Editorial

This issue covers articles on a variety of topical issues. The issue focuses on the three strands of the broad field of Library and Information Science. The lead article, by Chiware and Becker, discusses research data management, which is a new phenomenon that has attracted several LIS scholars. The authors conducted a readiness survey of university and research libraries in Southern Africa in providing research data management services in their institutions, through an investigation of existing and planned services. This article is followed by the report of an investigation on the research collaboration landscape of the University of Ibadan biomedical authors between 2006 and 2015 carried out by Asubiaro. Chipeta and Chawinga's paper traces the library and information science graduates of Mzuzu University, Malawi, in order to ascertain the LIS graduates' career path, to find out the relevance of their educational attainment to their present careers, and to examine their pereptions about the LIS curriculum. The paper by Khumalo and Masuku examined the self-worth of Records and Archives Management students at the National University of Science and Technology (NUST), Bulawayo, Zimbabwe. The authors noted low confidence level among the students.

The paper by Osadebe, Babarinde, Ekere and Dike explored the competencies possessed and required by primary school teacher librarians in Enugu State of Nigeria for improved library services. Among others, the study found that the personnel factor was crucial in effective library services. Nyanga, Nengomasha and Beukes-Amiss sought to investigate whether the National Archives and National Library of Namibia (NANLN) had put into consideration issues of prevention, preparedness, response and recovery in their Disaster Management Plan (The Plan). The main finding is that the Plan lacked most of the major components that make an ideal disaster preparedness plan. Echezona and Chigbu surveyed the user expectations and innovative strategies for improved patronage in university libraries in Nigeria. The authors concluded that libraries should join the global race for digital access, to remain relevant. Mwantimwa investigated the use of mobile phones in boosting socioeconomic information access and utilisation among Tanzania rural communities. This is issue, is concluded by an article on the impact of scientific productivity and trend in publications of Nigerian authors in Web of Science from 2006 to 2016. The author, Eniayejuni, found that publication output continued to increase moderately with a mixed growth pattern and that most institutions recorded an irregular rise and fall in their publication output.

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AIMS AND SCOPE

African Journal of Library, Archives and Information Science is established mainly to provide a forum for librarians, archivists, documentalists, information scientists and other information related professionals in Africa to report their research findings but with emphasis on African setting. The Journal is refereed by distinguished scholars. Emphasis is on empirical research; however, manuscripts of high quality on theoretical aspects of the three information related disciplines will be considered for publication.

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To provide on a regular and sustainable basis an excellent scholarly journal for reporting empirical research findings in the information profession in Africa

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To be the main resource base for library, archives and information science research in Africa

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Mazikana, P.C. (1987). Archives and Oral history: Overwhelming lack of Resources. *Information Development,* 3 (1), 13-16.

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Aboyade B.O (1989). *The Provision of Information for Rural Development*. Ibadan: Fountain Publications, 104p.

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Alemna A. A. (1995) Agricultural Information Services in West Africa. In: Aina, L.O., Kaniki, A.M. and Ojiambo, J.B. (Eds.) *Agricultural Information in Africa*. Ibadan: Third World Information Services, pp.67- 82.

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Research Data Management Services in Southern Africa: A Readiness Survey of Academic and Research Libraries

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Abstract

The paper reports on a study on the readiness of university and research libraries in Southern Africa to provide research data management services in their institutions. The aim of the study was to determine how ready university and research libraries are in leading and participating in research data management services. The study also determined the readiness of libraries to engage in stakeholder collaborative programmes to provide institution-wide services and systems for research data management. Various aspects relating to research data management services readiness that were included in the study are: data support services, archiving, organisational structures, staffing and training, funding, outreach and partnerships, and challenges and opportunities of research data management service provision. A questionnaire was distributed to fifty-nine university librarians and library directors in university and research libraries in eight southern Africa countries of Botswana, Lesotho, Malawi, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe. The results show that research data management services are still in their early stages of development with various countries and institutions at different levels of readiness for service provision and with some countries and institutions not yet ready to implement any type of services. A small number of institutions have policies in place or are planning to implement some in the near future. Existing institutional repositories are also seen as a possible extension of data management services. Recruitment of specialised personnel to manage data management projects is taking place in some institutions, and many are providing skills to existing library staff for the new services. It is recommended that there is a need to advocate for awareness of research data management within institutions with academic and research libraries taking a leading role in spearheading data management and providing training and the technical support needed to store and retrieve research output and data sets.

Keywords: Academic libraries, Research data management, Research libraries, Southern Africa.

Introduction

The growth and development of collaborative research and advanced Internet services are key drivers in the introduction of new research data management (RDM) services in university and research institutions across the world (Tenopir et al., 2012; Cox and Verbaan, 2016; Tenopir et al., 2017). The growth is also being driven by National Open Science and Open Data initiatives which advocate for research and data sharing to be more open (Borglund and Engvail, 2014; McKiernan et al 2016). The developments are evidenced by emerging institutional research data policies, setting up of RDM infrastructures, re-training of librarians to support researchers with data deposits and preservation, and mandates from funding agencies requiring elaborate

data planning and the storage and preservation of RDM in credible institutional repositories by funded researchers (Chiware and Mathe, 2015). Since the introduction of institutional repositories in Southern Africa, some academic and research libraries have provided some degree of support services for research data access and reuse. Over the last few years, many have found that they needed to extend and unify services around more aspects of data acquisition, management, dissemination, and preservation. The steady growth of eScience, Open Access and Open Data – digitally mediated research with large data sets and networked collaborative use are reasons why researchers look to their libraries for help with organising, sharing, and archiving data. It is therefore important to investigate the readiness of these institutions in providing RDM services.

Academic and research libraries are part of the collaborative efforts and at times are taking the lead in driving new RDM services. The role of academic libraries in RDM services is being documented in the literature (Pinfield et al., 2014; Chiware and Mathe, 2015; Der, 2016; Tenopir et al 2012; Cox and Verbaan, 2016; Tenopir et al 2017; Latham, 2017) as that of involvement in broader institutional and at times national RDM initiatives. The roles that academic libraries are playing in RDM services include those of assisting researchers with data management planning (DMP) tools and data storage and preservation. These roles are also seen as an extension of the existing research support and scholarly communication services of storing, curating, and disseminating knowledge. In RDM services, this extension involves engagement (Cox and Verbaan, 2016) with researchers in offering services through accompanying and assisting researchers in the entire research life cycle. This includes: assistance with the conception of a research topic, data management planning (i.e. an outline of how data will be collected, analysed, stored and preserved), data collection, data analysis, data storage and data preservation for long-term use and sharing in and across disciplines and data publishing.

As RDM services begin to mature in various environments, so are the roles of academic and research libraries and the skills sets of librarians changing as they seek to broaden their knowledge base to enable them to assist researchers in this new service area. Besides documenting the emerging role of academic libraries, studies have also been carried out on the readiness of university entities, especially academic libraries, to offer the range of RDM services (Henty and Kingsley, 2007; Stewart and Crossley, 2013; Der, 2015; Cox et al., 2017; Tenopir et al., 2017). Stewart and Crossley (2013) recommend that before libraries embark on RDM services they should assess their RDM maturity using models based on "identifying with one of a range of statements relating to six different outcomes of or aspects of RDM." These include:

- Libraries and institutional approach to RDM;
- Knowledge about research funder policies;
- Knowledge relating to data management and curation;
- Training support and guidance for researchers;
- Advocating and advising on the use of metadata; and
- Institutional repositories for data.

The Southern Africa region can be viewed as a unique region on the African continent, one with some of the best performing economies, above average African GDPs, lower levels of unemployment, high literacy rates and well-established tertiary education institutions as well as leading research centres. The region as covered in this paper includes Botswana, Lesotho, Malawi, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. Some of the universities in the region, though limited, have made inroads in developing RDM services (Chiware and Mathe, 2015) supported in some cases through national, regional or international initiatives. In order to understand the level of readiness in academic and research libraries in Southern Africa for implementing or preparing for RDM services, this paper reports on a study conducted in academic and research libraries in the region.

Problem Statement

The adoption and recognition of open research practices has been growing (McKiernan et al., 2016) with support from funders, publishers, scientists and other stakeholders in research (Molloy, 2011). At the forefront are the open access, open science and open data movements which are also encouraging

academic and research libraries to join in calls for supporting the management of research data in higher education and research institutions. Borglund and Engvail (2014) describe the concept of open data as that "which should make public information available for others to use". Open access advocates for "free scientific output, mainly generated with public funds, from the economic barriers and copyright restrictions that prevent it from being freely accessible" (Serrrano-Vicente, Melero and Abadal, 2016). Open science is then the over-encompassing movement to make scientific research more collaborative, make data more open and dissemination accessible to all levels of scientific engagement (Penev, 2017).

Progress is being made with the emergence of RDM institutional policies, institutional RDM working groups (Chiware and Mathe, 2015), institutional data centres, the development of advisory eResearch services and the growth and development of disciplinary based Web open data deposit platforms. The role of libraries in RDM services is seen as a natural extension of knowledge storage, curation and dissemination. In RDM services, the academic library's role is seen as collaborative with other institutional players such as research and innovation directorates and Information Technology, and technology transfer departments as RDM services require broader institutional approaches to make them successful (Cox and Verbaan, 2016).

The introduction of research data management services in some Southern African academic and research libraries is being driven by both new institutional requirements on better management of research data across disciplines and through national mandates requiring research data generated from publicly funded projects to be more accessible. This survey sought to answer the question: "What are the levels of readiness of academic and research libraries in the development and the delivery of RDM services?" The question is promoted by a number of factors including the philosophy of the Open Science, Open Access, and Open Data movements, institutional realisations of better management of research data and mandates and requirements arising from publicly funding agencies to make research data and other research outputs more accessible and preserved for long-term use. The question is also prompted by the changing nature of scientific research into more collaborative multi-disciplinary, multi-institutional and international projects. The study will provide a better understanding of existing gaps and identify areas that require further development and funding to enable RDM service provision.

The research problem was addressed through further questions relating to the following issues:

- RDM policy environments
- Data support services and data archiving practices
- RDM organisational structures, staffing and training programmes
- The level of funding for RDM, types of outreach and partnerships programmes for data management
- The perceptions of librarians and the lead roles libraries play in research data management service provision.

By posing the above questions, the survey's ultimate goal was to document the existing practices as well as the planning for RDM and furthermore reach conclusions on the level readiness for RDM services as well as recommend best practices suitable for the university and research libraries.

Literature Review

The literature review covers studies and reports on roles of academic and research libraries in RDM services, the drivers of RDM services in university libraries, the overall readiness of university libraries, skills and training needs of librarians, perceptions of librarians on challenges and opportunities of RDM services, as well as the state of RDM services in academic and research libraries in southern Africa..

The role of libraries in RDM services continues to be the subject of studies covering a range of activities that libraries are involved in (Tenopir et al., 2012; Tenopir et al., 2014; Pinfield et al., 2014Cox, et al., 2017). Data management is seen as a natural extension of the existing library data curation support services to research (Latham, 2017). Studies on the roles of academic libraries in RDM have sought to establish issues related to institutional policy frameworks, technology infrastructures and the role of support offices (Tenopir et al., 2012; Tenopir et al., 2014; Pinfield et al., 2014). The findings from the

studies show different levels of RDM service development in various institutions, countries and regions across the world (Pinfield et al., 2014; Chiware and Mathe, 2015; Der, 2016; Tenopir et al., 2012; Cox and Verbaan, 2016; Tenopir et al., 2017; Latham, 2017). The conclusions also show that efforts are being made to better manage research data, develop the right IT infrastructure and re-train of personnel in research, IT and library clusters so that they are all better prepared to meet the new demands. Cox and Pinfield (2013) point out that the steady flow of studies in RDM services globally "has a practical value of helping librarians, other professional services and policymakers benchmark the development of library services, nationally and internationally". Latham (2017) also indicates that RDM has been attracting a lot of attention in the literature, especially in the last year, because of the growing interest in academic and research libraries to introduce services.

The state of preparedness in terms of RDM services explores issues related to institutional policies, infrastructures, skilled personnel, national mandates, and institutional collaborations between different support services. Cox et al. (2017:2) report on an international study of RDM activities, services and capabilities in higher education libraries in Australia, Canada, Germany, Ireland, the Netherlands, New Zealand and the UK. The results of the survey indicate that "libraries have provided leadership in RDM, particularly in advocacy and policy development". The study also shows that service development is still limited, and services are focused more on advisory and consultancy services such as data management planning and data related training. The Cox et al. (2017) report also shows that there is a lack of skills and other challenges including limited resources, absence of collaboration with other support services and getting acceptance from researchers and university management. A similar study by Tenopir et al. (2017) on research data in European academic libraries also shows that library directors agree to the introduction of RDM services. However, libraries are planning or offering consultative services rather than technical research data services. Henty and Kingsley (2007) in an earlier study indicate the views of institutional leadership in Australia as that of getting the appropriate research data management policies in place at both national and institutional levels, having need to consider financial and economic implications, and working on the still developing technological infrastructures, skills development and the potential to consider institutional repositories as a natural extension for datasets. Furthermore, Henty and Kingsley (2007) conclude that despite increased interest on a governmental and institutional level in the management of research data arising from eResearch, there is a large void between current practice and what needs to be established and maintained. These reports and studies show the limitations in academic and research libraries' capabilities to implement full scale RDM services. In order to introduce and implement sustainable RDM services there is need for collaboration among university support services with clear separation of roles between research offices, libraries and IT. Librarians' perceptions of RDM services are that these services are still developing and limited to data management planning, reference and consultancy services, and with no technical support in place. Tenopir et al. (2014) point out that librarians feel that they have the subject knowledge to work with RDM services but still require more education in the field.

In Southern Africa, some studies and position papers on Research Data Management and Open Science/Open Data have been conducted, and these include: Chigwada at al. (2017), Chiware and Mathe (2016), Kahn et al. (2014) and Molutsi et al. (2016). The paper by Chigwada et al. (2017) on RDM in research institutions in Zimbabwe shows that researchers have largely been left to do their own data management without centrally provided services, and that there is a lack of institutional guidelines, inadequate human resources, technological obsolescence, insecure infrastructure and a disparity in language between researchers and librarians, absence of data management policies and the lack of funding for RDM services.

Chiware and Mathe (2016) provide a different perspective through a narrative of experiences of a South African university in implementing RDM services and highlight the key role of the university library in the process. In an earlier paper, Kahn et al. (2014) also explore the position of South Africa in relation to RDM services and conclude that while awareness of RDM is good among librarians, the areas requiring most attention were policy and skills development, as well as provision of resources. The paper also highlights the need for a consolidated national response in RDM service development.

Koopman and de Jager (2016) on South Africa observe that while some researchers are already engaged in digital archiving in repositories, neither the researchers nor their universities had implemented systematic research data management.

In Botswana, Molutsi et al. (2016) provide a position paper that promotes Open Data/Open Science approaches in Botswana in the light of the unlimited use and restrictive access to data due to cultural and technical reasons. It is also important to note that South Africa, at national level, has made significant plans in developing a national infrastructure through the Data Intensive Research in South Africa (DIRISA) to enable universities and research institutions to access facilities for data intensive projects. To date, two tenders on a Research Data Intensive Project (a regional data node) and a National eScience Postgraduate Teaching and Training Platform (NEPTT) have been awarded to two university consortiums. The Data Intensive Project which was awarded to universities in the Western Cape region (and includes the University of Cape Town, Cape Peninsula University of Technology, University of the Western Cape and Stellenbosch University, Sol Plaatjie University and Square Kilometre Array (SKA)) is expected to provide data intensive research management facilities and support. The NEPTT project which was awarded to universities in the northern parts of South Africa will play an important role in the training of scientists and other support staff working on the national shared data facilities.

Methodology

The overall objectives of this study were to assess the readiness of academic and research libraries for providing data management services in the southern African region (Botswana, Lesotho, Malawi, Namibia, South Africa, Swaziland, Zambia and Zimbabwe). The study also explored the policy environment, data archiving practices, organisational structures of research data management services, staffing levels and the types of staff development in place, as well as the level of funding for RDM services. It also explored challenges, opportunities and academic and research librarians' perceptions of their future role in RDM services in the region. The study was based on a questionnaire survey distributed to university and research libraries in the region. The study's research tool used was an adaptation from the Association of Research Libraries (ARL) – Research Data Management Services – SPEC KIT 334 by Fearon et al. (2013). The tool was found to be appropriate as it had been used in similar studies in the United States of America and some European countries. The adapted survey questionnaire was distributed using the web-based Inqwise survey tool which enables the users to create, deploy, and analyse surveys. The questionnaire's URL link was sent out through emails to 57 academic and research libraries' directors, library IT managers and library research support managers in Botswana, Lesotho, Malawi, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. The tool provided a summary of responses to each question (in both numbers and percentages) and listed all comments. The data and the comments extracted from the Inqwise tool were used for the analysis presented in the paper. Table 1 shows the distribution of the questionnaire to eight countries and fifty seven academic and research libraries in the region.

Table 1: Distribution of Questionnaire to Countries and Institutions

Country	University Libraries	Research Libraries
Botswana	2	1
Lesotho	1	0
Malawi	3	0
Namibia	3	0
Swaziland	1	0
Zambia	3	0
South Africa	23	6
Zimbabwe	12	2
Total	**48**	**9**

Results

The questionnaire was sent to a total of 57 academic and research libraries in the region and 30 responses were received of which 20 were fully completed and 10 were partially. Table 2 shows the countries and the number of institutions that responded. There were

no responses from Lesotho, Malawi, Namibia, Swaziland and Zambia.

Table 2: Distribution of Responding Institutions

Country Libraries	University Libraries	Research
Botswana	2	1
Lesotho	0	0
Malawi	0	0
Namibia	2	0
Swaziland	0	0
Zambia	0	0
South Africa	10	3
Zimbabwe	2	0
Total	**16**	**4**

Policy Environment

The development of RDM policies is an important building block in the delivery of services as they help in ensuring conformity among researchers, as well as the provision of standardised services by service providers such as libraries and IT services. The survey results show that 6 (19%) indicated their institutions had a policy in place, 13 (42%) were planning to develop a policy within the coming one to three years, 11 (35%) had no policies, and 1 (3%) was not aware of the existence of any RDM policies.

Participation in Related Activities

The survey also sought to establish how many of the responding libraries had participated in national e-Science, eResearch, Data Science, Data Management activities. The results show that 13 institutions indicated to have participated in eResearch activities, and 12 in data management activities, two participated in Data Science and ONE IN eScience activities as shown in Table 3.

Table 3: Participation in National eScience, eResearch, and Data Science and Data Management Activities

National eScience, eResearch, Data Science and Data Management Activities	Percentage	Count
eScience	3%	1
eResearch (e.g. DIRISA, EIFL, RDM sponsored activities, UN activities etc.)	48%	13
Data Science	7%	2
Data Management	41%	12

Data Support Services

The survey described RDM to participants as "support of the management and curation of research data throughout its life cycle. It includes services such as: data management plan consulting, data documentation/metadata, data organisation, data security and backup, data citation, funder requirements, ethical and legal issues, preserving digital data and sharing data and archiving data. For this survey, services are for research data, not institutional data such as departmental records keeping. It can include data in all disciplines such as sciences, social sciences, and humanities". Table 4 shows the type of RDM service offered or planned, including whether training was offered and the period of time the services had been offered. The responses show that 20 institutions indicated that services were either being planned or had been offered for more than three years. Among the responding institutions, 31 offered many more reference services in various areas such as institutional repositories, locating and using data sources, and copyright and patent advice, than training services (14) in locating and using data sources, general statistical software support and data analysis.

Table 4: Research Data Management Services Provided

Type of RDM service	No of Institutions offering services	Reference Services offered	Training Services offered	Service offered 1-3 years	Service offered 3+ years	Service Planned
Providing an Institutional repository	19	2	0	5	19	1
Locating and using data sources	8	6	3	0	8	8
GIS and geospatial analysis support	3	4	1	0	3	8
Data set purchase, acquisition, subscriptions	5	2	1	1	5	10
Copyright and patent advising	5	6	1	0	5	10
General statistical software support	10	3	3	1	10	4
Data visualisation support	3	1	1	1	3	11
Data analysis support	6	0	2	1	6	10
Data mining	3	2	0	1	3	12
Database design and management	5	3	1	1	5	6
Other data support services (e.g. Data Management Planning, Data Publishing)	8	2	1	1	0	9

In addition to these services, institutions also provided additional comments on related RDM services, and these included the following:

- Support with Data Management Plans (DMPs) including training support for researchers and data literacy
- Reskilling librarians to enable them to provide proper data management advice to researchers
- Reference to the utilisation of facilities such as High Performance Computing Centres provided by government ministries or built as a collaborative effort among universities (especially in South Africa and Zimbabwe)
- Provision of dedicated Web page information regarding different RDM services
- Research data awareness seminars and workshops
- Advice on where to archive various disciplinary research data in Web-based open platforms.
- Advice on data preservation.

In response to the question on research data management (RDM) services offered, 76% (19) of respondents indicated that they planned to offer services, while 12% that indicated that they already offered the services and 12% had no plans to do so. The survey also established that two institutions initiated RDM services in 2011 and one in 2012. Most institutions had recently introduced these services with four institutions having done so in 2015 and 2016 and one in 2014.

The respondents were required to respond to why they had initiated RDM services in their libraries. The main reasons provided for the implementation of RDM services were to assist researchers requesting for help with data management, data sharing or preservation 14 (93%), and in support of an institutional initiative to support research data services 12 (86%). However, the reason for the implementation of RDM services was the library initiative to expand support to faculty research, nine (38%). The least important reason was to assist researchers requesting help with data management, data sharing or preservation 11 (76%).

The survey also sought to establish if libraries had online resource related to Data Management Plans (DMPs) for any research grants funding agency or provide links to a DMP tool. The responses indicated that while four (17%) of libraries had Data Management Plans services, 15 (61%) indicated that no Data Management Planning services were offered by either the library or the institution, and five (22%) indicated that they had no online resources related to DMPs. In response to the question as to RDM resources, consulting or training services the libraries provide other than DMP support. The responses in Table 5 indicate that most of the institutions did not offer the listed services. They were also not in partnerships with other departments to offer the services that include data management best practices, data storage and backup planning, assistance with metadata standards, file organisation, data citation, data sharing and access or data management practices through workshops or web-based services.

Table 5: RDM Services Beyond DMP Support

Services	Offered by the library	Offered by the library and elsewhere	Offered elsewhere	Not offered
Data management best practices via website resources and links to relevant literature	3	5	0	12
Data storage and backup planning	1	3	5	10
Helping researchers identify appropriate metadata standards	3	2	2	12
Research file organisation and file naming conventions	1	2	2	15
Helping researchers apply metadata standards	3	3	0	14
Data citation	3	3	1	13
Data sharing and access	2	5	2	11
Helping with securing and anonymising data per research conduct policies and Institutional review Board advising on institutional data policies (e.g. retention, IP ownership	1	2	5	12
Data management best practices via workshops/direct training	3	2	2	12
Other RDM services	2	0	1	8

Archiving

The libraries indicated that archiving services were either offered outside the library or not offered at all. Only one respondent indicated that the library provided an archival service; four indicated that such a service was provided by the library and elsewhere; five indicated services being offered elsewhere in the institution, and nine did not offer any services.

While seven respondents indicated that they provided direct assistance with the depositing of data at either the library or the institutional archive, six only provided assistance in locating solutions at existing data repositories for particular research domains, and three provided no assistance. With regards to the specific archiving services and the library's archiving solution, six libraries indicated that the institutional repository were being used to archive research data while three indicated the library's research data archive for data deposits and access. Only eight libraries provided an answer to the question. Only three platforms were indicated as being used for data deposits. These are DSpace, Figshare and Archivematica. DSpace is being used for institutional repositories while Archivematica is being used for a data archive. One institution indicated that it was using an in-house platform developed in collaboration with an overseas university. Three institutions indicated that they were either using or planning to use Figshare. Five institutions provided an estimate of the number of data deposits in their archives. One of these had over 1000 items; one had less than 100; and remaining three had deposits of less than 50 items.

With regards to cost of data archiving, six institutions indicated that there was no cost to the library, while three indicated the library absorbs the cost. Although one library charged researchers, none of the libraries charged end-users.

Most libraries (10) indicated that archived data was related to a publication while nine indicated that the source of data were postgraduate research in the form of theses and dissertations and seven selected data associated with a full research project. Most institutions (86%) indicated that there was no limit to the size of the data deposit. It was revealed that in some cases (five) researchers were able to self-deposit their data collections, while in four cases, the library provided assistance with data deposits; and in three cases the library deposited the data collections on behalf of the researcher. An equal number of libraries (three) indicated that their data archiving solution either did or did not provide a persistent identifier for deposited data sets. Although institutional repositories are generally open access (with one exception), all libraries indicated that data archives had controlled access.

Organisational Structures, Staffing and Training

The study also sought to determine the organisational structures, staffing and types of training offered to librarians to provide effective RDM services. Most RDM support came from individuals based in libraries of four the institutions This is followed by a library department (three). Only four respondents indicated RDM service provision resulted from a committee or a group of staff from the library and other institutional departments. The responding research and academic libraries indicated that staff in a total of 24 positions assisted with RDM activities. Of these, four were at library director level, six at manager level and the rest were professional librarians holding positions of Research Librarian (four), Faculty Librarian (two), Digital Curator (three), Data Services Librarian (one), and RDM developer (one). Three institutions indicated that positions had not yet been created for staff supporting RDM services. Most of the staff providing these services had library degrees and some had library and IT degrees. Of the eight responses, only two indicated having degrees in non-related fields and 6 indicated that most of the staff had degrees at Masters or Honours level. In response to a request to list the skills and training seen as most important for those who provide RDM training, ten respondents indicated digital/data curation and IT technology or service training. Only six respondents saw subject domain experience as important while four listed librarianship Master level training and two indicated that traditional archives training was important.

Although the most important skills included digital/data curation and IT technology skills, the skills seen as being the most important for library staff included identifying and applying appropriate metadata standards, as well as digital preservation with eight libraries selecting these options. These were closely followed by ethical and legal issues and data retention

policy with seven selecting each. Subject domain expertise was selected least. Most libraries indicated that they promoted RDM service training through workshop attendance and independent study (Table 6). No respondent indicated that training provided by vendors or the hiring of consultants was viable.

Table 6: Promotion of RDM Skills Development

Workshop attendance	10
Independent study	10
Conference attendance	9
Training provided by professional organisations	2
Other	2
Local courses in computer or digital technology	1
Other colleagues on campus or other librarians from other institutions	1
Training provided by vendors	0
Hired consultants	0

Funding

In the responses to questions on funding for RDM services, nine (53%) of respondents indicated that current services were funded using the regular library budget; followed by two (12%) who indicated funding was either via a temporary budget or special projects budget; and two (12%) who indicated departmental or institutional research group funding. One (6%) respondent indicated that funding was received for RDM from researchers' grant funding. The remaining three (18%) indicated that there was no funding in place or they were still looking for suitable sources for funding RDM services.

