field of information systems. Without consulting key stakeholders, the resulting curricula may not reflect the professional goals of its target groups.

Third of the key facets is evaluating availability of facilities. It is important to consider availability of IT facilities, LIS information materials and lecture room facilities. LIS schools in Uganda where the lack of such facilities is ubiquitous may have to get necessary funding to solve this problem before revising the LIS curricula. Where such facilities are adequate, revision of the curricula should be done in line with the available facilities. For example, when introducing new technology courses, there should be enough software and hardware equipment to support teaching and learning.

The model described above should be followed with discussions in light of the curriculum three key facets content and available resources. Such discussions should be held by a selected curriculum committee that involves a LIS consultant/specialist and should focus on the courses to include the courses

to phase out or even the courses that require modification plus detailed the course content. After such discussions, changes can be implemented in the curriculum and communicated to the stakeholders. It is important to monitor and evaluate the changes to establish if revised curriculum meets its intended purpose. On the whole, LIS curricula in Uganda should be reviewed on a continual basis

Conclusion

LIS education has unceasingly changed face both in the developed and the developing countries. However, there is a widening chasm between the LIS curricula in developed and developing countries particularly as established in this paper between MLIS at GSLIS (USA) and the MIS at EASLIS (Uganda). Without meaningful restructuring of the MIS at EASLIS, a big gap will remain between the graduate students in USA and the postgraduate students in Uganda. Therefore, fundamental changes should be made to the curriculum at EASLIS to incorporate important modules meant to prepare LIS professionals for higher positions, enable them compete favourably with graduates from other parts of the world, and to meet the changing needs of the professional environment. However, change should not necessarily mean introducing only IT courses in the programme but rather take a holistic approach of revising the curriculum to include all courses that will keep the curriculum at the cutting edge in the LIS profession in the new age. It is thus important to realise that LIS curricula cannot be delivered as a single 'package' but rather require continual and constant revision to keep up with the changing times. This revision can be achieved by taking reformative and constructive steps such as those described in the proposed model in this paper in order to rectify and improve the existing LIS curricula in Uganda.

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DianahTwinoburyo Kacunguzi is currently a Ph.D. student at the Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign, USA and a faculty member at the East African School of Library and Information Science, Makerere University, Kampala-Uganda. She received her Master of Science in Information Technology for Libraries from the University of Pretoria, South Africa and Bachelor of Library and Information Science from Makerere University, Uganda.