According to predictions by the respondents, only six (20%) expect future funding to come from the library's regular budget; with a further six (20%) indicating that sources of funding had not yet been determined; four (13%) from external grant funding; six (20%) expecting funding to come from library's special research/project group funds; three (10%) from researchers' funding; one (3%) from direct administrative institutional funding, and one (3%) still unsure of any source of funding for RDM services. While eight (54%) of libraries expected their allocation of funds for RDM services to increase over the next three years, three (23%) felt the funding would decrease, and a further three (23%) expected funding remain constant.

Outreach and Partnerships

The most effective outreach method was Faculty promotion road shows (25%). The method used by all respondents, but seen as least effective was Website links cross-posted to other sites and other outreach methods not listed (see Table 7).

Table 7: RDM Services Outreach and Assessment Approaches

RDM Service Outreach and Assessment	Used	Most Effective	Total
Library staff referrals/promotion	7	1	8
Website links cross-posted to other library site pages	7	0	7
Workshop presentations to faculty or student groups	9	1	10
Direct emails to faculty/researchers	9	2	11
Website links cross-posted to administrative sites	5	1	6
Faculty promotion road shows	3	1	4
Other outreach methods	2	0	2

Only 12 libraries indicated that they had partnered with external institutions or groups to provide RDM services. Respondents also indicated that research units and departments in some institutions were involved with RDM services, while others indicated that individual faculties at their institutions were providing some level of RDM services. One institution indicated that the involvement of the Institutional IT Department. The results further indicated that very few libraries responded to these questions on service outreach and assessment, indicating a low level of both collaboration and referrals.

Research Data Management Service Provision: Challenges and Opportunities

The responding libraries provided their perceptions of challenges and opportunities in open-ended questions on RDM service provision in open-ended questions to outline at least three challenges and opportunities for the provision of RDM services in their environments. The following responses were provided as some of the challenges that academic and research libraries face in introducing and implementing RDM services.

Challenges

The main challenges listed by 14 of the 21 responding libraries is shown in Table 8. Organisational structures and limited job descriptions without specific data management roles were the most prominent challenges mentioned.

Table 8: Ranked Order of RDM Challenges

Rank	RDM Challenges
1.	Organisational structure issues
2.	Limited job descriptions without specific data management roles
3.	None existing policies ensuring the collection of institutional research output
4.	No existing capacity building programmes to develop skills to handle data management
5.	Lack of well-defined policy framework
6.	Not enough data storage facilities or specific institutional data storage solutions
7.	No proper linkages with national initiatives
8.	No specific Staffing budget for RDM service provision
9.	Lack of IT infrastructure
10.	Lack of skilled staff to assist researchers with data storage and preservation techniques
11.	Lack of incentives from senior university management to implement RDM services
12.	Lack of understanding of the concept of RDM services by researchers

Opportunities

Nine libraries provided responses to an open-ended question on opportunities that academic and research libraries have in implementing RDMs services (Table 9). Most opportunities were identified in South Africa, Botswana and Zimbabwe where institutions were better resourced and could be in a better position to be starting RDM services.

Table 9: Opportunities in Academic and Research Libraries for RDM Services

Opportunities	Institutions	Country
The demands by national research funding agencies for beneficiary researchers to deposit their data in accredited institutional repositories (e.g. National Research Foundation in South Africa)	7	South Africa
The increasing importance of RDM services at both institutional and national levels	6	South Africa
There are opportunities for institutional RDM through national efforts of country wide Open Science and Open Data policies	8	South Africa; Botswana
Useful for expertise sharing and training	6	South Africa
Academic libraries need to take leadership and advocacy, resources and support for RDM	10	South Africa Zimbabwe Botswana
Availability of research data which can be used for further studies	1	South Africa
Opportunity for collaboration with Post Graduate studies, research departments and researchers	1	South Africa

The leadership and advocacy role of libraries can be built on existing collaborations with faculties and departments where librarians are already actively promoting and delivering a range of library and information services. The existing relationships with other academic support departments like Information and Technology and the research offices also presents opportunities for developing RDM services.

Most respondents indicated that their future plans included developing RDM services such as training sessions on data management plans, providing online resources relating to data management plans for funding and providing direct assistance to researchers with regard to data management plans over the next year or two. A few of the respondents indicated a longer term vision of between three and five years for services such as providing online resources for research data management beyond the data management plans while a few had no current plans for providing any level of RDM service.

In alignment with the future plans, some institutions were increasing or realigning their staffing to provide RDM services. While the most (9, 43%) of the respondents indicated they would be adding RDM roles to existing staff positions, seven (33%) indicated that no changes to that staffing were planned. Only six (24%) of the respondents indicated they would be creating new positions for the provision of RDM services. Within the libraries which were planning to add staff or change the roles of staff, the primary responsibility was indicated as being data management guidance for researchers (other than DMPs), followed by subject references services, library IT and systems administration and cataloguing/collection development.

Thirteen of the respondents indicated that no RDM services were currently being provided. The reasons given for this included: lack of demand, libraries limited IT infrastructure to enable data management services, lack of dedicated personnel and technical know-how. Some of the thirteen institutions indicated that plans were in place to introduce these services; and in some instances

RDM has been included in the current strategic plan; and in others, staff were being trained.

Although libraries indicated that either new grants/funding agency requirements 13 (17%) or growth and development of data intensive research 13 (17%) would influence their provision of RDM services in future, circumstance, such as increased recognition of the need for better data sharing 15 (19%) and more requests from faculty/researchers for assistance with data management planning 14 (18%) were more the likely reasons that would influence decisions around data management service provision.

The respondents regarded the future roles of academic and research libraries in the provision of RDM services to include:

- Support and training (4);
- Collection, organisation, facilitating access, and preservation of research output (3);
- Custody of the RDM system (2);
- An ideal, neutral space to provide generic research support (2);
- Running open source Institutional Repositories applications such as DSpace-CRIS (1);
- Advocacy for RDM across the university (1);
- Encouraging, supporting and coordinating research data management (1);
- Involvement throughout the data life cycle (1);
- Archiving the data (1); and
- Data processing, reservation and archiving as well as providing its retrieval and use (1).

Data management is seen as a natural extension of the key role of libraries with librarianship skills being extended to include data management. Awareness of RDM must be created within institutions and the libraries should take a leading role in advocating for RDM, providing training and the technical support needed to store and retrieve research outputs and data sets. However, in order to promote such activities, librarians must be trained in RDM and must be supported by their institutions to become involved in RDM activities outside the institution.

Discussion

What is notable from this study is that the majority of institutions were not yet fully ready to offer a whole of range of RDM services due to a number of resource, infrastructure and human capacity constraints. At both national and institutional levels there was need for more commitment from government and institutional management on clear road maps for research data management through the development of policies and guidelines. This should be seen as part of the broader open science, open access and open data movements' initiatives that seek to widen the accessibility of research outputs including research data storage, preservation and reuse. In some countries, notably South Africa, Botswana and Zimbabwe, there were efforts at higher levels to come up with national policies on open science, and ultimately, these should provide the necessary guidance for development of institutional policies. International donor agencies and science professional bodies such as the European Union, EIFL, the World Bank, CODATA and Research Data Alliance are actively involved in engagements and the promotion of national open science policies in various countries, including southern Africa.

The study has also established that there is also a disparity between the different countries in the region with South Africa having much more developed infrastructure, policy frameworks and national initiatives for eResearch and eScience. While one country outside South Africa and Zimbabwe, and indicated the presence of a national High Performance Computing Centre, it was clear that the necessary policy frameworks to enable the wide utilisation of the facility are not yet in place nor are researchers' guidelines on how manage their data. While Botswana reports on plans and discussions taking place towards the realisation of a national blueprint on Open Science and Open Data, there is still little visible progress in academic and research libraries. This reflects the low level of readiness in the region for RDM services. In countries such as Namibia, Malawi, Zambia, Lesotho and Swaziland there were no reported activities in relation to RDM in university and research libraries or at national level again pointing to the need for clear national guidelines on how institutions should plan and develop this important area for research support.

Although institutional repositories exist in many of the surveyed libraries, the study has shown that that libraries have not explored fully the capabilities of the commonly used platforms such as DSpace to manage data sets, as well as the metadata of any data deposited in both internal and external platforms. The limitations of fully utilising open source platforms are partly due to limited IT and programming skills in libraries and the lack of communities of practice around a commonly used resource through which institutions could share experiences and have a better understanding and utilisation of these resources. There are opportunities to introduce data management linked to existing institutional repositories, especially for those that are managed through DSpace and other open source platforms.

The calls for open data are growing not only in higher education and research institutions but also in governments, civil society organisations and the private sector. It has also now been fairly established through global projects in many countries that RDM services are collaborative in nature. The study established a limited number of institutions that have participated or are actively involved in collaborative outreach programmes to promote the development of RDM services. There is need for academic and research libraries in Southern Africa to realise that introducing RDM services should be done through institutional collaborative efforts. In universities and research institutions, successful or promising RDM services are collaborative, and each stakeholder plays their important role to ensure the delivery of services, and more importantly the preservation of data and enablement for its future use.

The continuing training of librarians and organisational restructuring to align existing library research services to RDM is also very important if services are to take a meaningful shape in universities and research institutions. From other studies (Tenopir et al., 2014), it is very clear which areas academic libraries should focus on, and these include: provision of informational services, data management planning, training of researchers, managing metadata and finding and citing data sets. Attention should now be more focused on capacity building and the development of RDM skills amongst librarians as this is a commonly identified barrier.

It has also been established in many of the emerging studies that the technical aspects of RDM services are generally missing in academic libraries, and these are better provided and managed by other service providers within universities due in part to their complex nature and requirements for specialised technical skills. This also applies to the engagement with researchers who require the assistance of the research offices which seems to have better leverage with researchers and in advocating for new complex data management services.

Conclusion

As academic and research libraries become more engaged in research support and respond to open science, open access and open data initiatives, it becomes critical for librarians to have a better understanding of all research issues. To be able to respond to research data management needs libraries there is a need to align institutional goals, build collaborations with key institutional stakeholders to respond appropriately. Beyond institutional boundaries are other national and international imperatives that libraries have to respond to if new research data management services are to be acceptable and have the correct meaning to the target audiences – the researchers. Previous studies and international best practices show that coordinated responses at national and institutional levels are the best approaches to take. The re-skilling of librarians is also important as RDM services require new skill sets to what has been traditionally offered in library schools. In future, recruitment of personnel working in RDM services in academic and research libraries will have to consider other professions, especially those graduates with IT training and more specifically those with data management training. Development of institutional infrastructures is also a big challenge that still requires substantial amounts of funding and human capacity to implement and run associated systems. The rise of open specialised domain data deposit platforms on the Internet in various fields presents a challenge to libraries and institutions, as some researchers are finding these platforms more useful and appropriate in their research work. Awareness platforms and avenues for RDM services must be created within institutions and the libraries should take a leading role in advocating for RDM, providing training and specialised advisory services required for the management of research data.

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Research Collaboration Landscape of the University of Ibadan Biomedical Authors between 2006 and 2015

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Abstract

This analysis of co-authorship of biomedical researchers at the University of Ibadan (UI), Nigeria between 2006 and 2015 is based on bibliographic data from the PubMed®. It describes the types and the countries of collaboration, comparison of the visibility of the collaboration types and funding status. The results show that internal collaboration was high while international collaboration was low, and about 30% of the published papers were funded. The papers received an average of 2.58 citations per year while collaborative coefficient was 0.65. Furthermore, international collaboration and funded papers received more citations. While about two-thirds of the international collaborations were funded, just about 20% of the internal collaborations were funded. Comparison of the visibility of international with internal collaboration shows that international collaborations have impacted UI biomedical research more significantly than internal collaboration.

Keywords: Co-authorship analysis, Research collaboration, University of Ibadan, Bibliometrics, Biomedical research

Introduction

Using co-authorship as a basis for measuring research collaboration assumes that co-authored research originates from research collaboration, and research collaborations result in co-authored research (Laudel, 2002). Though this assumption is considered faulty (Bennett and Taylor, 2003; Glänzel and Schubert, 2004; Katz and Martin, 1997; Teixeira da Silva and Dobránszki, 2016) co-authorship remains the commonest method of measuring collaboration in science (Katz and Martin, 1997; Subramanyam, 1983; Tsai, Corley, and Bozeman, 2016). The co-author concept of collaboration has several advantages over other social science research methods for investigating collaboration. First, co-authorship research is verifiable and reproducible with available and cheap data. Second, standard metrics for measurement are simple and developed with several available types of software. Third, available datasets are large enough to cover large sample sizes and are, therefore, statistically significant. Fourth, co-authorship research is practical and objective with developed theories and methods as datasets are collected from academic artefacts (Katz and Martin, 1997). Research collaboration is considered important because evidence has shown that collaboration correlates with higher productivity, greater credibility, a higher number of citations and higher influence (Bozeman and Boardman, 2014; Katz and Martin, 1997; Luukkonen, Persson, and Siverten, 1992; Subramanyam, 1983). Also, collaboration correlates with quality as most novel research and innovations are products of interdisciplinary collaborations, and the most prolific researchers collaborate most often (Bozeman and Boardman, 2014; Katz and Martin, 1997; Lee and

Bozeman, 2005; Luukkonen, Persson, and Siverten, 1992).

Studies about collaboration using co-authorship are very important to science and professional communities as they investigate the development, maturity or "conceptual and professional evolution" of a scientific discipline, scientist or a group of scientists (Larivière, Sugimoto, and Cronin, 2012). Such studies also help to achieve assessments of individual, organisational, national or regional scientific outputs, impacts, growth, and diversification which explain biases and the strengths and weaknesses of their research activities. For example, the influence a discipline or a region has on another discipline can be explicated by co-authorship analysis of the scientific publications from the influenced discipline. (Ocholla and Roux, 2011; Pettigrew and McKechnie, 2001; McKechnie and Pettigrew, 2002; Kim and Jeong, 2006; Jeong and Kim, 2005). Studies about collaboration also explain authorial behaviour which could include inbreeding or intramural collaboration and international or extramural collaboration (Glänzel and Schubert, 2004),

The growing importance of collaboration in science has also received significant attention from policymakers because of its potential for capacity building. For example, some developing countries have employed the model of collaboration for capacity development, especially in Medicine, Science and Technology (Petroze et al., 2012; Lan, 2014; Chu, Jayaraman, Kyamanywa, and Ntakiyiruta, 2014; Kotecha, Walwyn, and Pinto, 2011). Developed countries such as Japan and the US and multinational organisations such as the European Union, World Bank and World Health Organisation also earmark huge sums for collaboration between research institutions from the developed and the developing countries such as Nigeria with the aim of capacity building (Wagner, Brahmakulam, Jackson, Wong, and Yoda, 2001; Cooke, Ariss, Smith, and Read, 2015).

Today, one of the challenges Nigerian universities face is the inbreeding culture of researchers. This phenomenon has discouraged research multidisciplinarity, researchers' mobility, and international collaboration. On the other hand, inbreeding has encouraged intra-disciplinary and intra-institutional research collaboration. Scholarship inbreeding occurs when generations of academics in a university have studied and gained all their academic experiences from the same university or a closely related university in the country with little or no exposure to international experiences. As Amini-Philips (2016) notes, Nigerian universities employ their best students as teachers as a reward for their academic brilliance. This is unlike universities from the Western countries where a certain percentage of their faculty is from foreign countries and other universities. For instance, Woolley (2017) observed that most of the Canadian universities' economics teachers are from the United States and other countries while most of the doctoral graduates from Canadian universities seek employment in continents of Asia and Australia. This observation has resulted in the effort of the Federal Government of Nigeria in alleviating this trend by providing funding for the training of university academics internationally to break the bonds of inbreeding and encourage international collaboration and exposure through the Tertiary Education Fund (TETfund) (Na'iya, 2013).

Studies on research collaboration globally have shown that the proportion of African research products is negligible compared to other continents (Confraria and Godinho, 2015; Luukkonen et al., 1992). Similarly, Wagner and Leydesdorff (2005) noted that apart from South Africa which is an emerging regional research hub, other African countries are negligible nodes on the global research network. This is consistent with the results of Glänzel (2001) wherein African countries play fringe roles in the global knowledge production industry. One of the features of African knowledge production is that collaboration among African countries is minimal (Onyancha and Maluleka, 2011). Also, medicine and the natural sciences dominate the list of the most emphasised African research focus (Pouris and Ho, 2014). Egyptian, South African, Ethiopian, Nigerian and Ugandan institutions dominate the list of the most prolific institutions in Africa (Pouris and Ho, 2014). For decades, South Africa, Nigeria, Kenya, Tanzania and Ethiopia, arranged in descending order are the countries that published the highest number of articles in sub-Saharan Africa (Confraria and Godinho, 2015; Onyancha and Maluleka, 2011).

Literature has shown that Nigeria is one of the top three African knowledge producers. Pouris and Ho, (2014) also showed that Nigeria is the only country among the African countries whose

collaboration rate is lower than 50% and one of the two African countries that produced articles with more than 28% single authors. Nigeria is one of the four sub-Saharan African countries that Onyancha and Maluleka (2011) identified as having relatively low international collaboration growth.

With the University of Ibadan (UI) as the focal point, this study looks at the pattern of biomedical research co-authorship with the aim of providing some knowledge about internal and external collaboration in Nigeria. This research investigates the type of collaboration that produces the highest citation numbers per year. It also investigates if funded research is cited more. The University of Ibadan in Nigeria was considered for this study first, because of its importance as the oldest university in Nigeria, and considering that it houses the largest medical school in the country. Secondly, for decades, UI has consistently produced the highest number of publications in Nigeria.

Methodology

Data was collected from the PubMed®® database (http://www.ncbi.nlm.nih.gov), an open access bibliographic database of biomedical literature. Using its advanced search functionality, the "Affiliation" option was specified as "University of Ibadan" while "Date – Publication" was specified as "2006" to "2015" for each year respectively during the ten-year period. The search returned a total of 2198 bibliographic records. The data collected was cleaned by removing articles that were published earlier or later than 2006 or 2014.

Data collected about the articles included the number of authors, institutions and countries, names of researchers, institutions and countries, and the funding status of the articles. The number of citations per article from date of publication to 2016 was obtained from Google Scholar (scholar. google. com). The number of citations received for every article was divided by the publication age by year to normalise the effect of the year of publication. The authors' main affiliation was identified as the institution of affiliation. The first institution listed as the authors' address with more than one affiliation was regarded as the authors' main affiliation. Articles in which UI is not the main affiliation of any of the authors were removed.

One of the limitations of the study is the absence of data about some authors' affiliation and funding information. PubMed® did not fully include authors' affiliation other than first author's affiliation in its index until 2014. PubMed®, (2017) wrote in its manual that:

> *"Affiliation [AD]*
> *Affiliation may be included for authors, corporate authors and investigators, e.g., cleveland [ad] AND clinic [ad], if submitted by the publisher. Multiple affiliations were added to citations starting from 2014, previously only the first author's affiliation was included."*

Information about authors' affiliation and funding status of articles were manually traced when they were not provided by PubMed®. Affiliation histories of researchers with missing affiliation were manually traced on PubMed® and Google. Also, information about the funding status of articles which were not provided on PubMed® was manually traced from sources such as the full text of the article or other bibliographic databases. Articles with untraceable information about affiliation and/or funding status were removed from the sample; this is the second stage of cleaning the data. Though the data was collected carefully and consistently, tracing authors' affiliation and funding information manually did not provide the same level of accuracy as collecting the data directly from the database. One of the major challenges faced while tracing author's affiliation manually was reconciling some authors' affiliations. For instance, more than one author may bear the same name and initials and vice versa. After cleaning the data, 1915 articles remained and were used for the analysis.

Three types of collaboration were analysed: intra-institutional, national, and international. Intra-institutional collaboration occurs when all the collaborating authors are from UI alone. National collaboration occurs when all the collaborating authors of an article are from UI and other Nigerian institutions alone, and none of the authors is affiliated with an institution outside of Nigeria. International collaboration occurs when the collaborating authors of an article are from UI and institutions within and outside of Nigeria. International collaboration can be with African or non-African countries.

With the number of authors, the mean number of author per paper and collaborative coefficient (CC) was calculated. Using the formula by Ajiferuke, Burell, and Tague, (1988) CC was calculated as:

$$CC = 1 - \frac{\sum_{j=1}^{k}(1/j)f_j}{N} \quad \text{equation 1}$$

Where fj = the number of j-authored research papers published in a discipline over a period;

k = greatest number of authors per paper;

N = the total number of research papers published over a period.

Results

The results of this study are presented in six sub-sections. The first subsection presents the results of the patterns of collaboration. In this subsection, the results on the level of multi-authorship, percentage of funded publications, number of citations received by articles and the CC are also presented. The second subsection presents results on the types of collaboration which could be intra-institutional, national, or international. A further analysis which is presented in the third subsection shows the results of the countries which collaborating authors are from African and non-African countries. The fourth subsection presents results on statistical tests to investigate the type of collaboration that received the highest amount of citations. Similarly, the fifth subsection presents the result of a statistical test to investigate if funded research is cited more. The result of cross-tabulation of type of collaboration and funding is presented in the last subsection.

Patterns of Collaboration

Total of 1915 publications were analysed and were written by 1848 unique authors from UI in collaboration with 2163 unique authors from 651 different institutions located in 74 countries. With reference to Table 2, the number of publications increased each year from 2006 to 2015; the number of publications doubled in 2013 and tripled in 2015 in comparison with 2006. According to Table 2, the mean number of authors is 4.25 (min=1, max=370, SD=8.81) for the ten-year period. The least mean number of authors was 2.38 and was recorded in 2009, while the highest was 6.01 and was recorded in 2015. Most (55.82%) of the articles were written by authors from UI only. The average number of authors ranged from 3.26 to 3.85 between 2006 and 2013, but increased to 5.02 and 6.21 in 2014 and 2015 respectively. The average number of authors for articles written by UI authors was 3.10. The average number of authors per article for national and international collaboration was 3.80 and 7.24 respectively. Table 1 further explains the distribution of articles by authors. It shows that few articles were written by one author, where 91.72% of the articles were written by more than one author. Concerning levels of multi-authorship or collaboration, three-author papers accounted for the largest proportion with about a quarter (25.10%) of the articles, followed by two-author and four-author papers which accounted for 22.69% and 17.10% respectively. Until 2009, two-author papers accounted for the highest proportion and this changed in the year 2010 to three author papers.

The analysis also shows that 30.09% of all the articles were funded. Less than 30% of articles published between 2006 and 2013 were funded, until 2014 when more than 35% of articles published were funded. The CC for the ten-year period is 0.65, while the least CC occurred in 2013 with CC of 0.61. The highest occurred in 2008 with CC of 0.77. The mean citation per year was 2.58 (min=0, max=45.44, SD=3.49). The papers received the highest (3.46) mean citation per year in 2007, while the papers received the lowest (1.89) mean number of citations per year in 2013.

Table 1: Number of Authors Per Year

Year	Number of Authors											
	1 (%)	2 (%)	3(%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)	10(%)	>10 (%)	Total (%)
2006	7.41	23.15	25.93	16.67	10.19	4.63	1.85	2.78	2.78	3.70	0.93	5.64
2007	10.91	20.91	24.55	16.36	8.18	9.09	2.73	3.64	2.73	0.00	0.91	5.74
2008	12.68	23.24	24.65	12.68	9.86	7.75	2.82	1.41	1.41	0.70	2.82	7.42
2009	12.67	25.33	25.33	15.33	9.33	6.00	3.33	0.67	1.33	0.67	0.00	7.83
2010	8.70	19.25	30.43	21.12	8.70	4.35	3.73	2.48	0.62	0.00	0.62	8.41
2011	7.19	25.75	27.54	13.77	9.58	9.58	2.99	1.80	0.60	0.60	0.60	8.72
2012	7.54	24.62	29.15	17.59	11.06	5.53	0.50	1.01	1.01	0.00	2.01	10.39
2013	3.54	28.32	28.76	23.89	7.52	2.21	0.88	3.10	0.44	0.00	1.33	11.80
2014	1.26	19.50	24.53	17.30	9.75	5.97	4.40	3.77	1.89	3.77	7.86	16.61
2015	5.39	16.47	23.05	14.67	11.68	9.58	5.69	2.10	2.10	1.80	7.49	17.44
Total	6.68	22.09	26.16	17.08	9.77	6.53	3.19	2.35	1.46	1.31	0.00	100.00

The average number of institutions per article for national and international collaboration was 2.45 and 4.16 respectively. According to Table 2, the highest number of institutions that participated in collaboration was 231. The mean number of institutions per article over the ten-year period is 1.95 (min=1, max=231, SD=5.54), the least mean was recorded in 2007, and the highest in 2015. 48.94% of the institutions were from Nigeria, while 51.06% were from other countries. Researchers from 152 different institutions in Nigeria participated at least once 566 times. Researchers from 80 different institutions in Africa participated at least once in 200 times; 428 different institutions from non-African countries participated at least once 826 times. Table 2 shows a list of institutions in Nigeria, Africa and non-African countries that collaborated with UI researchers, which gives greater depth to the analysis of institutions. Most (52.17%) of the articles were written by UI researchers alone, followed by 25.11% and 7.65% by researchers from two and three institutions respectively.

Table 3 shows that the UI researchers collaborated more with researchers that are affiliated with universities and other educational institutions. Among the top ten local and international collaborating researchers' institutions of affiliations, only two non-academic institutions were listed. The UI researchers collaborated with researchers that are affiliated with 147 institutions in Nigeria; more than half (77) are non-academic institutions (37 hospital, 22 research organisations, 14 government ministries and agencies and four other non-governmental organisations). However, only 26.87% of all the national collaboration articles were written with researchers that are affiliated with non-academic institutions. Similarly, 46.75% and 24.82% of African and other international collaborating authors' institutions of affiliation are non-academic, but they participated in only 20.88% and 23.34% of the collaborations respectively.

Institutions in Nigeria that collaborated most with UI biomedical researchers are Obafemi Awolowo University first, followed by Ladoke Akintola University and the University of Lagos. Institutions in Africa that collaborated most with UI biomedical researchers are the University of the Witwatersrand, South Africa first, followed by the University of Ghana and Makerere University. Institutions from non-African countries that collaborated most with UI biomedical researchers are World Health Organisation, Harvard University, and Johns Hopkins University.

Table 2: Authors', Institutions', countries' and collaborative co-efficient statistics per year

	No. of Pub.	Number of authors						Number of institutions					Number of countries							
		Avg au	=1 (%)	=2 (%)	=3 (%)	=4 (%)	Hist au	Avg inst.	=1 (%)	=2 (%)	=3 (%)	Hist inst	Avg cty	=1 (%)	=2 (%)	=3 (%)	Hi cty	Av. Cit	Fund (%)	CC
2006	108	3.85	7.41	23.15	25.93	16.67	12	1.56	61.11	26.85	8.33	5	1.27	79.63	14.81	4.63	4	3.05	23.14	0.66
2007	110	3.72	10.91	20.91	24.55	16.36	13	1.38	70.91	22.73	3.64	4	1.09	91.82	7.27	0.91	16	3.55	21.05	0.61
2008	142	3.69	12.68	23.24	24.65	12.68	20	1.73	57.75	31.69	7.04	19	1.44	80.99	21.83	2.11	6	3.03	28.87	0.77
2009	150	3.31	12.67	25.33	25.33	15.33	10	1.49	66.67	24.67	5.33	10	1.27	80.67	16.67	0.67	7	2.51	25.33	0.57
2010	161	3.52	8.70	19.25	30.43	21.12	13	1.60	62.11	25.47	7.45	11	1.27	79.50	16.77	3.11	7	2.50	27.95	0.61
2011	167	3.55	7.19	25.75	27.54	13.77	11	1.49	68.86	18.56	7.78	4	1.25	80.24	15.57	3.59	4	2.32	28.74	0.62
2012	199	3.48	7.54	24.62	29.15	17.59	14	1.56	60.80	27.14	9.55	8	1.29	77.89	17.59	4.02	6	2.15	30.15	0.62
2013	226	3.51	3.54	28.32	28.76	23.89	24	1.46	71.68	22.57	2.65	13	1.17	88.94	9.29	0.44	9	1.90	23.45	0.64
2014	318	5.18	1.26	19.50	24.53	17.30	33	2.47	40.88	30.82	13.21	27	1.72	65.72	22.64	5.35	22	2.52	40.57	0.71
2015	334	6.05	5.39	16.47	23.05	14.67	370	3.05	46.41	25.75	12.87	231	1.72	68.86	17.96	5.99	27	3.98	35.62	0.69
All	1915	4.26	6.68	22.09	26.16	17.08		1.95	58.38[1]	25.65	7.79		1.41	77.28[2]	16.76	3.50		2.61	30.09	0.65

Avg au=Average number of authors per paper, Hist au= Highest number of authors, Avg inst=Average number of institutions per paper, Hist inst.= Highest number of institutions, Avg cty=Average number of countries per paper, Hi cty= Highest number of countries, Av Cit=Average Citation, Fund=Funded Research, CC=Collaboration Coefficient

Table 3: Top ten Institutions that collaborated with UI by Region

	Nigeria	%	Africa	%	Rest of the World	%
1	Obafemi Awolowo University	7.30	University of the Witwatersrand, South Africa	9.34	World Health Organisation (Italy, Switzerland, Cambodia)	4.84
2	Ladoke Akintola University of Technology	7.12	University of Ghana, Ghana	7.69	Harvard University, USA	3.63
3	University of Lagos	6.41	Makerere University, Uganda	7.14	Johns Hopkins University, USA	2.06
4	Olabisi Onabanjo University	4.45	Stelenbosch University, South Africa; University of Cape Town, South Africa	6.04	London School of Hygiene, UK; University of Maryland USA	1.69
5	FMC (Owo, Abeokuta and Katsina)	3.91	University of Pretoria, South Africa	4.40	North-western University, USA	1.57
6	University of Port Harcourt	3.20	Kwame Nkrumah University of Science and Technology, Ghana	3.30	Indiana University, USA	1.45

[1] All articles written in one institution (UI) including articles written by single authors

[2] All articles written in one country (Nigeria), including articles written by single authors

7	Federal University of Agriculture, Abeokuta; University of Ilorin	2.67	North West University, South Africa; University of Fort Hare, South Africa	2.75	University of Chicago, USA	1.21
8	Lagos State University	2.49	Nelson Mandela Metropolitan University, South Africa	2.20	University of São Paulo, Brazil; Loyola University USA; University of Illinois, USA	1.09
9	Babcock University	2.31	University of Nairobi, Kenya	2.20	Shanghai Institute of Planned Parenthood Research, China; King's College, UK; National Institutes of Health, Bethesda USA	0.97
10	Ahmadu Bello University, Nnamdi Azikiwe University, University of Maiduguri	2.14	Cuttington University, Liberia; Kinshasa School of Public Health; University of Malawi, Malawi; University of Zimbabwe, Zimbabwe	1.65	Liverpool School of Tropical Medicine, UK; Veterinary Laboratories Agency, UK; Karachi University, Pakistan	8.47

Types of Collaboration

Of the 1915 articles that were analysed, 1787 (93.31%) were written by multi-authors. Most (55.09%) of the collaborations are intra-institutional, followed by international (24.21%), and national (20.14%). Figure 2 shows that there was more institutional collaboration than national and international collaborations between year 2006 and year 2013. In 2014 and 2015, international collaborations increased while the proportion of intra-institutional collaboration reduced.

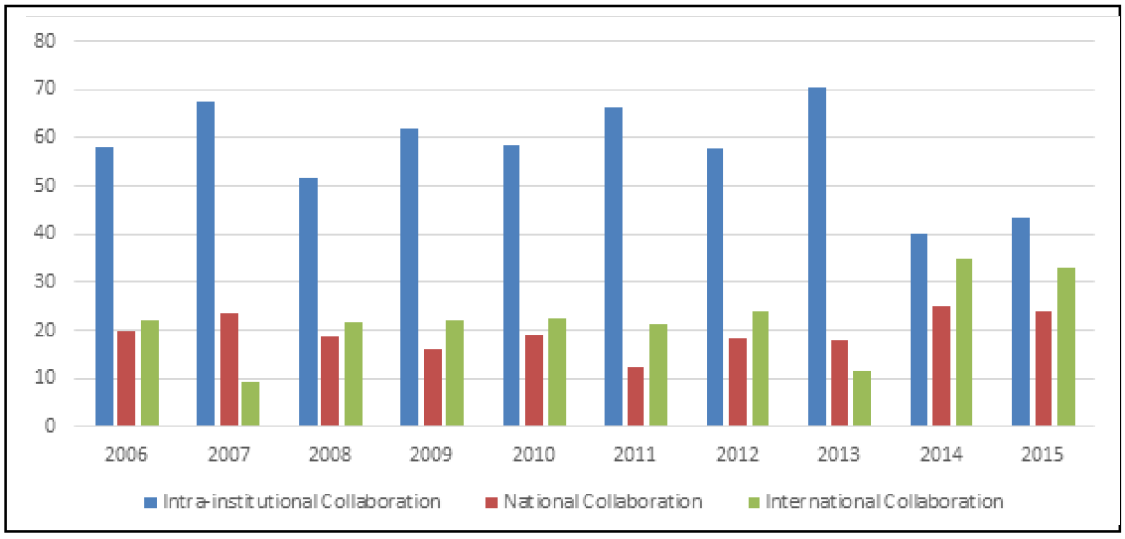

Figure 2: Types of Collaboration

Countries of Collaboration

Table 4 shows the distribution of African and non-African countries that collaborated with UI authors. Only 22 African and 52 non-African countries collaborated with the UI researchers. A total of six African and 25 non-African countries collaborated with the UI biomedical researchers at least five times. UI biomedical researchers collaborate mostly with researchers from non-African countries such as the US, followed by the United Kingdom, Switzerland, India and Germany. They also collaborate mostly with African countries such as South Africa, followed by Ghana, Uganda, Kenya and Cameroun.

The mean number of countries per article over the ten years is 1.48 (min=1, max=27, SD=1.38). The least mean number of countries per article which is 1.07 was recorded in 2007 while the highest mean, 1.72, was recorded in 2013. Most (69.60%) of the articles were written by authors from Nigeria only, while 16.45% and 3.42% were written by authors from two and three countries respectively.

Table 4: Ranking of Countries that Collaborate with UI Biomedical Researchers

Rank	Country	Participation (%)
1	USA	24.22
2	UK	11.42
3	**South Africa**	7.40
4	Switzerland	5.77
5	India	4.52
6	**Ghana**, Germany	3.14
7	Brazil	2.89
8	China	2.01
9	Italy, France, **Uganda**	1.88
10	Sweden, Australia	1.76
11	Spain	1.51
12	**Kenya**	1.38
13	Netherlands	1.25
14	Saudi Arabia, Japan, Pakistan, Canada	1.00
15	Cameroun, Finland, Israel, Norway	0.75
16	Lebanon, Mexico, Denmark, Belgium, **Tanzania**	0.63
17	Greece, Portugal, Colombia, Thailand, Luxembourg, Malaysia	0.50
18	Iraq, Bulgaria, UAE, **Malawi, DR Congo, Zimbabwe, Ethiopia**	0.38
19	**Egypt, Gambia, Senegal, Congo, Senegal, Congo, Liberia, Morocco**, Kuwait, Sri Lanka, Iceland, Iran, Cambodia, Myanmar, Austria, Peru, Poland, South Korea, New Zealand, Hong Kong, Romania, Bangladesh	0.25
20	**Mozambique, Rwanda, Guinea, Niger, Mali, Zambia**, Lao's People Republic, Ukraine, Jamaica, Argentina, Taiwan	0.13

Note: African countries in **bold** letters

Which type of collaboration produced the highest number of citations per year?

The Kruskal-Wallis test was conducted to investigate if there is a difference in the number of citation per year between international, national and intra-institutional collaborations. The result of the Kruskal-Wallis test is displayed on Tables 5a and 5b. The following hypotheses were stated while the null hypothesis was tested:

Null hypothesis: The means of the number of citations per year for international, national and intra-institutional collaboration are similar.

Alternative hypothesis: At least one pair of the means of the number of citations per year for international, national and intra-institutional collaborations is not similar.

The Kruskal-Wallis H test shows that there was a statistically significant difference in the number of citations per year between the three different types of collaborations, $\chi^2(2) = 76.105$, $p \approx 0.001$, with a mean rank score of 834.76 for intra-institutional collaborations, 828.63 for national collaboration, and 1077.69 for international collaboration. The null hypothesis was rejected, therefore at least a pair of the three types of collaborations is not similar.

Table 5: Kruskal-Wallis Mean Ranks H Test Statistic

	Collaboration Type	N and	Mean Rank		Citation per year
Citation per year	Intra-Institutional Collaboration	977	834.76	Kruskal-Wallis H	75.400
	National Collaboration	366	828.63	df	2
	International Collaboration	446	1077.69	Asymp. Sig.	.000
	Total	1787	a. Kruskal Wallis Test b. Grouping Variable: Collaboration Type		

To test for the pairs of variables that have significantly different means, three tests of the Mann-Whitney U statistical tests were conducted for international and intra-institutional, international and national and, national and intra-institutional collaborations. The following hypotheses were tested:

Null hypothesis 1: The means of the number of citations per year for intra-institutional and national collaboration are similar.

Null hypothesis 2: The means of the number of citations per year for intra-institutional and international collaboration are similar.

Null hypothesis 3: The means of the number of citations per year for national and international institutional collaboration are similar.

The result of Mann-Whitney U mean rank is presented on Table 6 while the result of Mann-Whitney U statistic test result is presented on Table 6. Mann-Whitney test showed that there was a statistically insignificant difference in the means of the number of citations per year between intra-institutional and national collaboration $Z = -0.254$, $p = 0.846$ with a mean rank score of 687.11for intra-institutional collaboration and 673.14 for national collaboration. Hypothesis one was not rejected, and the result means that national and intra-institutional collaborations were cited equally. Mann-Whitney test also shows that there was a statistically significant difference in the means of the number of citation per year between intra-institutional and international collaboration $Z = -8.297$, $p \approx 0.001$ with a mean rank score of 650.62 for intra-institutional collaboration and 845.17 for international collaboration. Hypothesis two was rejected, and the result means that international collaboration is cited more than intra-institutional collaboration. Mann-Whitney U test showed that there was a statistically significant difference in the means of the number of citations per year between national and international collaboration $Z = -6.735$, $p \approx 0.0001$ with a mean rank of 344.52 for national and 455.52 for international collaboration. Null hypothesis three was rejected, and the result means that international collaboration is cited more than national collaboration.

Table 6: Mann-Whitney U Mean Ranks

	Collaboration Type	N	Mean Rank	Sum of Ranks
Citation per year	Intra-Institutional Collaboration	977	673.14	657658.50
	National Collaboration	365	667.11	243494.50
	Total	1342		
	Intra-Institutional Collaboration	977	650.62	635651.00
	International Collaboration	445	845.17	376102.00
	Total	1422		
	National Collaboration	365	344.52	125750.50
	International Collaboration	445	455.52	202704.50
	Total	810		

Table 7: Mann-Whitney U Test Statistics Result

Test Statistics	Intra-Institutional and National Collaboration	Intra-Institutional and International Collaboration	National and International Collaboration
	Citation per year	Citation per year	Citation per year
Mann-Whitney U	176699.500	157898.000	59256.500
Wilcoxon W	243494.500	635651.000	126417.500
Z	-0.254	-8.297	-6.735
Asymp. Sig. (2-tailed)	0.799	0.000	0.000
a. Grouping Variable: Collaboration Type			

Are funded research Articles cited more?

Mann-Whitney U test was conducted to investigate if there is a difference in the means number of citations per year of funded papers and papers that were not funded.

Null hypothesis 4: The means of the number of citations per year for papers that were funded and papers that were not funded are the same.

Table 8 shows that the difference in means of the number of citations per year for funded papers and papers that were not funded is significant (Z = -9.451, *p*H”0.0001), therefore null hypothesis four was rejected. The table also shows that funded papers (1138.16) have higher mean rank than papers that were not funded (879.15). This means that funded papers were cited more.

Table 8: Mann- Whitney Mean Ranks and Test Statistic

	Funding Status	N	Mean Rank	Sum of Ranks		Citation per year
Citation per year	Not Funded	1332	879.15	1171022.00	Mann-Whitney U	283244.000
	Funded	583	1138.16	663548.00	Wilcoxon W	1171022.000
	Total	1915			Z	-9.451
					Asymp. Sig. (2 tailed)	.000
					a. Grouping Variable: Funding Status	

Funding and Type of Collaboration

Table 9 shows that only about 20% of national and intra-institutional collaborations were funded while about two-thirds of the international collaborations were funded.

Table 9: Collaboration Type and Funding

		Collaboration Type				
		No Collaboration	Intra-Institutional Collaboration	National Collaboration	International Collaboration	Total
Funding	Not					
Status	Funded	82.81%	78.81%	83.56%	33.93%	69.56%
	Funded	17.19%	21.19%	16.44%	66.07%	30.44%
	Total	6.68%	51.02%	19.06%	23.24%	100%

Summary of Findings and Discussion

This research is a descriptive analysis of biomedical research collaboration in UI between a ten-year period of 2006 and 2015. All the 1915 papers that were analysed for this study were written by 1848 unique authors from UI in collaboration with 2163 unique authors from 660 different institutions located in 74 countries apart from Nigeria. For 1871 authors to have written 1957 papers in ten years suggests that productivity of the authors is low. Most (77.28%) of the papers were written by researchers from Nigeria only. International collaboration of about 23% suggests that the international collaboration is low among biomedical researchers in Nigeria. This is in tandem with the results of Pouris and Ho (2014) which showed that 29% of papers written by researchers that are affiliated with Nigeria are co-authored with researchers from other countries. Researchers from 74 (22 African, 52 non-African) countries collaborated with UI biomedical researchers; this shows a good spread of global collaboration. UI biomedical researchers collaborate mostly with researchers from countries such as the US, followed by the United Kingdom, South Africa, Switzerland, India, Ghana and Germany. Unlike South Africa that publishes the highest number of academic paper in Africa and equally strongly collaborates with Nigeria, noteworthy is the low collaboration with Egypt, even though it publishes the second highest number of papers in Africa. The US and the United Kingdom combined contributed about 35% of the international collaboration.

The number of publications increased each year from 2006 to 2015; the number of publications

doubled in 2013 and tripled in 2015 in comparison to 2006. 93.52% of the articles were written by more than one author. Mean number of authors per paper was 4.24 (min=1, max=370, SD=8.81), with three author papers the highest, followed by two author papers and four author papers. 1.94 institutions per paper (min=1, max=231, SD=5.54), with majority (52.17%) written in one institution (UI) only, followed by two and three institutions respectively. The average number of institutions per article for national and international collaboration was 2.45 and 4.16 respectively. UI researchers collaborated more with researchers who are affiliated with universities and other educational institutions.

The major trend was that collaboration landscape was largely unchanged between 2006 and 2013. There were significant changes in all the parameters considered for analysing collaboration and productivity in 2014 and 2015. First, productivity increased by more than 40% between 2013 and 2014. Second, the average number of authors between 2006 and 2013 which ranged between 3.28 and 3.85 increased to 5.16 and 6.01 in 2014 and 2015 respectively; same trend was recorded for average number of institutions and countries and the collaborative co-efficient. Third, the ratio of intra-institutional-international collaboration changed. Before 2014, proportion of intra-institutional collaboration was always the largest. This changed as the proportion of international collaboration increased in 2014 and 2015. The only phenomenon that remained unchanged was the proportion of national collaboration which was the least and single-authorship which was minimal throughout the period of investigation. The trend observed could be due to the index errors from the data source (see Paragraph three under method section for details) and partly possible positive fallout of the six- month strike action of academic staff in Nigerian universities that preceded 2014.

A total of 30.09% of all the articles were funded. Less than 30% of articles published between 2006 and 2013 were funded; but the proportion of funded publications increased in 2014 and 2015 as more than 35% of articles published were funded. A further probe into the type of collaborations that were mostly funded shows that about two-thirds of international collaborations were funded while only about 20% of the national and the intra-institutional collaborations were funded. It is therefore assumed that funding is one of the motivations for international collaboration; however, this research did not take into consideration the source of the funding. Collaborative co-efficient for the ten-year period was 0.65 while the mean citation per year was 2.58. International collaboration and funded papers received the highest number of citations than national and intra-institutional collaborations and papers that were not funded. This corroborates earlier research works that have shown that collaboration correlates with higher productivity, greater credibility, a higher number of citations and higher influence (Bozeman and Boardman, 2014; Katz and Martin, 1997; Luukkonen, Persson, and Siverten, 1992; Subramanyam, 1983). However, this research provides evidence that international collaboration provides higher visibility to biomedical research from a developing country academic institution. Lastly, about two-thirds of the funded papers were funded, while only about 20% of the national and intra-institutional collaborations were funded.

Conclusion

Higher research impact and funding from international collaborations as evident in this research is an incentive to reduce the still strong academic inbreeding in Nigerian universities. On the other hand, high level of collaboration as observed in this study is a positive development. Suggestions for future research include investigating the effect of gender difference on collaboration between biomedical researchers in Nigeria. Also, there is a need to investigate the motivation for collaboration among researchers in Nigeria. Lastly, there is a need to find out if the type of journals in which the authors' papers are published influences the visibility of their publications.

There are limitations to the assumption of "co-authorship as collaboration", as the research method used in this study because not all co-authored research emanated from research collaboration. This is proven with the practices of gift/honorary/ unjustified and guest authorship where individuals are listed as authors without making real contributions to a research article (Bennett and Taylor, 2003; Teixeira da Silva and Dobránszki, 2016). There are also limitations to the assumption that research collaborations result in publications as there are other products of collaboration other than publications such

as course syllabus, grant proposal, etc. Also, there are some forms of research collaboration that cannot be quantified, such as casual interactions between researchers during which breakthrough ideas about a research work are mentioned (Katz and Martin, 1997). Furthermore, not all contributors to a research work are adequately acknowledged in form of authorship or sub-authorship (Glänzel and Schubert, 2004). Lastly, there are research (mal)practices of ghost authorship where major contributor(s) to or creators of research articles are not acknowledged appropriately (Bennett and Taylor, 2003; Teixeira da Silva and Dobránszki, 2016).

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A Tracer Study of Library and Information Science Graduates of Mzuzu University, Malawi

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Abstract

The main goal of this study was to trace Diploma and Bachelor of Library and Information (LIS) graduates from Mzuzu University (Mzuzu University), Malawi between 2005 and 2015. The study's intention was to ascertain the LIS graduates' career path, to find out the relevance of their educational attainment to their present careers, and to examine their perceptions about the LIS curriculum. A quantitative study through use of questionnaire, consisting of closed-ended and open-ended questions was executed to collect data. Data were analysed quantitatively. A total of 66 responses were received and used for the study. Most of the respondents were employed in the academic sector and held positions of librarians, information officers and lecturers. The non-library and information science positions held included information technology officer, IT network engineer, marketing officer, monitoring and evaluation officer, and programme directors. Although satisfied with the skills and knowledge they acquired from their LIS programme, the graduates recommended more practical sessions in cataloguing and classification courses and some more courses in ICT.

Keywords: Tracer study, Library and Information Science Career, Malawi

Introduction and Background to the study

A tracer study, according to Project for Rehabilitation through Education and Training – Opportunities for Needed Skills (PRET-Options) (2012**),** is a a tool that is used to measure relevance of the qualifications attained by graduates from a training institution, and to document graduates finding employment in their trained occupations. Gathering and documenting feedback from graduates can help improve project planning, revise, or reinforce interventions, demonstrate results, and contribute towards improving public confidence in training. Depending on the information sought, a tracer study can be used as a tool for management, or marketing, or monitoring.

Tracer studies are used to seek opinions of graduates about the curricula they were offered by their former universities and whether these graduates obtained the required knowledge, skills, and attitudes for the job market or not (Lutwana and Kigongo, 2004; Stilwell, 2004). Such studies have resulted in some universities changing their offerings of the curricula to match with the requirements of the job market (Lutwana and Kigongo-Bukenya, 2004). According to Mammo (2007), some tracer studies have resulted into departments changing the programmes offered; and in some intances, their names were completely changed.

An Overview of the Library and Information Science Programme at Mzuzu University

Mzuzu University, Mzuzu University was established by the Malawi Government through an Act of Parliament of 1997, following a concern with the low human resource capacity in the country. Mzuzu University became the second public university, located in Mzuzu City, in the Northern Region of Malawi. The University has five faculties, namely: Education, Environmental Sciences, Tourism and

Hospitality Management, Information Science and Communications, and Health Sciences. The University, also has five centres, namely: the Centre for Open and Distance Learning, the Centre for Water and Sanitation, the Centre for Security Studies, and the Testing and Training Centre for Renewable Energy and Technologies. The LIS programme is offered in the Department of LIS, under the Faculty of Information Science and Communications (Mzuzu University Annual Report, 2015)

The first programme to be offered was Diploma in LIS in 2003. Later in 2005 a four-year Bachelor of Library and Information Science (BLIS) degree programme was also introduced. The first cohort of Library and Information Science (LIS) degree students was enrolled in 2005. Mzuzu University is the only institution in Malawi currently offering a standalone degree in LIS and a Master's degree in the same field.

Statement of the Problem

Tracer studies are vital as they help institutions of higher learning get reaction from their former students, about the programmes, by way of soliciting their opinions on the worthiness of the courses being offered and the experiences they got from the respective institutions. Outcomes from such studies provided the necessary skills, knowledge, attitude and practices required by different sectors. Sadly for Mzuzu University, since the Department of Library and Information Science was established in 2003, and since the graduation of the first BLIS graduates in 2009, no proper documentation has been done to trace the location of the graduates and how they were performing out there. This could be because the Department of LIS did not have a track of its graduates' situations once they leave the training institution. The other reason, could be because of lack of knowledge on the importance of tracer studies, lack of resources, and lack of capacity to conduct such a study. According to Shongwe and Ocholla (2011), tracking of university graduates' situations once they leave the training institutions is the university's obligation and this is something university must not miss on. When university and departments fail to carry out tracer studies, they will usually find it problematic to know the employment status of their graduates, and the challenges the graduates face which would have otherwise help them redesign and review the curriculum so that they best help them. It also creates a network of its alumni that could otherwise be helpful for sharing knowledge and information about potential job opportunities for those nearing graduation. Shongwe and Ocholla (2011) further noted that the absence of such information denies universities and departments valuable feedback from the graduates as well as the employers, more especially on the relevance and value of the degrees being offered. In the absence of such valuable information from these stakeholders, it becomes difficult to restructure the curriculum and prepare it for the future graduates so that it responds well to the needs of the employers.

Accordingly, this study is of great significance to the Department of LIS and Mzuzu University as it may help them to obtain feedback from LIS graduates on the effectiveness of the programmes in relation to the needs and expectations of both the graduates and the employers. Similarly, the information generated will also be used to improve the LIS programme so that it best meets the expectations of all the stakeholders. It will also set the basis for further studies in the future and possibly make relevant literature available for those in the academia and research scholars since this kind of study has never been conducted in the LIS field in Malawi. Moreover, there is absolute lack of information regarding the whereabouts of LIS graduates, their career paths, and what they are doing out there.

The purpose of this study, therefore, was to trace graduates of the Department of LIS of Mzuzu University from 2005 to 2015 to establish where they are, what they do, and what interventions can be made to improve their professional practices. This paper addresses the following key research questions:

- What is the employment status of LIS graduates in Malawi?
- In what sectors of the economy are LIS graduates employed in Malawi?
- Are the skills, knowledge, attitudes and practices of the LIS graduates acquired from their LIS degree relevant to their jobs?
- What further training, and skills and knowledge

have LIS graduates undertaken since their graduation to improve their employability?

- What courses should be removed from or added to the DLIS curriculum to improve training delivery?

Review of Related Studies

There are not many studies available on LIS graduates' tracer studies in relation to their employment status, sectors of the economy they are employed in, the skills, knowledge and attitude required of them to work in a digital environment, additional skills to improve employability and the review of the curriculum to improve training delivery. However, Kisiedu (1993) from Ghana; Aina and Mohai (1999) from Botswana; Lutwama and Kigongo-Bukenya (2004) from Uganda; Mammo (2007) of Ethiopia; Nengomasha and Chiware (2009) from Namibia; Ocholla, (2001); Shongwe and Ocholla (2011) and Stilwell (2004) from South Africa and Noko and Ngulube (2013) and Mugwisi and Hikwa (2015) from Zimbabwe are some of the scholars who have done some studies in this area even though none of them was from Malawi.

Kisiedu (1993) conducted a survey of past postgraduate diploma students (1970/71 to 1980/81) in the Department of Library and Archival Studies of the University of Ghana. One of the objectives of the study was to find out the employment status of graduates. The findings revealed that most of the graduates were employed and that university libraries were the largest employer agency seconded by the public libraries. A similar study was also conducted by Aina and Mohai (1999) on the Botswana library school graduates. Using a social survey method, the study established that most of the graduates worked in either national libraries or universities libraries. In Uganda, Lutwana and Kigongo-Bukenya (2004) in their in-depth qualitative study of East African School of Library and Information Science (EASLIS) graduates established that the graduates worked in various sectors of the economy, chief among them being in academic institutions, government departments, banking institutions and non-governmental organisations. Likewise, in South Africa, Stilwell (2004) conducted a quantitative study to determine graduates' perception of postgraduate Information and Library Science Education programme at the University of Natal (now the University of KwaZulu-Natal). The findings revealed that most of the graduates were employed and that most of them were employed by academic libraries. Records and documents management units, school libraries, provincial libraries, special libraries, and education departments were the other employing agencies in South Africa.

Using a quantitative methodology, Shongwe and Ocholla (2011) conducted a tracer study of LIS graduates at the University of Zululand in South Africa to establish the employment status of the graduates and the sectors of the economy they worked in. The public sector was the main employer of the LIS graduates, with the private sector employing a few graduates. Out of the fifty respondents, only one indicated being unemployed. In Zimbabwe, similar tracer studies conducted by Mugwisi and Hikwa (2015) and Noko and Ngulube (2013) established varying results. Noko and Ngulube (2013) used a quantitative methodology informed by a cross-sectional survey design to trace Records and Archives Management (RAM) graduates in Zimbabwe. The results of the study were that the percentage of RAM graduates that were in employment was higher than those who were self-employed or unemployed. Relative to the sectors of the economy in which RAM graduates were employed, the study also found that the greatest numbers of respondents were employed in parastatals, followed by the private sector. The public sector was third and the non-governmental organisations (NGOs) had the least number of respondents employed. Mugwisi and Hikwa (2015) used a social survey to trace Master of Science in LIS graduates from the National University of Science and Technology (NUST), Bulawayo. The findings showed that many of their graduates were in employment after graduating. Most of the respondents were employed in universities, with the public sector and the private sector (the aviation industry, private schools, and a private financial institutions) being the other employers. An overall analysis of all the studies presented herein revealed that academic libraries and the public sectors were the main employing agencies. The private sector and NGOs also took some graduates, though at a minimal level.

Studies relating to relevance of the skills,

knowledge, and attitudes (SKA) of LIS graduates acquired from their studies which were for their jobs, curriculum reviews and improved training delivery, have been conducted in Australia by Combes et al., (2011); in Malaysia by Zainab et al., (2004); in Thailand by Nonthacumjane (2011); in the United Kingdom (UK) Goulding et al., (1999) and in Africa by several other authors.

In Australia for example, using a web-based survey and focus group discussion (FGDs) to find out the course expectations and satisfaction levels of graduates, Combes et al. (2011) established that many of respondents felt that they had studied subjects they expected to find in their courses. Participants were also reported to have been very satisfied with the contents of their courses. Generally, the graduates felt that the content of their courses thoroughly prepared them for the work place and were suitable as prerequisites for professional employment. In Malaysia, Zainab et al. (2004) traced LIS graduates to ascertain curriculum relevance to the job market and their satisfaction about the programmes. The study revealed that graduates were satisfied with the courses, particularly those with more practical orientation, including Information and Communication Technology (ICT) related modules such as information retrieval, and computer applications in library and information systems.

In Africa, Stilwell (2004), Nengomasha and Chiware (2009), Shongwe and Ocholla (2011), Noko and Ngulube (2013), and Mugwisi and Hikwa (2015) established that graduates were happy with the knowledge and skills they attained in their LIS programme since they were relevant to their jobs. Conversely, the authors (Lutwana and Kigongo-Bukenya, 2004; Stilwell, 2004; Mammo, 2007; Shongwe and Ocholla; 2011; and Noko and Ngulube, 2013) agreed that the graduates had some misgivings about the courses they had undertaken as they emphasised that more of theory than practical. In Uganda for instance, Lutwana and Kigongo-Bukenya (2004) found out that employers were not satisfied with graduates' lack of practical skills. They also criticised specialisations of courses through electives as faulty and was regarded as inadequate to impart the essential skills on the graduates. The findings also showed that the courses lacked ICT and research components. Such programmes as established by Mammo (2007) made graduates dissatisfied with their qualifications since they considered them inadequate for their jobs. That was the case because the job market was dynamic and what they had learnt did not keep pace with the changing environment. Kamba (2011) also noted that that due to the demand for ICT competencies in the job market, LIS schools in Nigeria had responded by way of integrating ICT courses in their traditional curriculum. Implementation of these modules was however less effective due to poor ICT infrastructure, including poor bandwidth and the Internet.

In the UK, Goulding et al. (1999) conducted a study to identify and analyse the skills and knowledge demanded by LIS graduate employers. The results showed that the graduates lacked certain skills which they needed to upgrade themselves to further education especially in customer-care and interpersonal-skills, time-management techniques, organisational and contingency planning skills, problem solving and critical thinking skills, and evaluation and analytical skills. Confidence-building and assertiveness training can assist new professionals in their negotiations with management, colleagues and users and can help to improve self-assurance needed to improve employability (Goulding, et al., 1999).

Using content analysis methodology to study the key skills and competencies of new generation of LIS professionals, Nonthacumjane (2011) classified and summarised the required skills and competencies into generic and discipline-specific knowledge in Thailand. Generic skills were defined as the general skills which cut across disciplines; for example, communication, critical thinking, information literacy and teamwork. He identified some generic skills that were considered critical for LIS professionals such as: information literacy, communication, critical thinking, teamwork, ethics and social responsibility, problem solving and leadership. The discipline-specific knowledge which was required for new LIS professionals also included metadata, database development and database management system, user needs, digital archiving and preservation, collection development, content management systems, knowledge management, information systems skills, and desktop publishing. These generic skills and discipline-specific knowledge would enable the new generation of LIS professional,

to work successfully in the digital library environment.

Some literature so far reviewed in this study established that the curricula offered in some institutions were inappropriate. For example, Noko and Ngulube (2013) established that RAM graduates in Zimbabwe were dissatisfied in areas of industrial attachment and ICT skills. Provision for industrial attachment was also rated poorly by respondents in studies by Kisiedu (1993); Aina and Moahi (1999); Stilwell (2004); Kavulya (2007); Mammo (2007); Shongwe and Ocholla (2011), and Burnett (2013), among others. Industrial attachment was considered important because it helped the students to put theory into practice and acquire work experience during their training period. Even in other countries worldwide, the design of the curriculum has also been a cause for concern. For instance, Ameen and Warraich (2011) conducted a study to analyse the opinions of young and senior LIS professionals in Pakistan on their curricula and its relevance to market needs. Using questionnaires, FGDs and personal experiences from the graduates, the findings ascertained that the LIS curriculum offered at the University of the Punjab was up to date and well-designed, but it did not fully meet the needs of the graduates and employers. Both groups were dissatisfied with employability skills due to lack of implementation of LIS curricula and shortage of specialised faculty members. The employers complained of weak communication, poor practicals and bad presentation skills. They expected graduates with more multidimensional and market-oriented skills. On curriculum review and improvement of training delivery, Shongwe and Ocholla (2011) found out that respondents had suggested that modules such as cataloguing and classification, programming, information and knowledge management, business intelligence, graphic design, customer care, database management, school librarianship, and library and information systems should be included in the curriculum. The study also recommended that the LIS department should review its curriculum regularly to keep pace with the ever-changing business environment. Based on the deficiencies of the curriculum, Mammo (2007) **recommended** that LIS educators should consider open and distance education, as an option to delivering courses that would help upgrade their skills. The study also recommended course that would look into community-based librarianship and information systems since there were many community library and information centres being established in Ethiopia. It is evident from these studies that LIS educators in Africa need to review their curricula continuously to keep pace with the changing business environments which have been necessitated by the emergence of ICTs. This then would enable graduates to adjust to the changes swiftly and accordingly.

Method of Data Collection

The study used a quantitative methodology accomplished through use of questionnaire, as the main instrument for data collection. It was envisaged that this would be able to reach a physically spread-out number of graduates. The study also adopted the method based on studies from by Shongwe and Ocholla (2011); Ngulube and Noko (2013), and Mugwisi and Hikwa (2015). However, the questionnaire was modified to suit the aims and purpose of this study. The 234 LIS graduates between 2005 and 2015 (see Table 1) made up the population of this study. The sampling frame for the graduates constituted the graduation record starting 2005, the year when the first LIS Diploma students graduated from Mzuzu University, while the first group of Bachelor of LIS degree students graduated in 2009 (Mzuzu University 2005-2015).

Source: Mzuzu University (2016).

Table 1: Graduation Statistics (2005-2015)

Year	Diploma in LIS	Degree in LIS	Total
2005	9	0	9
2006	10	0	10
2007	8	0	8
2009		6	6
2010	11	60	71
2011	13	19	32
2012	0	17	17
2013	8	1	9
2014	14	24	38
2015	8	26	34
Total	**81**	**153**	**234**

The study used a web-based questionnaire which was uploaded on Google drive forms and distributed using a social media platform (Facebook), emails to the LIS graduate employers and to the graduates themselves. Convenient sampling and snowballing were used as the forms were distributed to those that were within reach who could in turn distribute the forms to their fellow graduates, just like Shongwe and Ocholla (2011) advised. A web-based survey was also used in similar studies by Combes et al (2011) in Australia. Google forms generated some statistics which were imported onto *Excel* for data cleaning and generation of tables, charts, and percentages. To guarantee the study's adherence to ethical considerations, the researchers asked for consent from the Directorate of Research at Mzuzu University before doing the survey. The researchers also made sure to advise the participants that participation was voluntary and that the responses would be treated with utmost confidentiality. The outcomes would also be made available to the participants through reports, presentations, and through the Mzuzu University Library and or Mzuzu University website.

Findings and Discussions

This section reports on the major findings that were obtained from the LIS diploma holders and bachelor degree graduates on their jobs in Malawi.

Characteristics of Respondents

From the 234 diploma holders and graduates as shown in Table 1, 110 copies of the questionnaire were sent out to LIS graduates whose contact details were accessible by the researchers. From the 110 participants, 66 (60%) completed and returned the questionnaire. Only 58 people indicated their gender. Of these, 18(31%) were females while 40(69%) were males. The rest did not indicate their gender. Such a response rate is considered adequate, considering that other studies have realised much lower response rates: (Aina and Moahi, 1999 (41.2%); Mammo, 2007(42%); and Noko and Ngulube, 2013 (48.1%). The respondents for this study are shown in Table 2.

Table 2: Distribution of Diplomates and Graduates Returns (N=66)

Year	Diploma	Degree
2005	3	0
2006	3	0
2007	3	0
2009	2	3
2010	5	15
2011	2	4
2012	4	4
2013	4	3
2014	0	3
2015	3	5
Total	**29**	**37**

Employment Status of LIS Graduates and their Sectors

From the 66 respondents, 63 indicated their employment status. Out of the 63 respondents, 55 (87.3 %) indicated that they were in employment, while 6 (9.5 %) were self-employed or unemployed one respondent did not indicate the employment status. This study considers an employment rate of 87.3% remarkable. This may be attributed to the fact that the National Council for Higher Education (NCHE), a government agency that accredits university programmes, has set strict measures that demand that all universities must establish good libraries and employ qualified librarians. Hence, many colleges have established their libraries and made sure that they recruited qualified librarians. Other studies also found out different employment rates. For example, Zainab, et al. (2004) reported that the employment rate in Malaysia was at 81%. In Botswana, Aina and Moahi (1999) reported the employment rate of the LIS graduates from the University of Botswana was at 76.6% while in Zimbabwe, Noko and Ngulube (2013) reported that the employment rate of the RAM graduates was at 67%. Nonetheless, Mugwisi and Hikwa (2015) reported that employment rate of the LIS graduates was 100% and in South Africa, Shongwe and Ocholla (2011) reported that the employment rate of the graduates was at 72%.

Regarding the sectors where LIS graduates are employed, 63 responses were received. The sectors of the economy were arranged under the following groups: public, private, parastatal, NGO and 'other' to provide for those categories which were outside these categories. Most of the LIS graduates 29 (46%) indicated the academic sector was the main employer. Conversely, 19 (30.2%) of the respondents were employed in the parastatals, while 5 (7.9%) were employed in the private and public sectors. Additionally, only 3 (4.8%) of the respondents were employed in the NGO sectors and 2 (3.2%) were employed by the other sectors. More so, 6 representing 9.6% were self-employed. There could be two probable reasons that might have helped universities attract or employ more LIS graduates than other sectors. First, universities might have well established libraries with good compensation for staff, compared to the public sectors. Secondly, the pressure on them by NCHE which forced all universities to build and refurbish their libraries before being accredited could be one of the prime reasons. These findings match with those of Lutwama and Kigongo-Bukenya (2004) which established that 65% of the East Africa School of Library and Information

Science (EASLIS), Uganda graduates were employed by academic institutions due to their well-established libraries and good pay for staff. Aina and Moahi (1999) ascertained that 74% of the LIS graduates were employed in the public sector. The academic sector employed 37.7% of the LIS graduates. This was because the graduates were sponsored for their studies by these categories of sectors. The findings of the present study however contradicts those of Noko and Ngulube (2013) who revealed that the largest number of graduates were employed in government parastatals, followed by the private sector. More so, findings by Shongwe and Ocholla (2011) showed that most of the LIS graduates were employed in the public sector. Table 3 summarises the significant sectors of the economy in which LIS graduates have been employed and the different job titles they hold.

Job Titles

The respondents identified a variety of jobs. Of the 61 respondents, 29 (47.5%) were employed as librarians, with 15 of them employed in the academic sector, 13 in the parastatals, and 2 in the private sector. There were only 3 (4.9%) graduates who worked as lecturers in the Department of LIS. Others held positions of library assistants, senior library assistants, chief library assistants or knowledge managers. The study by Shongwe and Ocholla (2011) also found that 40% of the respondents held the position of librarians. Similarly, Lutwama and Kigongo-Bukenya (2004) established that 50% of the graduates worked as librarians. In Malaysia, Zainab et al. (2004) reported that all the graduates held different posts such as librarians, information officers, teachers, lecturers, and managers respectively. However, in the present study, it is interesting to note that many graduates hold the non-LIS traditional titles such as information technology officer, information technology network engineer, marketing officer, monitoring and evaluation officer, and programme directors. This is so because Mzuzu University LIS programme offers courses in ICT such as computer networks, databases and information systems, marketing of library and information resources, and projects management among others. These helped the graduates to get jobs that are related to ICT, marketing, and projects management, just to mention some. This also demonstrates that our curriculum is flexible and competitive as it enables the graduates get such an array of jobs.

Table 3: Sectors and Job occupied by LIS Graduates

Sector	Nature of Organisation	Positions occupied
Academic (29)	Universities/Colleges	Librarians, Chief Library Assistants Senior Library Assistants, Library Assistant, Systems Librarians Lecturers
Parastatal (19)	Universities/Colleges National Library Services Trade Development Centre Enterprise Development Fund	Librarians, Chief Library Assistants, Senior Library Assistants, Library Assistants Librarians Knowledge Managers IT Officers

Work Experience

From the 66 respondents, it is observed that 23 (36.5 %) of the LIS graduates had been employed for more than 10 years; 13 (20.6%) for more than a year; 11 (17.5%) for more than two years; 10 (15.9%) for more than five years and 6 (9.5%) for less than a year while three people did not respond (see Figure 1). The variations in work experience are attributed to the fact that, for those with more than 10 years of work-experience, they were already employed when they were studying for their diploma and degree programmes at Mzuzu University. They were admitted to Mzuzu University as mature students. Those with five years or less of work experience were admitted to Mzuzu University as generic students, (students that are admitted into the university straight from secondary schools) and after their graduation, they had to seek employment.

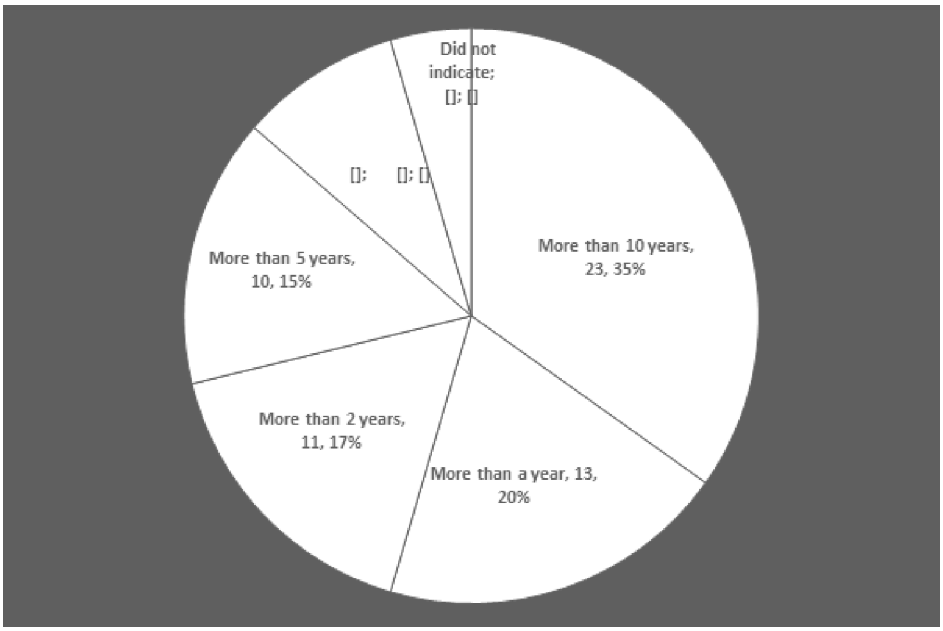

Figure 1: Work experience of LIS graduates (N=66)

Tasks Performed by LIS Graduates

The study found that most LIS graduates worked as librarians. This means that the majority librarians' daily tasks include selection, acquisition and processing of books and non-book materials. The processing part includes cataloguing, classification, abstracting and indexing. Other tasks include assisting students, staff, and researchers with information searching and retrieval and information literacy training. In addition, they also help establish processes and procedures for selection and circulation of information resources as well as, information storage and retrieval. They also orient students, academic staff, and researchers by explaining and demonstrating to them proper use of equipment, information systems and online resources. They also help with shelving books; general library administration and management (planning, preparing library budget, supervision and mentoring of junior staff); managing book circulation procedures; managing print and electronic journals collection; developing local databases on topics relevant to the needs of the university; and attending to library users' requests and writing report. These results were in tandem with what was established by Aina and Moahi (1999); Zainab, et al., (2004); Shongwe and Ocholla (2011) and Mugwisi and Hikwa 2015). The emerging common tasks performed by the LIS graduates as also established by Aina and Moahi (1999), Zainab et al. (2004), Shongwe and Ocholla (2011), and Mugwisi and Hikwa (2015) include cataloguing, classification, acquisition of library materials, information literacy, book circulation, inter-library loans, marketing of library services, and general library administration (planning, budgeting, staff

supervision and report writing). Those that occupied positions in IT Departments were tasked with network installation and optimisation, management of computer networks, supervision of network technicians and managing information systems. Those that occupied positions in the projects field, were busy with developing organisational programmes, planning and implementation, monitoring and evaluation and implementation, compiling and writing project reports. Lecturers were involved in lecturing and supervising undergraduate and post-graduate students with research projects, conducting research in the LIS department, preparing exams and assignments, marking and awarding grading exams and assignments. Those that were self-employed were involved in developing applications aimed at improving access to information in academic settings (digital libraries); personal entrepreneurship such as buying and selling foodstuffs and typing and printing secondary terminal examinations for some schools. Those in 'Others' were preoccupied with farming, salon management; selling jewelleries, handbags, and other hair accessories.

How did LIS Graduates get their Jobs?

The results showed that most graduates got their jobs by responding to advertisements in the daily newspapers. Out of the 63 respondents, 54 (85.7%) indicated that they got their jobs through newspaper. Others indicated that they got their jobs through personal contacts, being poached, dropping of unsolicited application letters, and through promotion. Nobody indicated that they were employed through internship or through employment agencies. It could have been that these two modes of recruitment are popular in Malawi. A similar study by Shongwe and Ocholla (2011) reported that advertising through newspapers and websites were the most popular ways of attracting LIS applicants.

The Skills, Knowledge and Attitudes Required for LIS Graduate Jobs

The question on skills, knowledge and attitudes (SKA) of LIS graduates was open-ended and required the respondents to provide multiple responses. All the 66 respondents responded to this question. For LIS graduates to carry out their tasks diligently, they must possess certain skills, knowledge and attitudes. This study categorised the skills and knowledge into generic and discipline-specific knowledge. For example, good communication skills may include skills such as writing, interpersonal, organisational, computer, information literacy, analytical and networking. Team-building, critical thinking and problem solving constitute the generic skills. These results are akin to those by Nonthacumjane (2011) and Ameen and Warraich (2011) who found out that communication, critical thinking, information literacy, teamwork, problem solving, and organisational skills were critical for information professional. These skills cut across an array of disciplines.

As for discipline-specific knowledge and skills, respondents indicated that graduates must have knowledge of cataloguing, classification, customer care, marketing, collection development, business management, copyright management, indexing, rural information services, leadership and management, digital citizenship, educational psychology, counselling psychology, planning and budgeting. Other knowledge levels identified included records management, knowledge management, human resources management, library and information sciences in general. Conversely, IT related knowledge that LIS graduates must have included web-based application development; systems programming; systems analysis and design; computer networks; information systems; database management systems and end-user computing. The LIS graduates were all in agreement that they needed to display attitudes such as perseverance; ability to accept and learn from others; teamwork; hard work; dedication to duty; creativity; integrity; adherence to ethics; self-confidence; self-starter; neatness; patience; good listening skills; strategic thinking; friendliness; humbleness; flexibility; and good problem solving skills for them to be able to function effectively. For those that were self-employed, they indicated that they got their knowledge and from the LIS programme. For example, one of the self-employed respondent commented: "*I acquired my marketing and communication skills from the LIS programme because during my studies we had a course called Marketing in Level 3 and Communication studies in Levels 1 and 2*". In line with these findings, Shongwe and Ocholla (2011) also found out that

attitudes like the ones above were critical for LIS graduates to survive in the workplace. Indeed, the SKA are key for LIS professionals since they help them seek employment and maintain their good jobs in the ever changing information environment.

Relevance of the Skills and Knowledge of LIS Graduates Gained from the LIS Programme

The opinion of LIS graduates about the relevance of the skills and knowledge they had acquired from the LIS department at Mzuzu University was collected through an open-ended question which required them to provide written responses. Out of the 66 respondents, 60 (90.9%) responded positively. The results showed that skills gained from the LIS Department at Mzuzu University were appropriate and applicable to their daily tasks at their jobs. Some respondents had this to say: "*Since our library is automated, IT skills like Networking and Information Security are heavily applicable*".

Another one said: "*Though not all skills apply, but some do. The computer skills I acquired as well as web development skills are relevant. I designed the website for my organization and I also use various computer skills for the effective implementation of the programs"*.

Another respondent wrote:

> *Yes, I am involved in orienting library patrons on accessing information resources in the library and understand the classification system which heavily relies on my knowledge of the classification system. I orientate them on the use of OPAC which requires me to use the knowledge I gained in database management and information retrieval. My knowledge gained in guidance and counselling helps me to counsel users when need arose. I acquired all this knowledge through my studies at Mzuzu University.*

Among those that were not positive, six of them indicated that the Department should intensify practical sessions in cataloguing and classification, electronic resources, and databases. The respondents indicated that the Department need to intensify the teaching of two prominent library software systems being used in Malawian libraries (Koha and Library Solution). It is not clear what the respondents implied by intensifying practical sessions in cataloguing and classification and whether this should be during class sessions or during the actual internship programmes. Another concern was that the Department should teach in detail a course covering monitoring and evaluation skills.

Satisfaction with the LIS Curriculum

The question on the level of satisfaction with the LIS curriculum drew several interesting and contradictory responses**.** There were 22 out of 66 respondents who indicated that they were fully satisfied with the LIS curriculum offered. One of them said:

> *Yes. I was introduced to courses which have direct impact on my duties, such as information literacy, communication skills, sociology of knowledge, information retrieval systems, cataloguing and classification, language skills, just to mention a few. I can now organise both traditional and electronic libraries from the scratch.*

Twenty-one respondents indicated that they were not really satisfied with the curriculum. They stated that they were not satisfied with it because of the inadequate ICT courses provided for by the current curriculum. In some cases where these ICT courses were taught, they were not covered in detail. Hence, one of the respondents remarked:

> *I was somehow satisfied and somehow not. I was particularly impressed with the diversification of courses that were offered ranging from the core courses of information management, ICT courses, Business courses, communication courses to psychology courses. However, the curriculum had too many linguistics courses which are not really needed on the market, yet*

lacked some important ICT and statistics courses that are marketable.

Shongwe and Ocholla (2011) also found some contradictory responses from the graduates when asked whether they were satisfied with the curriculum offered by the Department of Information Studies. Half of the graduates (25) indicated that they were not happy with the curriculum. Only 15 indicated that they were happy with the curriculum, and the rest (10) gave unclear and contradictory responses.

In the current study, the LIS graduates felt that they did not need linguistic courses as they did not add value to their after school environment. Other respondents' major concerns were shortage of teaching staffing in the department to cover the curriculum adequately, the offering of education courses which to them were not ideal for LIS. Thus, one respondent commented:

I was contented with the LIS programme undertaken by the Department of here at Mzuzu University. However, the challenge was the implementation phase of the curriculum. I observed that the department has inadequate teaching staff to comprehensively conduct teaching of the courses in the manner as outlined in the curriculum itself".

The remaining 20 respondents indicated that they were absolutely not satisfied with the curriculum. This is despite all 60 respondents indicating earlier on that the skills and knowledge gained from the curriculum were appropriate and applicable to their work environment. The reasons provided for dissatisfaction were that the curriculum was shallow and that its review was long overdue. Other reasons provided were that the curriculum was just meant for librarians. Still, others were not contented with the nomenclature of the library and Information sciences programme. They had this to say:

"The naming of the programme library and information science reduces marketability and employability because the assumption out there is that our place is the library. I would suggest renaming it to Information Management, encompassing records, data, archives, and knowledge management".

Courses or Subjects to be Removed from or Added to the LIS Curriculum to Improve Training Delivery

The study sought respondents' opinions regarding courses to be included or be removed from the curriculum. The courses that were suggested to be added have been categorised under five overarching themes. These themes are: ICT, information science, management, business, finance and economics, and education. Most respondents stated that ICT courses that should be added include: networking, information systems, programming in linux and c+, database management such as MySQL and Oracle building and managing digital repositories and Web designing. Within the theme of information sciences, courses that were suggested to be added to the DLIS curriculum included legal aspects of information, copyright management, Inforpreneurship, library management systems like Koha, social media in libraries and information centres, information packaging and data management. Under the theme of management, courses that the respondents have suggested to be added are knowledge management, human resources management, project management with an emphasis on monitoring and evaluation. The respondents suggested that courses such as statistics, entrepreneurship, purchasing and supply chain logistics, finance and accounting, advocacy and marketing, principles of economics, and public relations should fall under business, finance and economics should also be added. All self-employed LIS graduates were of the view that a course in entrepreneurship tailored to the local context should be offered. The theme of education had guidance and counselling, the art and science of teaching and some psychology courses. Some respondents suggested these educational courses should be maintained because they sometimes struggle to find jobs in the library field and end up teaching, hence they consider them relevant.

Ironically, great many graduates suggested that

education courses such as history, geography, phonetics, comparative linguistics and socio-linguistics, introduction to languages, history of computers, and discourse analysis should be removed. They added that these courses are not relevant to their profession. For instance, one respondent remarked:

> *"These educational courses should be removed from the LIS curriculum, I do not see any connection with the current job I am employed in*".

Further Training Undertaken and the Skills and Knowledge Acquired Since Graduation

Relative to the additional skills and knowledge that LIS graduates attained after graduation, the respondents indicated that they had gained various skills. For example, the skills included customer-care, communications (memo writing, report writing, etc.), team building, supervisory, facilitation, advocacy, negotiation, research, investigation, leadership, managerial, public relations, pedagogy, and ICT skills. The respondents indicated that they had acquired the knowledge of Koha Management, Library Solution and referencing software tools. Other knowledge acquired included human resource management, e-resource management, and D-space Content Management System.

Of the 61 respondents on the issue of further training for LIS graduates, 24 indicated that they had not attained any training, while 9 said that they had attained a Master's degree in Library and Information Science, Intellectual Property Rights, Education Psychology, Information Technology and Leadership. The rest (27) had attained some short courses leading to the award of certificates in finance, business, entrepreneurship, Christian leadership, customer care, time management, human rights, web designing, forensics, and events management.

Conclusion and Recommendations

This tracer study has provided an exposé of the strong points and the weaknesses of the LIS programme at Mzuzu University. The findings indicated that 87.3% of the LIS graduates were employed mostly in the LIS related professions. The respondents had worked for a period between two and ten years. Most of them (54%) indicated that they got their jobs through advertisements in the newspapers. The high employment rate as argued earlier on was because of the graduates having been already employed by the time they enrolled on the programme. The other reason could be attributed to the fact that NCHE forced universities to establish strong libraries and employ qualified librarians rest they risked not being accredited, and this made them employ graduates. The study has also shown that in Malawi, academic institutions and parastatals employ more LIS graduates than any other sectors. These graduates held different job titles with almost half of the respondents holding the position of Librarians.

The study revealed that some of the graduates were satisfied with the diversity of the courses offered as well as with the skills and knowledge they got from the Mzuzu University LIS programme, and that such skills were useful at the work place. There were some graduates who were not satisfied with the LIS curriculum because of lack of practical sessions and fewer ICT courses. It is for this reason that the study recommends that the Department of LIS should intensify practical sessions in cataloguing and classification courses, and add more ICT courses in the curriculum. This in turn may assist the graduates to be more marketable, as they will be theoretically and practically sound.

The study recommends that the LIS Department should be involving its LIS alumni and other stakeholders including students and the industry every time it is reviewing its curriculum so that they can provide their input. The involvement of the alumni and other stakeholders will also help improve marketability of the graduates and to raise awareness on the skills, knowledge and expertise of the graduates and the lecturers. Moreover, periodic tracer studies will assist the Department innovate and revitalise its curriculum as it will obtain direct feedback from both the employers and the graduates and in turn, the university will be the one to benefit enormously.

The study also recommends that the Department of LIS should keep a complete record of the graduates to enable future studies run smoothly. This study had some limitations in that, using

snowballing sampling technique led the researchers to study employed graduates only and it was difficult to locate unemployed graduates.

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The Self-Worth of Records and Archives Management Students at the National University of Science and Technology, Bulawayo, Zimbabwe

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Abstract

The purpose of this study was to investigate the self-worth of Records and Archives Management students at the National University of Science and Technology (NUST), Bulawayo, Zimbabwe. The study applied a qualitative methodology in which a case study research design and a questionnaire were used to gather data from a population of first, second and fourth year students in the Department of Records and Archives Management. The findings of the study show that the majority of students in the Records and Archives Management Degree programme were not confident of their degree programme. These students felt that they made a wrong decision by enrolling into the Records and Archives Management Degree programme. This was because the majority of the students had been admitted into the Records and Archives Management Degree programme because they had failed to meet the requirements and cut-off points of their preferred degree programmes. The paper therefore, recommends a rigorous marketing of the records and archives management programme, career guidance for students, and the resuscitation of the records and archives management professional association to develop the records and archives management profession in Zimbabwe.

Keywords: Records management, Archives profession, Zimbabwe

Introduction

Archives, archivists and archiving are terms not understood in many communities, as Mason (2011) highlights that many people think of archives as buildings that store old documents. The subject of records and archives management (RAM) is slowly diffusing across Africa (Nengomasha, 2007). Tsuura and Mutsagondo (2015) highlight that the records management programme faced prejudice, labelling and stigma even in the post-professionalisation era, and has been looked down upon in social circles. Such prejudices and stigma can potentially deter prospective students from enrolling and studying for degrees in RAM. Moreover, such stigma can dent the self-worth and confidence of students enrolled in the RAM degree programme.

The Department of RAM at the National University of Science and Technology (NUST) Zimbabwe was established in the year 2004, and it enrolled its first cohort the same year (National University of Science and Technology (NUST), 2014). At its inception, the RAM degree programme borrowed a number of courses and lecturers from the Department of Library and Information Science. This however, changed as the Department of RAM grew and started hiring RAM lecturers, and in 2011, it conducted a curriculum review exercise which replaced some LIS courses with RAM ones. The Department of RAM at NUST is in the Faculty of Communication and Information Science (CIS),

together with three other departments namely: Publishing Studies (IPU), Journalism and Media Studies (IJM) and Library and Information Science (LIS). Students in the Faculty usually battle for supremacy, constantly seeking to find which programme is better than the others. In Zimbabwe, NUST and the Zimbabwe Open University have been the two universities offering degree programmes in RAM, with polytechnics, and other colleges offering records and information management diplomas.

As a relatively new and budding programme, the RAM degree has been viewed differently by students and the community at large. The establishment of this degree programme can, however, be commended as a very positive move towards the growth and visibility of the RAM profession in the country. Positive signs towards the growth of the RAM profession in Zimbabwe are: RAM undergraduate programmes, Master of Philosophy graduates and the Doctor of Philosophy students specialising in RAM.

Growth is a process; and if the RAM profession in Zimbabwe has to grow, there is a need for consistency in the production of graduates, who go on to practise and further their studies in the field. Without the production of graduates, the future of the records and archives profession in Zimbabwe is bleak. In 2011, the Department of RAM at NUST reviewed its curriculum, taking into consideration developments and trends in the records and archives management profession. From its inception up to date, the Department of Records and Archives Management has had eleven cohorts enrolled in the programme. At the time of conducting this study, seven cohorts had graduated from this programme. With this development, there is a need to evaluate the self-worth of RAM students at NUST, Zimbabwe.

Literature Review

The education and the training of records and archives personnel improve the management of records and archives (Ngulube, 2001). Education and training in records and archives management enables personnel to acquire new skills, knowledge and to gain confidence in their work (Wamukoya, 2000; Ngoepe, 2011). Katuu (2009) also notes the impossibility of building real skills without building the basis of thinking being grounded in education. Furthermore, Ngulube (2001) encourages the development of guidelines and standards that suit the indigenous environment and the use of standards to enable learners to be competitive in the global economy. To Dickinson (2010), training must be properly timed and meet the real needs of the society at a particular time. Students have to be relevant and also instrumental in stirring development in communities. Kallberg (2012a) notes that the relationship between research, practice and higher education is important for archivists. According to Kallberg (2012b), higher education has an important role in supporting the practice with research that strengthens the archivist's profession in deûning problems and developing new working methods.

The status of professionals in any given field can at most influence how students view the profession. For most people, a job is the most important social and economic role held by most adults outside their immediate family or household (Hauser and Warren, 1997:179). The Social Identity Theory proposes that individuals think categorically about themselves and others, such that members of a high-status group assume themselves to be superior because of this group identiûcation, while members of low-status group may have an equal and opposite reaction (Hogg and Terry, 2000). Nengomasha (2009) identifies low salaries as one of the reasons for the poor status of records management in the public service in Namibia. Moreover, the International Records Management Trust (IRMT) (2004) highlights that in post-colonial Africa, poor remuneration lowered the prestige and status of records managers. Low salaries for records managers are likely to discourage prospective students from enrolling in the RAM degree programmes.

Professional identity is also important if the records and archives profession is to grow in Zimbabwe. Kallberg (2012) highlights that professional identity can be understood as a sense of shared experiences, understandings and skills, common ways of perceiving problems and their possible solutions. Kallberg (2012) also notes that the identity is produced and reproduced through a shared and common educational background and professional training, work practice, and memberships in professional associations. In

academic circles, RAM and librarianship have been considered as straightforward professions which need no specialised degree programme dedicated to them. The relevance of theory and academia in library and archives professions has been questioned by some scholars who have propagated the misconception that the work of these professions is general and straightforward and does not need any formal university degree program (Vollmer and Mills, nd: Roberts, 1987). Such thinking and arguments may dent the confidence of students studying towards degrees in these fields as they may feel inferior to students pursuing seemingly complex and sophisticated degree programmes.

Today's records managers and archivists have to manage digital documents which raise issues of privacy, security, preservation, intellectual property, surveillance, and access (Myburgh, 2005). Cox (2006) notes that graduate archival educators need to bring creativity and greater dedication to building a solid foundation for such professional education in universities. Turner (2003) posits that the purpose of education and training in electronic records management serves to provide knowledge and skills towards job performance and can be used to develop competency. Ngulube (2007) also points out that the education system should be sensitive to the challenges ushered in by e-government and comes up with strategies to equip students with skills required in the e-government environment. Mutiti (2001) points out that despite advances in the use of ICTs in many organisations, archival institutions have, in most cases, lamentably remained behind. Wamukoya and Mutula (2005) also raise concerns over the fact that among records and information managers and national archivists, there is insufficient capacity and training to articulate e-records issues and to provide guidance and input to policy makers and planners. Atkinson (2002) observes that archivists, in managing electronic records, also often lack the necessary skills to deal with electronic records because archival education remains relatively under-developed. Tibbo (2006) posits that archivists in North America have described, discussed, and debated the necessary and optimal content, configuration, and venue for archival education for close to a century but have given little consideration to integrating technology in their archival curricula. The failure to address e-records management in records management training produces half-baked records and archives management professionals who do not have the confidence to actively participate in e-records management environments.

The manner in which students are trained and oriented in the profession plays a pivotal role in shaping and boosting their confidence in their professions. Ljuca, Lozo and Vladimir (2008) reported that the student is the central figure in the process of education, and modern international institutions use "student centred approach" as their main philosophy in the process of curriculum development. Redmond (2008) insists that institutions should study the needs of the students and all the other feasibilities before selecting courses and drafting curricula. Little (2010) also highlights that there is a need for trainees to have a positive attitude towards work, fully commit, engage and be prepared to take learning back into the workplace. Powers and Rossman (1985) note that graduate students' satisfaction is related to faculty-student interaction, peer interaction, and a feeling of intellectual stimulation. Covington (1989) reported that as the level of self-esteem increased, so the level of academic achievement scored but as the level of self-esteem decreased, achievement declined. Self-worth and self-esteem, are therefore, critical factors if RAM students are to excel and contribute towards the development of the profession.

Okello (2009) avers that records and archives curriculum is poor in Uganda, and it runs para-professional with courses such as Library and Information Science (LIS). He further elucidates that education in RAM in Uganda can be described as inadequate but strongly growing. Kemoni (2011) conducted research on the RAM curriculum at Moi University, Kenya, and his findings revealed that some courses needed revisions to meet the market demands. Scheurkogel (2006) also notes that RAM students that go through LIS courses usually have few courses of archival science in their curricula, and poor delivery in archival institutions can be considered as a cause of concern. This study, therefore, sought to investigate the self-worth of RAM students at NUST with a view to determining how this affects enrolments into the degree programme and the growth of the records management profession in Zimbabwe as compared to other counties as reported in the literature.

Statement of the Problem

The low prestige and status of the RAM profession seemingly affected students in the RAM Department at NUST, as they felt inferior to students in other degree programmes. Furthermore, such a scenario may have led to low enrolments in the RAM degree programme, dropouts and may discourage students from pursuing higher degrees in RAM. This was witnessed by dwindling numbers of students who were enrolled in the programme between the years 2011 and 2015. Low self-esteem and the lack of self-worth could negatively impact the growth of the records and archives management profession in Zimbabwe. The aim of this study was to investigate the perceptions and self-worthiness of the students of the Bachelor of Science Honours degree in RAM at NUST, Zimbabwe.

Research Objectives

The study was guided by the following research objectives to:

i. determine the reasons why the students enrolled for the RAM degree programme.

ii. determine students' perceptions of the RAM degree programme;

iii. establish the level of confidence that the RAM students had in their degree programme; and

iv. establish possible future professional and academic plans of the RAM students at NUST

Research Methodology

The population of the study comprised students in the RAM Department in the 2014-2015 academic year, that is, the first, second and fourth-year students in the Department. Third-year students who were on industrial attachment were left out of this study as it would have been a challenge to contact them since they were located in different parts of Zimbabwe.

Purposive sampling technique was applied in this study as only students in the Department of RAM were chosen. Only registered students were included as the sample frame. The focus group discussion was the instrument used for conducting the study for each cohort or stream; hence three focus group discussions were conducted. In this study, 19 first-year, 16 second-year and 16 fourth- year students were studied and a response rate of 100% was achieved as all students were part of the focus group discussions. A standard interview guide was used in all the three groups. The interview guide had open-ended questions and the data analysis followed a thematic fashion. The study was carried out in March 2015. The students who were interviewed in this study were aged between nineteen and twenty-four years. All the students who participated in this study were not employed in RAM prior to enrolling for the programme. Only fourth-year students had gone through industrial attachment in their third year which had exposed them to records management practices.

Findings

Data were presented thematically and the themes were derived from the objectives of the study.

Factors Influencing Enrolment in the RAM Degree Programme

The reasons behind the students' enrolment in whatever degree programme differ as there are a number of factors which lead to students' degree choices. These factors include: advice from relatives and friends, the subject combination they would have read for at high schools and failure to satisfy minimum requirements in other degree programmes inter alia. Upon applying for enrolment at NUST, students are given the freedom to choose between three degree programmes in order of preference. These students were thus asked to highlight the choices they made when applying for a place to study at NUST, and their responses are presented in Table 1.

Table 1: Degree Choices Made by Students upon Application for Admission Stage

	RAM as First Choice	RAM as Second Choice	RAM as Third Choice	Did Not Choose RAM
First Year Students	6 (32%)	4 (21%)	3 (16%)	6 (32%)
Second Year Students	5 (31%)	6 (38%)	2 (13%)	3 (19%)
Fourth Year Students	4 (25%)	5 (31%)	4 (25%)	3 (19%)

Some students who had RAM as their first choice stated that their friends and relatives who were RAM graduates had encouraged them to enrol in the programme. Some students also stated that their parents advised them to choose RAM as it was new and not flooded like many traditional programmes such as LIS, marketing, accounting and journalism inter alia. Students in this category also stated that they chose RAM because they knew RAM graduates who were excelling in life and this was encouraging. One student stated that she enrolled in RAM out of curiosity, just to find out what the programme was all about and she had eventually "fallen in love with it". One-fourth year student, however, highlighted that " lack of career guidance at high school led me to enroll in RAM and should I have known better, I would have not enrolled in this programme." The students were further asked if they were regretting their decisions to enrol in the RAM degree programme, and their responses are presented in Table 2 below.

Table 2: Students Regretting/Happy about Enrolling in RAM

Cohort	Number of Students Regretting Enrolling in RAM	Number of Students Happy About Enrolling in RAM
First Year	6 (32%)	13 (68%)
Second Year	1 (6%)	15 (94%)
Third Year	5 (31%)	11(69%)

The students who did not regret being in the programme highlighted that they were slowly beginning to appreciate the programme, but hoped that the curriculum will be improved with time. These students also stated that the issue of unemployment was not facing RAM graduates only and this, to them, showed that the unemployment challenge was as a result of the country's economic meltdown and not the weakness of their degree programme. These students reported that South African RAM graduates were being employed and doing well and that, to them, meant that under a stable economic climate, they could be employed and become prosperous. These students also indicated that they were going to use their RAM degrees as stepping stones to achieve greater things in life. The students who were regretting enrolling in the RAM Degree highlighted that there was a number of RAM graduates who were unemployed and this made them feel insecure about their future, and they had no passion for the programme as they had enrolled thinking that it would be easy to change to other programmes.

Perceptions of the Students of the RAM Degree Programme

Students' perceptions and appreciation of a degree programme are critical as they show their interests and can inspire creativity and innovation therein. The following table highlights the students' appreciation of the RAM degree programme at NUST:

Table 3: Appreciation of the RAM Degree Programme by Students

Cohort	Students Appreciating the RAM degree Programme	Students not Appreciating the RAM degree Programme
First Year	14 (74%)	5 (26%)
Second Year	16 (100%)	0 (0%)
Fourth Year	11 (69%)	5 (31%)

First-year students who professed to appreciate the RAM degree programme indicated that the profession had not yet reached a stage where there were a lot of graduates competing for jobs, and this gave them hope that they could be employed after graduating. This group also cited that nearly all organisations and companies have records that have to be managed and this, to them, meant that nearly all organisations were potential employers for them. Second-year students who highlighted their appreciation for the RAM degree programme cited reasons raised by first-year students and also added that only a few universities in Zimbabwe were offering degree in RAM. One of these students stated that "it is only NUST and Zimbabwe Open University (ZOU) in Zimbabwe which offered this degree programme, and upon graduating, we will not be facing too much competition such as other students in traditional and over-subscribed degree programmes." Fourth-year students who appreciated the RAM degree cited reasons such as its uniqueness compared to other degree programmes. To these students, their degree programme was unique as they were having practicals unlike most degree programmes. These students also raised the fact that the degree programme was slowly being appreciated by employers as evidenced by the increase in the number of companies requesting for RAM students for Industrial attachment.

First-year students who did not appreciate the RAM degree programme cited the following reasons: "the shallowness of the RAM degree at NUST does not adequately prepare us to manage e-records management." These students also highlighted that they were being looked down upon by students from other faculties. One of these students lamented this in the following words:

> "*We cannot confidently tell anyone that we are studying RAM because people despise our degree programme and we always have to explain to people what RAM is. Most people do not know about RAM and they seem not to believe that someone can enroll in a degree only to study how to manage records"*

The Empowerment of RAM Students

Students have to acquire knowledge and skills that will empower them to contribute to the development of their communities and countries. If a degree programme cannot empower students, its existence becomes questionable. Respondents were asked if the RAM degree programme had empowered them. Their responses are presented in Table 4.

Table 4: Students Who Felt Empowered by the RAM Degree Programme

Cohort	Students Who Felt Empowered by the RAM Degree	Students Who Did Not Feel Empowered by the RAM Degree Programme
First Year	14 (74%)	5 (26%)
Second Year	4 (25%)	12 (75%)
Fourth Year	12 (75%)	4 (25%)

Students in all the three cohorts who felt that the RAM Degree programme had empowered them opined that they now understood the importance of archives, records and freedom of information towards the democratisation, development and good governance of a nation. These students also felt that they were now prepared to contribute meaningfully to the development of the country and Africa at large. Practicals which were part of the course work were mentioned as another way through which the students felt empowered.

Second-year students who felt that the RAM degree programme had empowered them indicated that they could now design websites among other things. Some fourth-year students also highlighted that courses such as infopreneurship and information economics had unveiled the business side of records and information management. Some reasons raised by the students across all the three cohorts included better communication and writing skills which they had acquired. Students who felt that the degree programme had not empowered them at all indicated that there was no need to study managing records at a degree level. These students believed that on-the-job training could suffice as there was not much to learn over four years. However, first - and fourth-year students felt more empowered by the RAM degree programme than second-year students. Fourth-year students' industrial attachment experiences had empowered them with practical skills. Twelve out of sixteen second year students (75%) were of the opinion that they were not empowered by the degree programme because they thought that the degree programme offered them very basic skills which did not empower them to work in international organisations such as the United Nations which required prospective employees to be conversant with e-records management and archiving software. These students felt that there was no practical e-records management and they had never come across any e-records management software or applications.

RAM Degree Programme Areas Which Need Improvements

The students were asked whether they thought that the RAM Degree programme could be improved for the development of the RAM profession. All the students in the three cohorts perceived that the RAM degree programme could do with some improvements. Some of the areas which the students thought needed to be improved on included practicals, especially in e-records management as most of the courses were just theoretical. The students also opined that the RAM Department was supposed to increase the number of e-records management courses as these were few. The students also were of the opinion that the RAM degree programme was designed with the public sector in mind and did not pay attention to records management in the private sector. The fourth-year students further highlighted that there was a lot of repetition and overlap between some courses that had been administered at lower levels. These students also noted that some courses were having the same course content. The fourth-year students also stated that they needed to have core courses and electives to avoid being treated as a homogenous group and not being able to choose courses they had interest in. These fourth-year students also highlighted that they needed lecturers who have a practical experience of what they were teaching rather than just theorising and searching for notes on the Internet.

The Contribution of the Industrial Attachment Experience to the Students

NUST students usually go for industrial attachment during their third year of studies. At the time of conducting this study, only fourth-year students had gone through industrial attachment. Industrial attachment provides students with the opportunity to experience RAM processes in any given organisation. Fourth-year students were asked to share their experiences during industrial attachment. These students indicated that they were required to either go to the National Archives of Zimbabwe or any other company that had a functioning records management system for their industrial attachment as this would enhance the value of this exercise. These students noted that some industrial attachment hosting institutions did not have records management systems and, therefore, students could not achieve any records management value and even learn. Some of these students noted that in some organisations there were neither records management systems nor qualified records managers who could train them.

Confidence in the RAM Degree Programme

The students were further asked if they had confidence in the RAM Degree programme and the Table 5 shows students' responses to this question.

Career Plans for RAM Students

Table 5: Confidence in the RAM Degree Programme

Cohort	Confidence in the RAM Degree Programme	Lack of Confidence about the RAM Degree Programme
First Year	2 (11%)	17 (89%)
Second Year	9 (56%)	7(44%)
Fourth Year	0 (0%)	16 (100%)

All the sixteen fourth-year students stated that their lack of confidence in the RAM degree programme was because the felt underrated and undermined in organisations they were conducting their industrial attachment in. These students indicated that they felt like their roles as records management attachés were insignificant and not part of organisations' strategic areas. Across all the three cohorts, the students reported that when asked about the degree programme they were enrolled in, they preferred not to tell the truth and but were telling people that they were enrolled in other degree programmes such as marketing and media and journalism and not RAM. Most of these students stated that they could not stand being associated with RAM as it was one of the degree programmes which most fellow students at NUST felt was insignificant. One final year student also stated that "we are just overqualified secretaries or clerks." These students also stated, that in most organisations, RAM is always associated with filing, and employers would rather hire a secretary than a RAM graduate to do filing. The students further stated that they had no confidence in the RAM programme since NUST (the university that offers the programme) did not have a university archive and records centre. This study established that the students had failed to meet requirements of their preferred degree programmes, and thus they were offered the RAM degree programme which was not their preference.

Preferred Degrees within the Faculty of Communication and Information Science

Respondents were then asked to highlight their preferred Faculty of Communication and Information Science degree programmes which included RAM, IJM, LIS and IPU. Their responses are presented in Table 6.

Table 6: Preferred Degree Choices

	RAM	IJM	LIS	IPU
First Year Students' Preferred Degree Programme Choice	13 (68%)	4 (22%)	1 (5%)	1 (5%)
Second Year Students' Preferred Degree Programme Choice	13 (81%)	2 (13%)	1 (6%)	0 (0%)
Fourth Year Students' Preferred Degree Programme Choice	5 (31%)	9 (56%)	1 (6%)	1 (6%)

Some career paths chosen by students included infopreneurs, that is, start businesses in line with information and records management, information brokerage, consultancy, commercial records centres and archives. These students also highlighted that they would also venture into research, become records managers, archivists and RAM lecturers. The above-mentioned students who considered careers in records management had an interest in audio visual archives management, e-records management, archives management, health information, informatics, database management, virtual archives and records management and data archives management. Five (26%) first-year students, twelve (75%) second year students and four (25%) fourth-year students indicated that they were not going to practice in the area of RAM as they had no passion for the degree programme. These students were not even sure of what they would do with their RAM degrees after graduating. These students stated that they found themselves enrolled in RAM just because they failed to satisfy the minimum requirements in other degree programmes. One final year student said that "I did not want to do RAM. When I came for registration there was a lady/receptionist who said that RAM was going to change to BSc Hons Information and Communication Technology, and it was this assurance that made me choose RAM. I regret ever meeting that lady who did not tell me the truth."

Continuing Education in RAM

The students were further asked if they were going to enrol in RAM higher degrees after graduating, and their responses were as follows.
not all students had lost confidence in the degree programme as some of them were foreseeing a bright

Table 7: Willingness to Pursue RAM Higher Degrees

Cohort	Students Willing to Pursue RAM Higher Degrees	Students not Willing to Pursue RAM Higher Degrees
First Year	16 (84%)	3 (16%)
Second Year	8 (50%)	8 (50%)
Fourth Year	3 (23%)	13 (77%)

The respondents who chose to pursue higher degrees in RAM after graduating highlighted that they did not want to start pursuing new areas outside the scope of records and archives management. These students also stated that they wanted to develop and become experts in RAM. Some of these students further highlighted that RAM would develop to grow like every other professions, and having higher degrees in the field would position them to become academics or lecturers when more universities and colleges start offering RAM degrees and diplomas. However, some of these students highlighted that they were not going to pursue their higher degrees at NUST as doing so would be mere repetition of what they studied during their undergraduate years. These students highlighted that they would rather study for RAM higher degrees in South African and overseas universities. Students who were not willing to pursue RAM higher degrees highlighted that they had already enough of the RAM programme. One fourth-year student expressed that "I will just use this programme as a stepping stone, I want to enrol for a first degree in Law."

Conclusion

Findings of this study showed that some RAM students at NUST felt the degree programme being offered by the university was lacking, especially in e-records management which happens to be the most sought-after skill in RAM. The study also concluded that most students had not intended to study for a degree in RAM, but due to their failure to meet the requirements in other degree programmes, they found themselves enrolled in RAM. The study also showed that some students' perspectives and views were shaped by their negative experiences during industrial attachment. These researchers also concluded that

future in RAM. This study also concluded that most students did not know about RAM prior to enrolling in the programme and they did not plan on making a career out of records management.

Recommendations

This paper recommends the RAM Department needs to do career guidance and conduct other educational programmes to help their students understand what it really means to be an archivist or records manager. RAM professionals, successful NUST RAM students' alumni and motivational speakers can be called upon to motivate students and give them hope. The study recommends the proposal of Ceja and Inefuku's (2009) for the need to support networking, mentoring, and career and leadership development as an element that would support the retention of minority students in the archives profession. The paper also recommends a comprehensive recruitment programme incorporating tuition stipends in support of graduate archives education, paid internships, and financial support for students to attend RAM conferences and workshops (Inefuku, 2014). Furthermore, the Department has to do a lot of marketing in order to be visible and establish contacts which can translate to employment opportunities for its graduates. These researchers also recommend that the RAM Department at NUST visits schools and conduct career guidance; set up records and archives clubs and conduct some archives competitions and other initiatives which may attract students who will be passionate about RAM from a tender age.

The RAM Department at NUST has to see to it that it reviews its curriculum in order to strengthen the e-records management and technology bit. Ataman (2009) highlights the need for new roles and new skills for archivists, records managers and librarians, and recommends increased technology content in education (Ataman, 2009). Kallberg (2012b) also notes the need of changing skills and knowledge in archival education and a need for increased technology. Furthermore, there is a need for practicals in e-records management and other technologies in records management as bombarding students with theory void of practice will not at all prepare them for the workplace. It is recommended that the students are to be made aware of the need for tertiary education in RAM. Kallberg (2012a) suggests that archivists need education in order to obtain the additional skills needed for pro-active and strategic work.

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Competencies Required by Teacher Librarians for Improved Primary School Library Services in Enugu State of Nigeria

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Abstract

School libraries are central to learner-centred and inquiry-based education. However, the services of teacher librarians are required to make the school library functional. To function effectively, teacher librarians require competencies in teaching, literacy promotion, librarianship, administration and advocacy. This paper explores competencies possessed and required by primary school teacher librarians in Enugu State of Nigeria for improved library services. The study is a survey research. With a purposive sample of sixteen primary schools with more developed school libraries, the researchers collected data through three instruments: an observation checklist assessing school libraries on accommodation, collections, personnel and services; a structured questionnaire with five clusters on competencies possessed, as well as open questions on factors inhibiting performance and strategies for improvement; and an interview guide. Data were analysed using frequency and percentages; and narrative description. Findings revealed that the personnel factor was crucial in effective library services; that while none of the teacher librarians had qualifications in both education and librarianship, they did possess some competencies, especially in the areas of literacy promotion and teaching while lacking others such as library skills. Among recommended actions to increase competencies and strengthen the performance of teacher librarians were: establishment of a clear career ladder for teacher librarians, continuing professional education leading to dual qualifications, inclusion of library periods on the timetable, development of a curriculum to guide teaching of library and information literacy skills, and advocacy to create a more supportive working environment for teacher librarians. Only such actions can improve school library services, since only well qualified teacher librarians can deliver effective school library services.

Keywords: Teacher librarians, School libraries, Library services

Introduction

The school library media centre can be regarded as the heart of the school. It offers services and resources that enable all members of the school community to become critical thinkers and effective

users of information in all formats and media (IFLA, 2015). It empowers the learner by introducing new experiences and promoting access to knowledge and enjoyment. It also provides a flexible learning environment for teaching and learning and encourages the teacher to widen and enrich his/her teaching expertise. Jato, Oguniyi and Olubiyo (2014) observed that learners who use their school libraries regularly had 18% higher achievement tests scores than their counterparts who do not. Afolabi (2016) also noted a strong positive relationship between academic achievement and availability of school library media resources. The author noted that availability of school library media resources has a great positive effect on students' academic achievement in social studies.

However, crucial to the effectiveness of any school library is a well-qualified teacher librarian. School library Association of Queensland (2013) has declared that there will never be a strong school library without a teacher librarian. IFLA, (2015) defined a teacher librarian as 'the professionally qualified staff member responsible for planning and managing the school library supported by as adequate staffing as possible, working together with all members of the school community, and liaising with the public library and others'. Numerous studies, including those of Greenwood, Creaser and Maynard (2008), Ontario Library Association (2015) and Gillen (2017), attested to the importance of this human resource. A committed school head and a well-qualified, dedicated teacher librarian were repeatedly singled out as critical factors for success in developing stronger school libraries.

The qualifications of teacher librarians vary all over the world. They may include librarians with or without teacher training and librarians with training in other library specialties (IFLA, 2015). Current opinion tends to favour some form of dual qualificationS in library and information science and in education because the school or teacher librarian bridges two professions: teaching and librarianship (Australian School Library Association, 2016). As an integral part of the school, teacher librarians must have firm grasp of educational principles and practice and the ability to interact freely and equally with classroom teachers. At the same time, they require thorough grounding in library and information science if they are to organise the school library, provide access to varied resources and facilitate their use by learners and teachers. In addition to these areas of knowledge competence, teacher librarians require certain personal qualities leading to commitment, leadership and advocacy of school library service. While paths to achieving this differ, the common goal is to develop professionals with competencies that reflect their dual role as teachers and librarians.

Various competencies have been identified as required for developing stronger school libraries. IFLA (2015) divided these required competencies into three categories: teaching competencies, library competencies and administrative competencies. Similarly, the American Library Association (ALA) in conjunction with the American Association of School Librarians (2010) gave the following areas as standards for initial preparation of school librarians: competencies in teaching, literacy and reading, information and knowledge, advocacy and leadership, programme management and administration.

School libraries are not yet well developed in Nigeria in spite of the education policy putting them 'at the heart of any education enterprise' (Nigeria Educational Research and Development Council (NERDC), 2008). The position of the teacher librarian has also not been well defined (Achebe, 2007). While the *National Policy on Education* (NERDC, 2008) lists librarians among the specialist teachers for primary schools, this has remained on paper; school libraries still lack professional librarians (Lawal-Solarin, 2016). Typically, a teacher without library qualifications is assigned responsibility for the school library, often without freeing him or her from a classroom teaching load. Moreover, teachers in charge of libraries may have little opportunity for meaningful continuing professional development.

Given the importance of personnel in creating effective school libraries, this study is an attempt to determine the competencies required by teacher librarians and the actions that might be taken to strengthen their performance for enhanced school library services, based on the views of serving staff in some of the more developed primary school libraries in Enugu State of Nigeria.

Objectives

The general objective of this study is to identify the competencies needed by Nigerian teacher librarians

to develop stronger primary school libraries. Specifically, the study:

(i) examined school library development, in terms of accommodation, material and human resources and services in the primary schools selected;

(ii) examined competencies of primary school teacher librarians in the areas of teaching literacy, library skills, administration and advocacy;

(iii) suggested an action plan to strengthen the performance of teacher librarians for more effective primary school library services in Nigeria.

Methodology

The study was carried out in Enugu State in the South-East geopolitical zone of Nigeria using the two major towns in the state. These are Enugu and Nsukka towns. The study is a survey research. The researchers purposively selected sixteen primary schools identified as among those having well developed libraries in the state. Eight schools were selected from each town. Ten of the schools were public schools while six were private. The respondents were the 16 teacher librarians in these schools.

Three instruments were used for data collection.

1. As a guide to observation, the researchers adapted the assessment form and scoring method used during the Best School Library Competition carried out in Nsukka Local Government Area in 2013. This was adapted from the Minimum Standards for school libraries used in the Anambra State school library competition of 1986 (Anambra State School Libraries Association, 1987). The observation checklist scored each school library in four areas - accommodation, collection, personnel and services with a maximum score of 20 points for each checklist area, a total of 80 points for a full score. The total score was also expressed in percentages.

2. A questionnaire for teacher librarians was developed based on the IFLA competencies for school librarians (IFLA, 2015) and the Standards for initial preparation of school librarians developed by the American Library Association (ALA) and American Association of School Librarians (AASL) in 2010. Section A of the questionnaire asked for personal information on gender, age and qualification, while Section B had five clusters asking respondents to indicate their competencies in teaching, literacy and reading, library management, administration, and advocacy and leadership. The structured questionnaire data was analysed using frequencies and percentages. The questionnaire also gave respondents opportunities to comment on factors limiting performance, training needs and ways of improving performance. The questionnaire was used to obtain information for research objectives 1 and 2.

3. To complement information from the questionnaire and also to obtain data for research objective 3, the researchers developed a five-question interview schedule, administered to seven of the teacher librarians. Qualitative data was used for Objective 3, action plan for strengthening school libraries and also to elaborate on findings for Objectives 1 and 2.

Findings of the Study

School Library Development

The researchers first assessed school libraries in terms of accommodation, collection, personnel and services using an observation checklist to score the libraries, and this was supplemented by personal observation during the visits. Observations were described in the sections below. Thereafter, the overall assessment of the libraries in these four areas presented in Tables 1a and 1b. For the purposes of this paper only findings relating to the competencies and development of teacher librarians are described in detail.

Accommodation

Effective school library service does not occur in a vacuum. Accommodation is needed to house the library facilities and to provide a learning space for learners. Therefore, accommodation was assessed

in terms of library size and placement, condition and maintenance, décor and ambiance, and furniture. This assessment also brought out the crucial role of personnel in providing these services and having competencies for creating and maintaining a user-friendly environment. Teacher librarians require competencies for creating user-friendly library as well as opportunities to maintain it.

Libraries in public schools were very dusty and some of the books were scattered on tables. The researchers learned this was because the state government had ordered all full-time teacher librarians back to the classrooms, leaving no one available to keep the libraries open and functional. However, two schools managed to keep their libraries open and functional. The two libraries still in operation were managed by teacher librarians who doubled as teacher librarians and classroom teachers. This situation in itself highlighted the importance of dedication in running a school library.

Library Collections

The researchers took note of the size, balance and quality of the collection, as well as shelf arrangement, accessioning and cataloguing. Only two out of the sixteen school libraries used for the study had accession registers. The collections of six school libraries were properly catalogued with call numbers, spine labelling and the materials neatly arranged on the shelves. These consists of one private school in Enugu, which has a library and information science graduate as librarian; four public schools in Nsukka that have benefitted from assistance and workshops provided by the Children's Centre, University of Nigeria, Nsukka; and the University Staff School, whose books had been catalogued by Library Science students of the University of Nigeria, Nsukka. This indicated a major need for library competencies.

Personnel

Aspects of personnel considered were the presence and qualifications of teacher-librarian; participation in workshops, reading promotion activities and work with classroom teachers; availability of an assistant and student prefects, a library committee and supportive administration as evidenced by development efforts. The questionnaire revealed that the public school teacher librarians were qualified teachers with basic teaching qualification for primary school, the National Certificate in Education (NCE), a three-year post-secondary programme. In addition, four had Bachelor's degrees, of which three were in Education; and one had a Master's degree in Political Science. However, none had library qualifications from their background, such teacher librarians may be well versed in teaching but not in library work.

The picture in the private schools, where library personnel are usually employed specifically as teacher librarians, was different. Two out of the six persons working as teacher librarians in private schools have Master of Library and Information Science degree, two had Bachelor of Library and Information Science degree, one had ordinary diploma in library and information science and the other had a Bachelor of Education Degree in Guidance and Counselling. Private schools therefore, had more qualified teacher librarians than public schools.

Five teacher librarians had attended workshops; these were three teacher librarians from Nsukka public school libraries working with the Children's Centre. Two librarians from private schools in Enugu attended workshops; and were members of the Nigerian Library Association.

Use of the Library by Students

The use made of the library by learners and teachers were also assessed. This included evidence of borrowing, an active timetable of library periods, access to materials, use of library resources for school assignments, and inter-library loans. The interview indicated that teacher librarians in Nsukka engaged learners in library activities such as story hour, book club, quiz, debate, drama and project work. These activities were stimulated by the annual library week organised by the state education board and events such as Children's Day at the Children's Centre. Likewise in private schools, three teacher librarians organised book clubs and story hours, but not in collaboration with classroom teachers. There was little evidence of collaboration with classroom teachers in providing learning materials or conducting library-based activities in either public or private schools.

Overall Assessment of the Selected Primary School Libraries

Scores in the four areas were totalled to assess and rank the libraries. Results are set out in Tables 1a and 1b, with school libraries listed in rank order by score and percentage. Several things can be noted from the table. First, it appears to be much easier to acquire accommodation (51%) and collection (48.5%) in public primary schools and (79.1% and 72.08% in private primary schools) than to bring these to life through personnel (22.5%) and services (21%) in public primary schools and 32.5% and 47% in private primary schools. While observation showed considerable differences in the quality of the library space and collection, accommodation and collection ranked highest in all the schools. Only two schools scored above average in human resources, seven scored below average, while seven of the school libraries did not attract any score for human resources. Seven school libraries scored above average in services, five scored below average while three scored zero for services. Both of these underscore the importance of the personnel factor in the services of school libraries.

Table 1a: Overall Assessment of the Selected Public Primary School Libraries

School ranking	Accommo-dation	Collection	Personnel	Services	Total Score	%
	Score out of 20	Score out of 20	Score out of 20	Score out of 20	Total out of 80	Total score as %
1	12	14	9	11	46	57.5
2	12	14	9	12	45	56.25
3	12	12	9	11	43	53.75
4	11	12	9	11	43	53.75
5	10	11.5	9	2	32.5	40.62
6	10	8	0	3.5	21.5	26.9
7	12	8.5	0	0	20.5	26.25
8	10	5.5	0	3.5	19	23.75
9	8	7.5	0	0	15.5	19.4
10	5	4	0	0	9	11.25
Average points	10.2	9.7	4.5	5.4		
% for cluster\	51%	48.5%	22.5%	21%		

Table 1b: Overall Assessment of the Selected Private Primary School Libraries

School ranking	Accommo-dation	Collection	Personnel	Services	Total Score	%
	Score out of 20	Score out of 20	Score out of 20	Score out of 20	Total out of 80	Total score as %
1	19	19	15	14	67	83.75
2	18	17	13	14	62	77.5
3	16	16	9	8	49	61.25
4	10	12.5	0	11	33.5	41.81
5	14	10	2	7.5	33.5	41.87
6	18	12	0	2	32	40
Average points	15.8	14.4	6.5	9.4		
% for cluster\	79.1	72.0	32.5	47		

Secondly, the private schools had better library resources and managed. This was evident in some of their libraries. The three highest scores in table 1b (83.75%, 77.5%, and 61.25%) were attained by private schools. However, the results also show that effective school libraries could be developed through the drive and enthusiasm of committed personnel. The four public school libraries that scored 57.5%, 56.25%, 53.75% and 53.75% are all from Nsukka town. They had all benefitted from the dedication of highly committed head teachers and teacher librarians, supported by the local education supervisor and library educators working through the Children's Centre at the University of Nigeria, Nsukka. Lacking similar support with training, the public schools in Enugu, with scores below 40%, were the most disadvantaged. While these schools exhibited some library activity in the past, assisted by a Non-governmental Organisation (NGO) and the state Universal Basic Education (UBE) Board, all these have been suspended since teacher librarians were sent back to the classroom in 2014.

The condition in which these researchers met the libraries during observation showed that there were lack of organisation and orderly arrangement in all the libraries, even those managed by staff with library qualifications. The findings also indicated the low level of services, collaboration with teachers, and integration of the library with the curriculum. This led the researchers to examine more closely the views of the teacher librarians on competencies they possessed and what more they needed for developing stronger school libraries.

Competencies of Primary School Teacher Librarians

The teacher librarians, all but one of who were females and between the ages of 25 and 44. They were asked to indicate their competencies in five areas (teaching; literacy and reading; library collection management; library administration; and library advocacy and leadership) by ticking (√) against the competencies they possess. Frequencies and percentages were used to analyse the responses, which are presented in rank order. The list of competencies, as indicated above, was drawn from the schema of ALA/AASL (2010).

Table 2: Ranked Order of Teaching Competencies of the Teacher Librarians

		Public Schl. Lib. Respondents =10			Private Schl. Lib. Respondents =6		
S/N	***Teaching competencies***	**F**	**%**	**Rk**	**F**	**%**	**Rk**
1	Guiding pupils in the choice and use of library resources	10	100	1st	5	83	2nd
2	Conducting information literacy and library use instruction	8	80	3rd	4	66	3rd
3	Working with teachers to integrate the library with the curriculum	7	70	5th	6	100	1st
4	Teaching pupils and teachers how to access information from the library	9	90	2nd	2	33	5th
5	Developing instructional programs for imparting library and information skills	7	70	4th	3	50	4th
6	Teaching teachers and students information search skills	6	60	5th	5	83	2nd
7	Assisting teachers in developing units that combine use of library and community resources	5	50	6th	3	50	4th
8	Teaching the use of newer resources such as information and communications technology (ICT)	2	20	7th	1	16	6th
	Average point in %		66			60	

The teacher librarians from public schools possessed skills in the area of teaching competencies, especially those referring to direct guidance provided to learners in using library resources, teaching pupil and teachers how to access information from the library, and developing information literacy skills. The teacher librarians from private schools had skills in working with teachers to integrate the library with the curriculum, guiding pupils in the choice and use of library resources, teaching teachers and pupils' information search skills, and conducting information literacy and library use instruction. Teacher librarians from both types of schools also had competencies in other areas of collaborative work with teachers. However, teacher librarians from both types of schools lacked skill in the use of newer resources such as ICT. The same picture emerged from interviews; none of the teacher librarians expressed confidence in using or teaching ICT. One teacher librarian from public primary school saw no value in bringing computers into the library since she could manage without it. Much of their confidence was in the teaching areas. This is not surprising since most of them were trained and experienced teachers. One expressed the opinion that she was selected because she was 'versatile' and 'capable.'

Table 3: Ranked Order of Literacy and Reading Competencies of the Teacher Librarians

		Public Schl. Lib. Respondents =10			Private Schl. Lib. Respondents =6		
S/N	***Literacy and reading competencies***	**F**	**%**	**Rk**	**F**	**%**	**Rk**
1.	Knowledge of high quality reading materials for children and youth	9	90	2nd	6	100	1st
2.	Promoting reading through story hour programs and book talks	10	100	1st	5	83	2nd
3.	Promoting reading through the acquisition and lending of wide variety of reading materials in multiple formats	7	70	3rd	4	66	3rd
4.	Promoting literacy through organisation of library clubs	6	60	4th	3	50	4th
	Average point in %		80			75	

Table 3 shows the literacy and reading competencies which the teacher librarians possess. In both the public and the private schools, knowledge of high quality materials for children and youths and promoting reading through story hour programmes and book talk occupy the first and second position in the table. Prominent among activities mentioned by both types of schools during the interviews were conducting debates in topical social issues, quizzes in general studies and story hours. Teacher Librarians from the private schools mentioned project works also.

Table 4: Ranked Order of Library Competencies of the Teacher Librarians

	Public Schl. Lib.	**Public Schl. Lib. Respondents =10**			**Private Schl. Lib. Respondents =6**		
S/N	***Library competencies***	**F**	**%**	**Rk**	**F**	**%**	**Rk**
1.	Enhance access to library collection for all	10	100	1st	6	100	1st
2.	Selecting and acquiring books and other library resources	9	90	2nd	5	83	2nd
3.	Ensure that the collection covers the interests of all pupils	5	50	6th	3	50	4th
4.	Have knowledge of library material in the locality	7	70	4th	3	50	4th
5.	Providing reference and information services to users	8	80	3rd	3	50	4th
6.	Processing and preserving library materials for use	5	50	6th	4	66	3rd
7.	Creating displays and other library resources	4	50	6th	3	50	4th
8.	Developing collections for topics in the curriculum	6	60	5th	3	50	4th
9.	Organising through cataloguing and classification	2	20	7th	1	17	5th
10.	Setting up and implementing a viable circulation system	1	10	8th	1	17	5th
11.	Indexing and abstracting newspapers and magazines	2	20	8th	1	17	6th
	Average point in %		55			50	

Table 4 shows that the weakest areas of library competencies identified in both types of schools were on the more technical aspects of library work. These include cataloguing, indexing and abstracting, and circulation (items 21, 22, and 23).These areas have very low scores (Scores below 50%). The teacher librarians felt more comfortable about their competencies in more reader-oriented services such as enhancing access to library collection for all, selecting and acquiring books and other library resources etc. (items 13-20). During interviews, teacher librarians from public primary schools specifically mentioned library competencies as areas of need. For instance, one public school teacher librarian stated, 'I need more training on how to organise and catalogue library materials and more knowledge of library materials and their uses.' Another agreed: 'I don't really have competency in library work. The only idea I have is what I did when I was an undergraduate, and it's theoretical.' She and others from the public schools in Nsukka mentioned that the skills they possessed in this area were acquired from workshops at the Children's Centre Library. The teacher librarians from the private schools mentioned cataloguing, indexing and abstracting as library competencies they have not mastered. One of them lamented "my biggest problem is cataloguing and I have nobody to correct me when I make a mistake; being a novice without a coach is not good".

Table 5: Administrative Competencies of the Teacher Librarians

		Public Schl. Lib. Respondents =10			**Private Schl. Lib. Respondents =6**		
S/N	***Administrative competencies***	**F**	**%**	**Rk**	**F**	**%**	**Rk**
1.	Enforcing discipline	10	100	1st	5	83	2nd
2.	Keeping accurate records of collection, circulation, etc.	10	100	1st	6	100	1st
3.	Planning and arranging the library environment	9	90	2nd	2	33	5th
4.	Developing school library policies	7	70	3rd	3	50	4th
5.	Publicising library resources and services	6	60	4th	4	66	3rd
6.	Organising and supervising work in the library	5	50	5th	3	50	4th
7.	Training library support staff and student volunteers	2	20	6th	1	17	6th
8.	Preparing budget and administering library funds	2	20	7th	1	17	6th
	Average point in %		64			52	

With regard to administration, it is not surprising that the few respondents had competences in the last two items (items 7 and 8) since few teacher librarians have any opportunity to budget and administer library funds, or to supervise staff. Most of the functions teacher librarians performed revolved around enforcing discipline and keeping accurate record of collection, circulation, etc. (items 1 and 2).

Table 6: Advocacy and Leadership Competencies of the Teacher Librarians

		Public Schl. Lib. Respondents =10			Private Schl. Lib. Respondents =6		
S/N	***Advocacy and leadership competencies***	**F**	**%**	**Rank**	**F**	**%**	**Rank**
1.	Advising the head teacher on school library matters	7	70	1st	4	66	1st
2.	Maintaining membership of library associations	7	70	1st	4	66	1st
3.	Drawing attention of the head teacher and parents to the goals of school library	6	60	2nd	3	50	2nd
4.	Initiating library programmes that will gain the interest of parents.	6	60	2nd	4	66	1st
5.	Serving as the advocate and link between the library and the rest of the school	6	60	2nd	3	50	2nd
6.	Attending workshops and conferences	5	50	3rd	3	50	2nd
	Average point in %		62			58	

Table 6 shows the advocacy and leadership competencies of the respondents. At least, half the numbers of teacher librarians in both types of schools were competent in each of the items of the advocacy and leadership competencies.

The highest self-ratings overall for public primary schools were in literacy and reading promotion (80%), followed by teaching competencies (68%), administrative competencies (64%), and Competencies in advocacy (62%). Library skills competencies (55%) were perceived to be lowest and this is also reflected in the comments of their teacher librarians. Among the private primary schools, literacy and reading competencies had the highest score (75%), followed by teaching competencies (60%), advocacy and leadership competencies (58%), administration (52) and lastly library competencies (50%)

Action Plan for Improving Performance of Teacher Librarians

In the open questions and interviews, respondents were asked for suggestions on how to enhance their performance for more effective school library services. Eleven teacher librarians (seven from public and four from private schools) provided suggestions on the questionnaire and/or during interview. Their suggestions ranked in order of frequency are presented on Table 7.

Table 7: Suggestions on Enhancing Performance for More Effective School Libraries

		Pub. Pri. schl	Priv. Pri. Schl.
Rank	**Suggestions of Teacher Librarians**	**Frequency**	**Frequency**
1.	In-service training for teacher librarians	7	4
2.	Provision of spacious, conducive, well-secured library accommodation	5	3
3.	Inclusion of library period on the time table	4	2
4.	Employing or posting a teacher-librarian to the school library	5	1
5.	Library advocacy to raise awareness of parents, pupils and NGOs	3	3
6.	Provision of adequate reading and learning resources for pupils	4	1
7.	Supply of sufficient library furniture for pupils to read and work	3	2
8.	Time to manage library and attend workshops/ conferences	1	3
9.	Securing government recognition of position for teacher librarians	4	–
10.	Use of incentives to encourage reading and library use	3	–
11.	Provision of support staff and student volunteers to assist	3	2

These suggestions have been taken together with the findings on the first and the second objectives and are used to recommend ways of moving primary school libraries forward.

Conclusion

This study looked at the personnel serving in primary school libraries in Enugu State of Nigeria, examining the competencies teacher librarians require to develop stronger school libraries. The study noted that availability of library accommodation and resources is essential, but that the position of a qualified and committed teacher librarian is even more important. It is the teacher librarian who can ensure the use of these resources for enhancing teaching and learning, promoting reading and developing information literacy for lifelong education. The findings indicated a great need for education and training, through programmes to obtain qualifications in teaching and librarianship and through in-service training. Teacher librarians, however, require certain conditions to put acquired competencies to work, including a well-equipped library, time and a curriculum for library use, and a supportive environment with high awareness of the role of the library in education. The authors have, therefore, recommended ways to enable teacher librarians to acquire the necessary competencies and utilise them for building stronger libraries in Nigerian primary schools, thereby providing quality education for all.

Recommendations

There are five actions that need to be done to develop stronger school libraries. They are:

1. The position of teacher librarian should be established in every primary school

One major step forward would be to establish a full time position for a teacher librarian in every school. Until this is done, it will be difficult to make a strong case for training, and even qualified personnel will be used for classroom teaching rather than school library service if the position of teacher librarian is not created.

2. Continuous professional development programmes should be organised for teacher librarians

In-service workshops and courses should be organised for teacher librarians and indeed all teachers. Avenues should also be created for teacher librarians to acquire better qualification through diploma, certificate and degree programmes. In-service workshop and short one to two weeks courses on the rudiments of library organisation and management; and the use of the library in education are valuable for orientating serving staff.

However, short term in-service training is no substitute for full qualification. Government needs to provide avenues for serving teacher librarians to acquire qualifications in whatever area they are deficient, for instance, through paid study leave for qualifications in library and information science. The Abadina Media Resource Centre of the University of Ibadan (now Centre for Educational Media Resource Studies) has already started the master's degree and doctoral degree programmes specially tailored for school library media specialists. Such programmes would also equip fresh entrants into the profession and gradually produce well qualified personnel for school libraries in Nigeria. They would, however, need an established position and career ladder (Elaturoti, 2011).

3. Resources to Work With: Competencies in Selection and Use

Library personnel are essential, but they need material resources to work with. These include: a well-furnished library accommodation and varied collection of resources—print, audio-visual and digital. Also, teacher librarians require certain competencies if resources are to be put to use.

The link between collection development and competencies was implicit in the assistance offered by the Universal Basic Education Commission (UBEC)/World Bank-assisted primary school library project of 2000-2002 and the Bendel and Anambra States book depots of the 1980s (Ngwuchukwu, 2013). In both cases, government agencies offered wide selection of varied resources, while at the same time conducting workshops on principles of selection and use of library materials in teaching and learning. Likewise, during in-school discussions, Children's Centre facilitators helped teacher librarians explore ways of using varied resources in teaching. These models should be revived and adapted to equip teacher librarians with the requisite competencies in resource selection and use.

4. Developing Library and Information Literacy Skills

Providing the basic human and material resources will only be fruitful if these resources are put to use in teaching and learning. Hence another basic step in any effective action plan is the inclusion of a library period on the timetable. This has been given heavy emphasis by six of the teacher librarians. A library period was approved by the Enugu State Government, among others, in 2006, but is still to be implemented.

Once there is a library period, a curriculum is also needed to guide teacher librarians, especially since most lack library training and familiarity with learner-centred approaches to developing information literacy. This is an area where action is being taken. Members of the library school at the University of Nigeria have been working locally on developing curricula for library periods and information literacy for over a decade (Dike, Ngwuchukwu and Onyebuchi, 2011). In addition, in 2013, three library educators from the Nigerian School

Library Association (NSLA), including one of the authors of this paper, developed a curriculum for library and information literacy skills for library periods for Primary 1 to Senior Secondary 3. This has been submitted to the Nigerian Educational Research and Development Council (NERDC) for further action. The inclusion of a library period not only necessitates a curriculum but also a person to actualise it, that is, a teacher librarian. In this way, each of these steps reinforces the other in developing effective school libraries.

5. Advocacy and Raising Library Awareness

The importance of raising awareness was highlighted by respondents, who stressed the need to sensitise all stakeholders- government, other agencies, parents, and pupils on the central role of school libraries in education. Library associations such as the Anambra State School Libraries Association (1977-1991) and the Nigerian School Library Association have played effective role in liaising with government, public libraries and other agencies to put forward a school library agenda, mobilising teacher librarians and schools at grassroots level, and providing in-service training (Ngwuchukwu, 2013), as have NGOs such as the Children's Centre, which has combined advocacy with training and mobilisation of teacher librarians on a local level.

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Appendix

List of Public and Private Primary Schools that Participated in the Study.

Public

New Haven Primary School, Enugu
Obiagu Road Primary School, Enugu
Women Training College Primary School 1, Enugu
Women Training College Primary School 3, Enugu
Ziks Avenue Primary School, Enugu
Agu Achara Primary School 1, Nsukka
Agu Achara Primary School 2, Nsukka
Nru Community Primary School 1, Nsukka
Nru Community Primary School 2, Nsukka
Model Primary School 2, Nsukka
International Nursery and Primary School, Enugu
Pine Crest Primary School, Enugu
Seat of Wisdom Primary School, Enugu
Hill Crest Primary/Preparatory School, Nsukka
Shallom Primary School, Nsukka
University School, Nsukka.

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Disaster Preparedness and Management at the National Archives and the National Library of Namibia

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Abstract

This paper is based on a study, which investigated whether the National Archives and National Library of Namibia (NANLN) had put into consideration issues of prevention, preparedness, response and recovery in their Disaster Management Plan (The Plan). The study was guided by the disaster management cycle made up of four phases, namely prevention, preparedness, response and recovery. The population of the study consisted of NANLN management, librarians, archivists, housekeeping staff, security personnel, the accountant and users, as well as personnel from support institutions. Applying purposive sampling technique, 40 respondents were selected to take part in the study. Data collection methods included interviews, focus group discussions, direct observations, and document analysis. The main finding is that the Plan lacked most of the major components that make an ideal disaster preparedness plan. The study concluded that the Plan would be ineffective in the event of a disaster as it was incomplete. The recommendations include: staff awareness of the Plan and training; coming up with a comprehensive list of stakeholders and an updated list of contacts; acquisition of emergency supply kits; development of a security management plan; further development and regular reviews of the Plan.

Keywords: Archives, Disaster management, Disaster planning, Disaster preparedness, Libraries, Namibia

Introduction

All institutions are at risk of a disaster, be it natural or man-made. According to Eden and Matthews (1996), a disaster is any incident that can harm or threaten safety to buildings, collections, equipment and systems. The first step before drawing up a disaster plan is to identify the potential hazards. The United Nations International Strategy for Disaster Reduction (UNISDR) (2004 as cited in UNISDR 2005: 1) explains hazard as:

> *A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydro meteorological and biological) or induced by human processes (environmental degradation and technological hazards).*

Grau (2000) identified fire and water as the most common hazards for archives, museums and libraries. However, Fullerton (as cited in Hlabangani and Mnjama 2008) argued that archives and library disaster prevention should not only be restricted to water and fire threats. Fullerton's observation is supported by Hlabangani and Mnjama (2008), who argued that information institutions ought to prepare for all types of disasters and security problems. Among the well documented library and archives disasters are the Florence Flood of 1966 which destroyed cultural materials in the Bibliotheca Nazionale Centrale (Feather, 1994); terrorist bombing of the Pentagon Library in the USA in 2001 (Buchanan, 2002); and destruction of 60% of monarchy documents in the Iraqi National Library and Archive whose collection suffered three fires during the United States of America invasion in 2003 (Mustafa, n.d.). The Institut d'Egypte was burnt in 2011 in a public uprising and thanks to public assistance, 30-40,000 books and manuscripts were rescued (Mustafa n.d.). Alegbeleye (as cited in Issa, Mulikat, Adegboyega and Akangbe (2012) highlighted some disasters, which occurred in Africa. These include National Archives of Swaziland in 1984 where a hurricane destroyed some archives, and fire damage to the records of the Secretarial Office in Nairobi, Kenya in 1939. As a result of these disasters, documentary heritage was destroyed. Over 3000 books were destroyed at Bindura University in Zimbabwe due to floods (Hayes, 2015). In December 2015, Mzuzu University Library in Malawi lost about 45 000 books in a fire that completely destroyed the library building (Hayes, 2016). The National Archives and the National Library of Namibia (NANLN) are not exceptions as they are equally at risk to all forms of disasters. Such disasters in Namibia include the Ministry of Education's Ondangwa East Regional Office (Namibia) that had all its human resources records and 2000 library materials burnt in 2003 (Shivute, 2003); and a fire that destroyed the Eastern block of Outjo Municipality offices (Namibia), reducing all municipality files to ashes in 2009 (Namibia Press Agency (NAMPA) (2014).

From the foregoing, it can be argued that disasters are part of human existence, and as such there is need by archival and library institutions to put in place disaster management plans to control them. Ngulube (2003) pointed out that disaster planning or emergency preparedness is fundamental to the preservation of records and archives. He further pointed out that the phases of disaster planning are as follows:

- Before the disaster (preventive and preparedness): implementing measures to remove or reduce danger as well as being ready by having resources, materials, services and procedures in place to deal with problems when they occur;
- During the disaster (response): knowing how to respond to minimise damage quickly and efficiently; and
- After the disaster (recovery): knowing what to do to recover damaged material.

Statement of the Problem

A study by Nengomasha (2009) established that in the event of a disaster such as fire or flood, the public service of Namibia would not be able to protect its records. The National Archives of Namibia tasked with the mandate of providing a records management service in the public service of Namibia had not issued a disaster management plan at national level, and there were no institutional plans. Nengomasha (2009) recommended further research in this area. No studies had been conducted on disaster management in the context of records and archives management at the time this study. As far as the researchers were aware no such study had been conducted at the time of writing this paper. This study was partly a reaction to that call. The NANLN have a thirty-paged Disaster Preparedness Plan, which was produced in 2001 (Namibia Library and Archives Services, 2001). The study investigated whether the Plan covered the basic components of a disaster preparedness plan meant to address phases of the disaster management cycle, namely: prevention, preparedness, response and recovery (see literature review).

The purpose of the study was to come up with recommendations on how disaster preparedness and management at NANLN could be enhanced. The main question, which this study aimed to answer, was: "Does the Plan at the NANLN address all the phases of the disaster cycle?" This was addressed by providing answers to the following sub-questions:

1. How comprehensive is the current disaster plan of the NANLN?
2. What potential threats do the NANLN face which are likely to cause a disaster?
3. What measures are in place to minimise the impact or avoid a disaster at the NANLN?
4. How has the NANLN reacted to near disasters or disasters?
5. What are the solutions to problems identified if any?

Theoretical Framework and Literature Review

Disaster management ensures minimisation of occurrences of disasters by taking preventive measures; reduce the impact of disasters through preparedness, which in turn leads to swift response and effective recovery. This study was informed by the disaster management cycle which "illustrates the ongoing process by which governments, businesses, and civil society plan for and reduce the impact of disasters [prevention and preparedness], react during and immediately following a disaster [response], and take steps to recover after a disaster has occurred [recovery]" (United Nations International Strategy for Disaster Reduction (UNISDR) (2005).

Measures must be put in place to remove conditions that would encourage the likelihood of a disaster after the potential threats have been identified so as to minimise the possibility of occurrence of a disaster. This study aimed to establish whether this disaster preparedness step (i.e. risk analysis) was carried out before the Plan at the NANLN was written. According to Grau (2000), in the preparedness phase, the institution is getting ready to cope with a disaster. The International Federation of Library Associations and Institutions (IFLA) (n. d.) describes the preparedness stage as comprising of the following activities: developing a written plan; making provision for its testing; selection of a disaster management team; training of the team and all staff members and making them aware of the plan and its contents; preparing and keeping an up-to-date set of documentation; distributing the plan and documentation to appropriate locations on- and off-site; and instituting procedures to notify appropriate people of the disaster and assembling them rapidly. Grau (2000) also revealed that communication and chain of command of the disaster team must be put in place beforehand to avoid confusion in a real disaster situation. Response is the phase of the disaster plan that addresses actions that have to be taken when disaster actually strikes. Buchanan (2002) mentions that it covers the instructions for the immediate actions after a disaster. Söderlund (2000) advises that disasters have to be dealt with immediately. The study sought to establish how the situation has been normalised after near disasters at the NANLN.

The basic components of a disaster management plan will vary according to an organisation's needs, size and resources (Lindell, Prater and Perry, 2007 as cited in Kostagiolas, Araka, Theodorou and (Bokos, 2011) but should include the following:

- List of vital records, particularly significant or vulnerable holdings, location and control documentation;
- List of equipment and materials available for use in disaster salvage and recovery; The function, composition and chain of the salvage and recovery team and their contact information;
- Procedures for identification and declaration of a disaster situation and initiation of the disaster response chain of command by the normal business operation; provisions for training and current awareness of the team;
- List of sources of back-up resources, including expertise, trades people, materials, equipment, vehicles and accommodation;
- Procedures for updating and testing the plan; simple technical information on handling of damaged material, directed towards establishing priorities for early action (Government of South Australia, State Records of South Australia, 2007).

These components of the disaster preparedness plan have also been acknowledged by the ICA (1997), Connecticut State Library (1997), International Records Management Trust (1999), Northeast Document Conservation Center (1999), Söderlund (2000), ICA (2001), Ngulube (1991), Ngulube (2003)

and Western New York library Resources Council (2003).

Halsted, Jasper and Little (2004 as cited in Kostagiolas et al. (2011) highlighted the following steps of coming up with a disaster management plan: setting up a disaster response team; assessing the risk; establishing a disaster communication network; ensuring access to financial resources; reinforcing building security; creating lists and collecting supplies for cases of emergency; defining weak points; creating an evacuation plan; drawing up a disaster management plan; conducting disaster exercises (preparedness exercises); and reviewing and updating the disaster management plan.

A disaster management plan should be supported by:

- A clear policy statement that mandates the plan and defines responsibilities;
- Vital records and risk assessment and analysis;
- Copies of current ongoing contracts (such as vital storage, pest control, emergency equipment and supplies and contact details); and
- Arrangement for reviewing risks and contracts, and revising procedures (Government of South Australia, State Records of South Australia, 2007, p. 18).

As indicated above, a risk assessment and analysis should support the development of a disaster management plan. Ngulube and Magazi (2006) conducted a study on measures taken by public libraries in KwaZulu Natal to control or minimise the impact of disasters. Their findings suggest that the libraries did not place much importance on risk assessment. "Seventeen (34%) libraries had conducted a hazard survey; although only 14 of these libraries used some of the information from the risk management exercise to formulate written disaster plans" (Ngulube and Magazi, 2006). The same study also showed that the libraries were very weak in terms of instituting preventive measures to mitigate disasters. "Six (12%) libraries never inspected or tested their fire extinguishers, and 30 (60%) libraries had not trained staff in the use of fire extinguishers. Only 11 (22%) libraries had fire detection systems and 10 (20%) of these libraries' fire detection devices were connected to a central monitoring facility. Nine of these libraries used smoke sensors for fire detection" (Ngulube and Magazi, 2006).

A study in Greece by Kostagiolas et al (2011: 522) identified the following most prominent factors arising from disasters: collection damage (32%), data loss (19%), system damage (15%), equipment damage (14%) and building damage (14%). The same study established that 90% of the libraries did not have formal disaster management plans. A Nigerian study also identified a lack of disaster management plans as a factor hindering disaster management (Echezona, Ugwu and Ozioko, 2011). Rutto and Otike (2016), in addition to some of the factors mentioned here, identified a lack of policy framework as hindering effective disaster management. The reasons given by the directors of the libraries in the study in Greece for not coming up with disaster management plans included: other priorities (29%), not their authority (23%), not aware of the existence of such a plan (17%), and cost (17%). The hazards, which were identified by the same study as most likely to cause a disaster, were: earthquakes, construction omissions and deficiencies, fire caused by human negligence, flood attributed to inside causes such as leaks, and inadequate collection protection. Kostagiolas et al. (2011) made the same argument as Ngulube (2003) that theft as a hazard that can lead to a disaster is usually overlooked. Kostagiolas et al. (2011) argued that the library directors viewed "a disaster as something that has very grave consequences such as earthquakes and do not actually grant a similar "significance" to smaller in consequences but frequent in occurrence risks, such as incidents of vandalism, torn and smudged pages, minor thefts, etc." (p. 525).

Methodology

The methodology comprised a case study research design, with interviews, focus group discussions, direct observations, and document analysis as data collection methods. Interviews were conducted with the following personnel at the NANLN: management, librarians, archivists, housekeeping staff, security, the accountant, users, and personnel from support institutions. Two focus group discussions were administered, one each for the National Archives and National Library of Namibia. One-on-one face-to-face interviews were conducted with representatives from IT, Fire Brigade, Police, City of Windhoek/ Municipality, and Office of the Prime Minister's

Disaster Management Division. The respondents were purposively selected. The data collection instruments used included an observation checklist and separate interview guides for NANLN management, support institutions, and NANLN users. The Plan was analysed against basic components of a disaster management plan as highlighted in the theoretical framework and literature review section below. Data was analysed using the content analysis technique and presented in descriptive narrative.

The study had 40 respondents. From the NANLN, data was gathered from 25 respondents comprising management staff, librarians, archivists, clerks, housekeeping staff, and security officers. The 10 users ranged from students to researchers. From the support institutions (stakeholders), data was collected from one police officer from City of Windhoek Police; two disaster management specialists, one each from City of Windhoek Disaster Management Unit and Office of the Prime Minister Disaster Management Directorate; and one officer from City of Windhoek Fire Brigade.

Presentation of Findings

Data from different data collection methods and sources (the NANLN, Namibian Police, City of Windhoek Police, Fire Brigade, Office of the Prime Minister's Disaster Management Directorate, and Ministry of Works) have been integrated within the following thematic areas: Comprehensiveness of the current disaster plan at the NANLN; Potential hazards to the NANLN; Measures in place to minimise the impact or avoid a disaster at the NANLN; and Reaction to near disasters or disasters by the NANLN.

Comprehensiveness of the Current Disaster Preparedness Plan at the National Archives and National Library of Namibia

In order to establish the comprehensiveness of the current disaster preparedness plan at the National Archives and National Library of Namibia the researchers asked the National Archives and National Library of Namibia respondents the following questions: " Are you aware that the National Archives and the National Library of Namibia have a joint written disaster preparedness plan?", "Does your institution have a preservation policy?", "Who do you think must be in the institution's disaster management committee?", "How much support does the disaster management committee have from management?", "How much money do you budget for disasters?", " Have you received any training in emergency procedures and on how to use emergency equipment?", "What institutions do you think you would need for help and advice in disaster related matters and partner with during disasters?", "How often do you test your disaster preparedness plan?", How many times has your disaster preparedness been reviewed?" and "What emergency supplies are already in your stores?"

The following are the responses to these questions.

Awareness of Disaster Preparedness Plan

Three members of staff of the NANLN were aware of the existence of the disaster preparedness plan while 22 were not aware. These included two senior staff members one each from the National Archives and National Library, and the remaining members of the disaster management team. All respondents from support institutions were not aware. Those aware of the existence revealed that the other members of staff were not aware of its existence that the plan had not been implemented or tested. One of the senior members of staff who was aware of its existence had not seen it. "I'm aware of its compilation but it never got operational. Members of staff are not aware of its existence and it's not accessible". Those who were not aware of the plan's existence felt that it was very important for them and all other members of staff to know the existence of the Plan and its contents. What one of the archives respondents' said reflects the general sentiments: "I think we all need to know if the document is in place simply because this will help us to actually manage a disaster. It is actually of importance that everybody knows that there is a disaster preparedness plan for us to know how to tackle disasters as well and know where to go for assistance".

Existence of a Preservation Policy

Although the NANLN had vision and mission statements, the study established that none of the

two institutions had a preservation policy. The study also established that both had no conservators on their structures. The contents of the National Archives and National Library disaster preparedness plan revealed that it had no provision for a policy statement that mandates the plan and defines responsibilities.

Disaster Management Team

The Plan at the NANLN had a list of disaster team leaders drawn from all subdivisions (National Archives, National Library, Educational Library, and Community Library). The composition of the team leaders catered for all categories of staff and cut across (senior staff, librarians, archivists and clerical staff). The total number of the team leaders was 20. The composition of the team was as follows: four emergency controllers; four deputy controllers; three communication controllers; three evacuation leaders; three first aid leaders; and three fire leaders. However, interviews with the management of the NANLN revealed that all the 20-team members apart from one had over the years left the institutions. The study also revealed that the plan was silent on who was the overall team leader. Two respondents felt that the Head of the National Archives should be the team leader; one respondent felt that the caretaker must be the head of the team, and one respondent felt that the Records Manager must be the team leader.

Management Support

The only remaining member of the disaster management team revealed that the team and the disaster preparedness plan had no management support and backing right from the inception. However, one senior manager revealed that management would be willing to give the team and The Plan 100 percent support if the team was reconstituted.

Budget

The findings were that there was no budget for disasters and that there had never been one. The reasons given by the NANLN senior management staff were that there has been no disaster before; they had never thought about it, because of ignorance about disasters, there has been no request and that they felt that it was not their responsibility. "There is no budget. It never came up and it was never discussed and the building was previously managed by Ministry of Works and we thought it was their duty to run their building and keep it safe. Further, it has never happened before and due to lack of knowledge". Another responded: "There is no budget because it has never been there, it was never requested for. I would say the reason why there is no budget for disasters is because people who are supposed to request for it have never seen the need to request for it".

Provisions for Training

One of the objectives of the study was to find out whether the plan had provision for training on fire drills, simulations and how to use emergency equipment such as fire extinguishers, packing wet materials and evacuation procedures. All members of staff responded that they had not received any training at all. "I have not received any training I don't even know how to use fire extinguishers". Another responded: "We need training to save lives because we cannot wait for the Fire Brigade who will come after 30 minutes or so when we could have saved lives and users. While waiting for the Fire Brigade, we should take the first initiative".

Stakeholders List

The following institutions were listed in the disaster preparedness plan with contact phone numbers: Police, Fire Brigade, Four hospitals, and an Electricity company. In addition to the above institutions that were listed on the Plan, respondents suggested that the following institutions must be added to the list: Office of the Prime Minister, Directorate of Disaster Management, The Red Cross Society of Namibia, The Namibia Defence Force, City of Windhoek Disaster Management Unit, City of Windhoek Police, Ministry of Works and Transport, Ministry of Education, Commercial storage and archiving companies, Refrigerator/Cold storage companies, and the Ministry of Justice.

Of the above-named institutions, the following were part of the population for this study, Namibian Police, Office of the Prime Minister (directorate of disaster management), City of Windhoek (Disaster

Management Unit, Fire Brigade, Police), and Ministry of Works and Supply. One of the objectives of the study was to find out what role these stakeholders played during the formulation of the disaster preparedness plan at the NANLN and what role they would play in an event of a disaster. Respondents from these institutions were asked the following specific questions: "Are you aware that the NANLN have a joint written disaster preparedness plan?", "Explain the role your institution played or would have played in formulating the disaster preparedness plan at the NANLN?" and "What role do you think your institution can play in the event of a disaster at the NANLN?"

Respondents from all the stakeholders expressed ignorance of the existence of the Plan at the NANLN.

The following presents responses by each of the stakeholders.

- Ministry of Works and Transport respondent also stated that they would have played an active role by giving advice in terms of technical issues related to structural building, health, safety and technical issues that might be required had they been consulted or asked to contribute towards the formulation of the plan. He further added that in an event of a disaster, they would carry out a technical investigation and establish the real cause of the disaster. "We would also help to decide if the building can be used after a disaster or advise on erecting a new one".
- Namibian Police respondent stated: "In the event of a disaster, the Namibian Police's role would be to immediately study the situation and the levels of damage caused by the disaster, as well as provide guidance in the following areas such as evacuation routes and evacuation of injured; calling ambulances and fire brigade; alert hospitals; identifying victims and damage to materials; take photographs of the scene; and guard against looting".
- City of Windhoek's Disaster Management Unit was pleased to hear that there was a Plan at NANLN and looked forward to collaborating with them to strengthen the Plan and advise on its implementation. The respondent made the following remark:

> *The other thing would be public awareness for the staff members of the Archives themselves, for the public within the vicinity of the city of Windhoek as well as the stakeholders in terms of how essential the documents, treasure that is kept by the National Archives. We would sensitise the community on the importance of taking ownership. That would be important in case there is an emergency – issues of communities wanting to loot could be minimised.*

- Fire Brigade respondent stated that in terms of building safety they would assist with evacuation plans as well as educate and create readiness for any eventuality. The respondent also revealed that the Fire Brigade has a training centre that offers courses in fire training and first aid for external institutions.
- City of Windhoek police respondent said: "It is the duty of police officers whenever there is a disaster to ensure that the place is secure from looting. We must secure the place as the property belongs to the state. During the disaster, the City Police would block the road to avoid other accidents to happen. Way has to be cleared for fire engines. All this can only be possible if we know The Plan and get involved or are consulted".

Testing of the Plan

The study wanted to find out whether the Plan has been tested since its formulation. The findings were that it had not been tested before. It was also found that it had no implementation date.

Review of the Plan

With the passage of time, new hazards can occur and people come and leave the institution. It is therefore imperative that a disaster preparedness plan must have a review period; if possible it must be reviewed regularly. It is against this background that the researchers wanted to establish whether the disaster preparedness plan at the National Archives and National Library of Namibia had a provision for its review. The findings were that the Plan had no

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review date, and it had not been reviewed since it was drawn.

List of Supplies

A disaster preparedness plan must have a list of a disaster response kit and must indicate where the supplies are stored. The study sought to find out if there were supplies in store already bought and whether they were listed in the Plan. The findings were that there was no list and there were no supplies that had been bought. Further, there was no list of suppliers for supplies and services.

List of Vital Records

The study established that both arms of the NANLN had vital records. However, it was also found that there was no deliberate policy identifying them; and as such, there was no list incorporated in the disaster preparedness plan. Further, it was found that the Plan had no priority list for salvaging materials in an event of a disaster. A senior member of archives staff responded: "There has never been a deliberate effort to identify vital records, for example, catalogues and databases are considered as vital records but there was no back up in form of offsite storage".

Potential Hazards to the National Archives and National Library of Namibia

This study aimed to identify the hazards that could cause disasters at the NANLN. Based on what the NANLN had experienced over the years the respondents highlighted some, such as water damage, fire damage, deterioration of archival and library material, overheating of NANLN building, malfunctioning of facilities in the building, damage and destruction of archival and library materials, theft and mutilation of archival and library materials, loss of equipment, and loss of vital records.

The following are some of the statements that were made by the respondents:

- "Water is dripping in the electricity boxes. Water and electricity do not get along, and lives could be lost. There are always short circuits from the main electricity supply box especially during the rainy season and also power loads and surges".
- "Members of staff smoke within the building something that should not be allowed in the Archives".
- "The plugs can cause fire in this building. In winter once we connect heaters and kettle you see sparks, smoke and power goes off".
- "As a result of leakages from the cooling plant, it is hot and moist in the National Archives. I'm aware of government gazettes on level two which were destroyed by these leakages in December 2011, on level two in repository, two thousand photos were heavily damaged due to fungal and mould infestation". The study confirmed the presence of mould through observation.

A look at the Plan highlighted the following potential hazards: water, fire, and bomb threat. Observation identified water leaks, rust water and air conditioning system pipes.

Reaction to near Disasters or Disasters by the NANLN

One objective of this study was to find out how members of staff of the National Archives and National Library of Namibia had reacted to near disasters or disasters. The following questions were posed to the NANLN members of staff: What do you understand by the term disaster? Has your institution experienced a disaster? Explain the extent of damage the disaster caused to archival and library materials and human life. Explain the procedures that were used to salvage affected materials? Explain how the materials were treated. Explain the procedures that were followed to come back to normal.

Some of the answers that were given by the respondents as the definition of the term, disaster, were as follows:

- "A disaster is any event that leads to serious damage to either the institution, its holdings or to any person who is working or present in the building".
- "A disaster is an unfortunate mishap that can cause extensive damage to the library materials, equipment and anything that is housed in the library".

- "A disaster is something that comes unexpectedly; it disrupts and destroys infrastructure, buildings and natural resources around the place".

The study revealed that the NANLN had suffered near disasters, which included among others flood, mould infection, fire, mutilation of books, stealing of books and burglary, as well as computer crash. See Table 1 for a summary of the hazards and the damages caused.

Table 1: Hazards, damages and reactions by NANLN

Hazard	Causes	Damages	Reactions
Flood	Leaking Pipes, Leaking Roof and Leaking Cooling Plant	Damage to some court records	No reference was made to the existing disaster plan and no expert advice was sought on what to do with the soaked materials. Some records were saved by air drying
Mould attack	Moist conditions	Damage to photo album	Unaffected photos were digitized only to be lost as the computer on which they were saved crashed
Fire	Overheating fan	No damage	Smoke was seen coming out of the ceiling of the National Library of Namibia, which caused panic among users and members of staff. There was a near stampede as library users and members of staff were running out of the library using one exit door. The Fire Brigade was called, who later normalized the situation.
Computer crash	Hardware failure	Loss of statistics; digitized records and working documents	Attempts to recover the data failed. Anti-virus software was upgraded.
Burglary	Members of the public	Computers and loss of valuable documents; and surveillance cameras	Security was beefed up through security services.
Mutilation and Steeling of Books	Users and Members of Staff	Loss of books	Procedures were put in place to stop users from bring in books; search users and staff when leaving; and not granting staff access to the premises after working hours.

Discussion of Findings

This section discusses the findings under the same thematic areas as for data presentation.

Comprehensiveness of the Current Disaster Plan at the National Archives and National Library of Namibia

The study revealed that the Plan at the NANLN was not comprehensive as it lacked some basic components. The Plan was not backed by a preservation policy, as it was not in existence. The disaster management team members' list had never been updated, and members who had left the institution had not been replaced. There was no overall team leader, and some roles such as press and public relation matters in the event of a disaster had not been assigned. There was also no provision for a budget and training of staff members most of whom were not aware of the existence of the Plan. The list of stakeholders and their contact phone numbers and addresses had not been updated. There were neither formal nor informal arrangements with stakeholders for cooperation and assistance before, during and after disasters. Review of the Plan which had never been tested had not been provided for. Other omissions were list of vital records; building floor plans had not been attached to the disaster preparedness plan and The Plan had no implementation date.

Preservation Policy

The NANLN did not have a preservation policy, which is a cause for concern as preservation is a core function of heritage institutions such as national archives and national libraries. According to Ngulube, Modisane and Mkeni-Saurombe (2011: 244) "Preservation policies are a fundamental ingredient of accountability as they justify why certain decisions are taken, demonstrate how funds were spent and facilitate the development of preservation strategies and plans".

Disaster Management Team

The study revealed that only one of the 20-team members listed in the Plan was still with the NANLN. All those who had left had not been replaced. The Disaster preparedness plan did not have a provision for an overall team leader. The implications are that in the event of a disaster, there is no disaster management team to spearhead the management of a disaster at the NANLN. Key to a disaster plan and ultimately recovery is the personality and skills of the disaster manager. Eden and Matthews (1996) identified three key roles in disaster management, the disaster manager, disaster reaction manager, and disaster recovery manager. A leader should be appointed ahead of time to avoid confusion during a crisis (Ngulube, 2005).

One of the findings of the study was that the disaster preparedness plan at the National Archives and National Library of Namibia did not make provision for someone to deal specifically with the media in the event of a disaster. Institutions are advised that there should be a member tasked to provide information to the media and present the institution in a good light (Ngulube, 2005; Schneid and Collins, 2001).

Budget for Disaster Management

The study investigated the existence of the budget for disaster management. There was no budget allocation for disaster management at the NANLN and there has never been one. The reasons given by senior management staff were that there had been no disaster before; they had never thought about it, because of ignorance about disasters. They also expressed the sentiment that it was not their responsibility. Davis, Smith-Hunt and Kern (2010) advised that a disaster management plan should include procedures on how to access funds for disaster management activities. A budget determines the supplies and equipment required to respond effectively to a disaster.

Testing of the Plan and Staff Training

All members of staff that were interviewed responded that they had not received any training at all. Similarly, the study revealed that the disaster preparedness plan had not been tested before and that it had no implementation date. Without training the most likely result would be chaos, which would lead to more damage to archival and library materials, injury and even loss of human life. Testing of the disaster preparedness plan would reveal where the

disaster preparedness plan is weak and needs strengthening long before the actual disaster.

Collaboration with Stakeholders

Although the NANLN Plan had a list of stakeholders with their contact details, the stakeholders expressed ignorance of the existence of the disaster preparedness plan at the NANLN. None of the stakeholders was consulted or invited to assist during the formulation of the Plan. All the respondents from the stakeholders expressed willingness to have contributed to the formulation of the Plan at the NANLN, had they been invited. It was also discovered that there were no running service contracts between those institutions (Police, Fire Brigade, four hospitals and Electricity Company) listed on the Plan and the NANLN. There were no formal or informal arrangements with any external institution or individual regarding the role they could play either to mitigate against a disaster or during and after a disaster.

The NANLN need the input and expert advice from external institutions and individuals during the risk identification and analysis, leading to the writing of the disaster preparedness plan and formation of the disaster management team (volunteers). External institutions such as the Office of the Prime Minister of Namibia (Directorate of Disaster Management) and the City of Windhoek (Disaster Management Unit) would play a coordinating role in the event of a disaster (pulling resources and identifying other stakeholders), while the Namibian Police and the City of Windhoek Police would provide security to avoid looting of archival and library materials, control traffic and assist in putting in place a security strategy. The Fire Brigade would help to combat fire, offer medical services, evacuation and rescue operations in the event of a disaster. The Ministry of Works and Transport would carry out a technical investigation to come up with a fact finding of the real cause of the disaster and would have played an active role at the prevention and preparedness stage by giving advice in terms of technical issues related to structural building, health, safety and other related issues that might be required, had they been consulted or asked to contribute towards the formulation of the Plan. A water pipe burst at the National Archives of Namibia in 2014, which damaged some materials, was confirmed by the Ministry of Works and Transport to have been caused by a pipe, which could not hold water of a certain pressure due to the materials used (Namibia Press Agency (NAMPA, 2014). This damage could have been avoided had the Ministry been roped in as a stakeholder to mitigate against such a threat. As Matthews (2005) observed, it is unfortunate that much cooperation only happens in the immediate aftermath of a disaster through the assistance of institutions in the vicinity.

Review of the Plan

With the passage of time, new hazards can occur and people come and leave the institution. It is therefore imperative that a disaster preparedness plan must have a review period; if possible it must be reviewed regularly. The Plan had no review date and it had not been reviewed since it was written. Members of the disaster management team, who had left the institutions, had not been replaced. Stakeholders' contact addresses and telephone numbers that were listed in the Plan were outdated. This situation makes the Plan irrelevant to the current operating system in the event of a disaster. The regular revision of disaster management plans will address outdated contact details, identify flaws and omissions and incorporate technological changes (Buchanan, 2002; Hlabaangani and Mnjama, 2008).

Vital Records

It is good practice to identify which records are vital in order to protect the records that are essential for continuation of operations. The list of vital records must be included in a disaster preparedness plan. Both the National Archives and the National Library of Namibia had vital records. However, there was no deliberate policy identifying them and as such there was no list incorporated in the Plan. Further, it was found that the Plan had no priority list for salvaging materials in the event of a disaster. This is what one of the senior managers had to say regarding vital records: "There has never been a deliberate effort to identify vital records, for example, catalogues and databases are considered as vital records but there is no backup in case of offsite storage".

Vital records should be main priorities of salvage efforts when a disaster occurs (Government of South Australia, State Records of South Australia, 2007,

p.28). This view is acknowledged by Hlabaangani and Mnjama (2008) who argue that it is critical that information centres should identify their vital records so that their services would not come to a halt if they were to be struck by disasters.

Reaction to Near Disasters or Disasters by the NANLN

The study revealed that there were near disasters at the National Archives of Namibia as a result of water leaks from the cooling plant, leaking pipes and a leaking roof. The December 2011 incident was the most significant, which resulted in the destruction of some appraised court records while some were air-dried. The study also revealed two incidents of near disasters involving fires. One of the incidents was in the National Archives of Namibia while the other one was in the National Library of Namibia. The disaster preparedness plan at the National Archives and National Library of Namibia has instructions on how to react to both fire and water disasters. However, the study revealed that in both instances no reference was made to the disaster preparedness plan during the disasters and no expert knowledge was sort on how to deal with soaked records.

The Plan had a clause which clearly stipulates: "In the event of flooding, leaking or water damage after a fire, the wet books must be freeze-dried" (Namibia Library and Archives Services, 2001). Despite this clause, the study revealed that only air-drying was applied. While the National Archives members of staff must be commended for air-drying some records, it is the view of the authors that if both methods had been applied some of the soaked records that ended up being completely destroyed could have also been saved.

In most instances of water damage, the first decision to be made will be whether to air dry or freeze materials (Illinois State University, n. d.). The use of air drying or freezing water damaged materials has also been recommended and acknowledged by Adcock, Varlamoff and Kremp (1998); Buchanan (2002); Government of South Australia, State Records of South Australia (2007); and ICA, Committee on Disaster Prevention (1997). This goes to show that both methods can be applied depending on the situation. In the case of the National Archives of Namibia, it is the view of the authors that if the members of staff were aware of the contents of their Plan, they would have considered both options to save those records that ended up being destroyed as a result of being immensely soaked. Freezing the records would have given the National Archives of Namibia time to consult an expert on what to do with soaked materials. Illinois State University (n. d.) advises that wet materials can be stabilised through freezing, as organisations decide on how to deal with them, and refers to materials which have been successfully unfrozen and dried after spending a decade in a freezer.

Conclusion

The study established that some components of the Plan had been based on best practice and other components were lacking. The Plan lacked some of the elements that would make an ideal disaster preparedness plan complete and comprehensive. Members of staff were not aware of the existence of the Plan and its contents; there was no preservation policy, or a list of disaster management team members. Similarly, stakeholders such as the Police, the Fire Brigade, four hospitals and the Electricity company mentioned in the Plan were not aware of the Plan as well as their role. Risk identification would have naturally required that these stakeholders be involved. It was not carried out prior to drafting the Plan, which stakeholders did not contribute to its development. Other shortcomings include the following:

- The disaster management team members list had not been updated and members who had left the institutions had not been replaced, hence contact details were outdated;
- There was no provision for a budget;
- There was no provision for training;
- The Plan had not been tested and implemented;
- No review date and provision for regular reviews; and
- There was no list of vital records.

Recommendations

In view of the shortcomings identified by the study, the authors have come up with some recommendations. The major recommendation of this

study is that the Plan should be reviewed in order to update contact details as well as other omissions. Whilst it is acknowledged that such a major review takes time to achieve, the following are recommendations on what NANLN can do immediately:

- Replace disaster management team members who have left the institutions and update the contact details;
- Raise awareness among staff and stakeholders about the existence of the Plan and its contents;
- Bring other stakeholders on board as recommended by the staff and enter into agreements with all;
- Institute security strategies to protect against theft by staff;
- Come up with emergency supply kits;
- Come up with a budget for disaster management. Bearing in mind that there are budget constraints and rigid budgeting processes in different institutions, this could be an item visible on the current budget format;
- Include a review date on the current Plan and schedule regular reviews;
- Regular maintenance of hand held fire extinguishers.

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User Expectations and Innovative Strategies for Improved Patronage in University Libraries in Nigeria

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Abstract

Users of university libraries in this modern age demand quick and alternative means of accessing current information resources for teaching, learning and research. University libraries need to re-strategise their policies and apply innovative strategies for improved patronage. This study aimed to identify user's expectations, which when applied will improve library patronage. The descriptive survey research was adopted for the research using the instruments of questionnaire and structured . Two hundred and twenty practising librarians across twelve university libraries in Nigeria constituted the population. The responses of 201 librarians (89%) were received and used for analysis. Results show that availing Open Access database (89.5%), creating user awareness of available Open Access Resources (87.8%) and acquisition of e-resources for multiple and concurrent access (85.5%) were highly rated as the current expectations of users. Digitisation of the bibliographic tools (85.7%); provision of wireless access and plug-in points for laptops (85.2%) were ways of applying user centered strategies. Provision of Internet facility (89.5%), storage of library resource content on local servers (85.5%) and incorporating selective dissemination of information (85.0%) were the accepted market-oriented approaches for readers' retention. Expanding computer laboratories in libraries (90.7%), and granting users free, unlimited Internet access in libraries (90.7%), were technology-based strategies. Providing these highly rated needs of library users are innovative strategies capable of satisfying library patrons. This agrees with Keller's principle that a highly satisfied customer generally stays loyal longer. The paper concludes that libraries should remain relevant. It recommends collaboration with peer information systems and obtaining licence from reputable databases.

Keywords: University libraries, Resource provision, Library patronage, User satisfaction, Information digitisation

Introduction

Many libraries in sub-Saharan Africa have problems keeping up-to-date with information resources procurement, especially print books and journals. This is mainly due to budgetary inadequacies. The mission of academic libraries is building and maintaining collections that support and enhance instructional needs of groups and various programmes taught in their institutions. Budgetary inadequacies disallow libraries from fulfilling this mission. The continued use of traditional library management systems which restrict users to the use of only the available resources within their library collections, combine to

force library users to look for alternative means of sourcing current information resources elsewhere. This problem may not be peculiar to libraries in developing countries alone. Woodward (2009) had noted that the inability of libraries to keep up with the ever-increasing amount of published journals has been an enduring topic in library literature for many years. He observed that lean budgets have badly affected resource provision in many libraries. In view of this, affected libraries negate their primary objectives of adequately supporting teaching, learning and research in universities.

With time, the problem of many libraries has moved from low level patronage to total flight of users from library usage. A research carried out by Umar on libraries in North West Nigeria in 2011 confirms this point (Umar, 2011). Users found various information providers such as: Internet, social network services, Google, etc, quicker to access and more beneficial. This has left affected the university libraries to function as classrooms, meeting points for students after lectures rather than information resource centres they were supposed to be. Given the appropriate digital linkage, libraries can also provide information desired by users. Indeed, many of these libraries are struggling to bring back their patrons. Feldman (2006) stated that the important need for today's libraries is to examine the change in the needs and demands of library patrons. This is in order to serve them better and have them return to library usage. University libraries can only remain relevant to the academic community when their services are centred on their patron's needs. To do this more appropriately, a user-centred information needs assessment survey of users and libraries needs to be carried out by library researchers to determine user expectations and the innovative strategies that can help to improve patronage of university libraries in Nigeria. The highest expectation of most academic library patrons is to find relevant literature to support their research and academic outputs.

Development in technology has opened up avenues for sourcing scholarly communication outputs, through access to digital information. The library as an information provider is expected to be equipped and to provide opportunity for users to log in and access information resources anywhere in the world, without limitation to the four walls of the library (Okebukola, 2003). A whole range of collaborative activities are available to libraries to access data banks and databases of information centres, many of which are open access. Libraries can also collaborate to acquire enhanced bargaining power with suppliers for resources that are not on open access. They can have shared services within the banded group to utilise resources so acquired jointly. This is possible when the libraries are linked together in a 'wired world' as noted by Woodward (2009).

Electronic publishing has also made it possible for authors to make their publications freely available through the Internet. Many academic institutions across the globe now have their own institutional repositories (IR), which contains the research outputs of their scholars and researchers. These IRs consist of: journal articles, book chapters, theses/ dissertations and research reports. These are veritable research outputs that patrons of academic libraries require, and expect the libraries to provide for them. In view of the importance of these items to education and research, Aina and Adekanye (2003) have stressed the need for libraries to make faster response to the challenging market where resources will never be out on loan, but available at any time anywhere. It is the strength of this that this study aims to present to university libraries in Nigeria innovative strategies which could be adopted in order to improve the patronage of users by satisfying their total information needs.

Objectives of the Study

The study objectives are to:

1. find out the current expectations of patrons of university libraries in Nigeria.
2. determine ways university libraries in Nigeria could apply user-centred strategies to attract better patronage.
3. find out the appropriate market-oriented strategies that university libraries in Nigeria could apply to improve patronage of their users.
4. ascertain the technology-based strategies needed in university libraries in Nigeria for improved patronage in Nigerian university libraries.

Research Questions

1. What are the current expectations of users of university libraries in Nigeria?
2. In what ways could university libraries in Nigeria apply user-centred strategies for improved library patronage?
3. What market-oriented strategies could university libraries in Nigeria apply for improved patronage to their libraries?
4. What technology-based strategies could be applied to bring innovative and improved patronage in university libraries in Nigeria?

Literature Review

Electronic Publishing offers authors and scholars the opportunity of making their research contributions freely available on the Internet (Woodward, 2015). It is referred to as Open Access (OA) and allows librarians free access to current publications of many authors and publishers all over the world. Indeed, in 2005, Bindley had predicted that by 2020, forty per cent of the UK research monographs will be produced in both print and digital platforms (Bindley in Woodward, 2015). A research by Norris et al. (2008) showed that in some subject disciplines, well over 50% of all published papers were already freely available. This shows that the prediction of Bindley was close to reality. Publishers themselves had seen the growing demand for e-books and journals and therefore are providing their current titles and back catalogues in e-formats. They are also responding to the student and consumer demand for e-books to be read on mobile devices such as: Sonny e-book reader; Amazon's Kindle and now i-phones (Woodward, 2015). Even Online Booksellers Amazon.com had stated that their site had books available both in print and e-books; and that the electronic versions have sales of 35% of the same book in print.

The electronic environment has also simplified the method of accessing institutional repositories (IR), especially those from other institutions, using theses metadata harvesting as opposed to using Dissertation Abstracts (in print) to locate them, and inter-library loan to bring them to users, which takes such a long time to achieve. These vital research resources are now freely available on the Internet. Overseas students had no difficulty locating and using UK theses and dissertations through simple Internet search. These are the dividends of electronic environment and access to information resources in the new age.

A study by the OCLC (2005) on perceptions of libraries and information resources indicated that patrons viewed libraries as places to get traditional resources such as books, reference materials and research assistance. Generally, they did not see libraries as the first place to access electronic resources (OCLC, 2005b). This perception appears to continue to hold among contemporary users of libraries in Nigeria. Not all academic libraries in Nigeria have full or steady access to electronic resources where most recent information resources are found. Indeed, many libraries in Nigeria, as in various parts of Africa, have problem of Internet access to e-resources. Many cannot access free open access journals in the web because of their low library budgets to carry such expenditure. Umar (2011) alluded to low level use of university libraries in his study. He stated that library use and patronage have dramatically reduced in most university libraries. Other writers such as Osinulu (1998), Ekpenyong (2003) and Ugah (2007) have variously observed the same problem in various libraries in Nigeria. Libraries are therefore trying what they could do to remain relevant to their users. According to Umar (2011), university libraries today need to become relevant in information service delivery and to provide an optimum level of services to reach more potential users and encourage the use of library resources.

According to Bodi and Maiev-O'shea, (2005), the demands of the digital environment are at odds with traditional library structures. This is because technology provides numerous platforms for providing information services to academics and researchers. Librarians who are library's 'ears' and 'eyes' understand user's needs and perceptions. They know what readers need, how to help, inform, persuade and teach users to access information. It is therefore essential that they be involved in planning and implementation of efficient services to library users, (Bailey, 2005).

The main objectives of libraries today according to Mukerjee (2007) are to become relevant in information service delivery and provide an optimum

level of services to reach more potential users. In order to create a dynamic university library system that strives towards high customers' value delivery, it is necessary to cultivate and manage relationship with customers (Sharp, 2000). Relationship marketing can be achieved by creating a good working relationship by librarians among all the community of users, such as departments and employees and students of university communities. It can also be achieved by identifying exactly what the preferences, needs and desires of the library customers are. Umar (2011) added that another strategy is to capture the notion of customer-centric philosophy in their (library's) organisational values which has to be embedded in the library's mission and vision statement. In his outline of strategies suggested for libraries, Vtrenz (2004) listed the following: building awareness of user brand of information media; building customer trust by putting their needs first; communicating regularly with users and measuring customer satisfaction periodically. According to Keller (2006), a highly satisfied customer generally stays loyal longer [with his library].

The Council on Library and Information Resources (2005) clearly defined library administrative principles of services to users. According to them, organising and providing access to information is a classic role of libraries. The twin function of cataloguing and classification has allowed published works to be given multiple access points for easy retrieval by users. Nevertheless, the shifts in library user behaviour and interests prompt the libraries to extend traditional services in the networked environment where the users are migrating to. Undeniably, the highest impact on the entire library profession has been technology (Bodi and Maier-Oshea, 2000 and Manoff, 2000).

Digital technologies also opened the door to a host of new possibilities for sharing knowledge and generating entirely new forms of content that must be made broadly available (Lynch 2009). These shifts demand that university libraries take on a much more active role in sharing and dissemination of knowledge produced by researchers. A research study conducted by Higher Education Consultancy Group (HECG) in 2006 showed that students used e-book in huge numbers at all times of day and night in the university libraries. The way forward in university libraries is therefore to continue the digitisation of their valuable heritage materials and also work towards improving the flow of digital content into their holdings and allow users to interact with digital data (Woodward 2009). Another initiative adopted by the European Digital Library is aimed at linking users directly to digitised heritage content accessible in a web 2.0 environment. As the digital technology continued to open up, a range of other collaborative activities which enable libraries to band together to acquire enhanced bargaining power with suppliers has emerged to provide shared services. Such cooperation is only possible in a wired world. Libraries in the developing world should look forward to sharing such services.

Based on the extant literature there is need for a study on user expectations and innovative strategies in Nigerian university libraries.

Methodology

The study adopted a survey research design which utilised a questionnaire to elicit data from librarians in university libraries in the six geopolitical zones of Nigeria. Two universities were selected from each geopolitical zone, making a total of twelve universities. Two hundred and twenty-five librarians drawn from their university libraries constituted the sample population. The list of universities selected from the six geopolitical zones is presented in Table 1.

Table 1: Nigerian University Selected for the Study

GeoPolitical Zone	Name of University	Generation
North East	Federal University of Technology, Yola	3rd
	Abubakar Tafawa Balewa University Bauchi	3rd
North West	Ahmadu Bello University, Zaria	1st
	Usman Danfodio University, Sokoto	2nd
North Central	University of Ilorin	2nd
	University of Jos	2nd
South East	University of Nigeria, Nsukka	1st
	Nnamdi Azikiwe University, Awka	3rd
South West	University of Ibadan	1st
	University of Lagos	1st
South South	University of Port Harcourt	3rd
	University of Benin, Benin City	2nd

The basis of selecting these universities was to make the study holistic by covering the entire six geopolitical zones of Nigeria. Also, the coverage ensured that the dates of establishment of the universities were taken into account. Universities that were established before 1970 are tagged as first generation universities. Those that were established between 1970 and 1980 are categorised as second generation universities. The third generation universities are those that were established after 1980. Thus, the universities used for this study consisted of all the zones and all the generations.

The distribution and collection of the questionnaire took two months due to the large expanse of the geographical area. Copies of the questionnaire were distributed through contact librarians who were in attendance at the 53rd edition of the Nigerian Library Association Conference/ Annual General Meeting held in July 2015 in Oshogbo, Osun State, Nigeria. Some were distributed by the researchers in the universities closer by. A total of 225 librarians who worked in the selected libraries constituted the sample population. Out of the 225 copies of the questionnaire distributed, 201 were returned fully completed and useable. This gives a return rate of 89%. Data were analysed using SPSS as it is useful for creating frequency tables and providing percentage ratings for each of the variables.

Table 2: Distribution of Respondents per University Library

S/N	Name of University Library	Respondents	Proportion
1	University of Lagos, Library (Unilag)	18	8.95%
2	University of Ilorin, Library (unilorin)	15	7.46%
3	University of Jos, Library (Unijos)	16	7.96%
4	University of Ibadan, Library (UI)	18	8.95%
5	Ahmadu Bello University Zaria, Library (ABU)	18	8.95%
6	Abubakar Tafawa Balewa University Bauchi, Library (ATBU)	15	7.46%
7	University of Benin, Library (Uniben)	18	8.95%
8	Federal University of Technology Yola, Library (FUT Yola)	15	7.46%
9	University of Port Harcourt, Library (UNIPORT)	16	7.96%
10	Usman Danfodio University Sokoto, Library (UDU)	18	8.95%
11	Nnamdi Azikiwe University Awka, Library (NAU)	16	7.96%
12	University of Nigeria Nsukka, Library (UNN)	18	8.95%
	Total	**201**	**100%**

Data Analysis and Discussion of Results

The findings of the study are presented, analysed and discussed on the basis of the research questions raised in the research work as follows:

Library Users' Expectations

Looking at the changing nature of information needs of users as one of the objectives, the study set out to find the current expectations of users. Respondents were given a list of current expectations and asked to pick as many as are applicable in their libraries. Table 3 shows the response rate in percentages.

Table 3: Expectations of Library Users

Items	Uni Lag	Uni. Ilorin	Uni Jos	UI	ABU Zaria	ATBU Bauchi	Uni. Ben.	FUT Yola	Uni Port	UDU Sokoto	NAU Awka	UNN	Overall %
Availing open access databases to enable readers have access to current information resources	90.8	80.0	90.8	87.5	92.0	89.2	90.8	93.8	89.8	89.0	91.2	89.2	89.5
Subscribing to subject specialised open access databases such as: Biomed Central, VET, Bib; Sci. ELO; AGRIS; Astrophysics Data System; Social Science Research Resource network etc	93.8	76.5	86.8	87.5	83.0	82.2	85.5	87.5	82.2	91.8	85.0	87.5	85.2
Creating awareness of open access resources (OAR) available for readers	90.8	77.8	85.5	87.5	90.8	85.8	90.8	92.2	88.2	91.8	86.2	89.2	87.8
Training different categories of users for skill on digital information access.	81.2	77.8	86.8	85.8	90.8	80.2	88.2	82.8	81.0	83.2	82.5	84.8	84.0
Employing marketing strategies for selective information dissemination to user categories through E-mailing; blogging; institutional websites, hand bills etc.	82.5	69.5	80.2	87.5	77.8	84.0	79.0	87.5	78.0	91.8	80.0	77.8	80.2
Developing institutional repositories bibliography to assist users	84.5	80.5	89.5	82.2	92.0	80.2	81.5	89.0	76.5	83.2	85.0	84.8	84.2
Providing online institutional repositories of other organisations for meta data harvesting	81.2	75.0	83.0	82.2	83.0	80.2	76.2	81.2	79.5	80.5	82.5	76.8	79.8
Acquisition of e-resources for multiple and concurrent access by library user.	84.5	77.8	85.5	89.2	85.5	84.0	84.2	86.0	86.8	91.9	88.8	84.8	85.5
Moving away from expensive library management systems such as OPAC to easier information management access such as Google	84.5	59.8	64.5	66.0	76.2	62.5	58.0	76.5	76.5	64.0	78.8	74.0	70.0
Building library services around user workflows	84.5	75.0	76.2	78.5	83.0	78.5	75.0	87.5	76.5	66.8	78.8	85.8	79.2

It was observed that availing of open access database, creating awareness of open access resources (OAR), and acquisition of e-resources for multiple and concurrent access for users were rated highly by respondents with percentage values of 89.5, 87.8, and 85.5 % respectively. On the other hand, moving away from expensive library management system was rated lowest with percentage value of 70.0 %. It nevertheless showed that the percentage rating of the ten items that ranged between 89.5 and 70% implies that the respondents agreed that all the identified items were current expectations of library users in academic libraries. Looking at the universities specifically, it reveals that librarians from all the universities agreed that all the ten items were the current expectations of library users in academic libraries used for the study.

The finding shows that a higher percentage of respondents agreed to availing open access databases, creating awareness of open access resources (OAR) available for users and subscribing to subject specialised open access databases and providing online institutional repositories. This means that academic libraries in Nigeria are changing faster than at any time in their history. The emerging technologies have afforded users the opportunity to access information resources in different formats. This finding is in line with Lynch (2009) who noted that online databases and catalogues and digitised archives have put the library back at the heart of teaching, learning and academic research on campus. Digital technologies have opened the door to a host of new possibilities for sharing knowledge and generating new forms of content that must be made broadly available rather than rely on the available resources in the library. It is also in line with Wright (2015) who ascertained that in this 21st century, most of the resources that users need are online. The onus is on the library to organise a training session whereby the use of popular database can be taught to its users.

User- Centred Strategies

Looking at user-centred strategies that can attract users back to library as one of the objectives, the study set out to consider factors that can attract users back to the library. Respondents were given a list of factors that can translate to user-centered strategies and asked to pick as many as are applicable. Table 4 shows the response rate in percentage values.

Table 4: User- Centered Strategies

Items	Uni Lag	Uni. of Ilorin	Uni Jos	UI	ABU Zaria	TBU Bauchi	Uni. Ben.	FUT Yola	Uni Port	UDU Sokoto	NAU Awka	UNN	Overall %
Expansion of library e-resource for multiple and concurrent access to information resources by readers	87.5	83.5	88.0	85.7	81.5	89.2	81.5	90.7	86.7	80.0	90.0	83.0	85.5
Digitisation of library bibliographic tools for easy access to essential books and other collections of libraries	84.5	82.0	89.2	84.0	94.7	85.7	77.7	82.7	89.7	91.7	88.7	81.2	85.7
Clearing large number of back runs of journals from the shelves and replacing them with digitised back files.	78.2	75.0	72.2	76.7	73.7	73.2	65.7	68.7	76.5	72.2	82.5	74.0	74
Large areas of library space should be reshaped for IT provisions	84.5	83.5	84.0	89.2	84.2	76.7	71.0	72.0	78.0	75.0	82.5	77.7	79.7
Libraries should make provision for the use of wireless access and plug-in points for laptops and other mobile devices	84.5	82.0	86.7	87.5	86.7	89.2	81.5	92.2	82.2	80.5	87.5	83.0	85.2
Discarding all book materials and acquiring only digital resources	59.5	57.0	60.5	48.2	56.5	42.7	42.0	54.7	57.2	61.0	50.0	48.2	52.5
Stop subscription to physical journals and acquire only digital online journals	59.5	57.5	48.5	53.5	64.7	34.0	48.7	50.0	57.2	61.0	43.7	49.0	51.5

From the responses in Table 4, it could be observed that digitisation of library bibliographic tools for easy access to essential books, expansion of library e-resources for multiple and concurrent access and provision of wireless access and plug-in- points for laptops were rated highly with percentage values of: 85.7, 85.5 and 85.2 respectively, while discarding all book materials, and acquiring only digital resources were rated low with percentage values of 52.5 and 51.5 respectively. Specifically, all the universities disagreed with discarding of all materials and to stop subscription to physical journals, with particular reference to: ATBU, UNIBEN, and UNN with 34, 48.7, and 49 percent respectively.

The finding shows that a higher number of respondents indicated that expansion of library e-resource, digitisation of library bibliographic tools for easy access and provision of wireless access and space for plug-in points for laptops and other mobile devices, are user-centred services that will attract users to the library. This is in line with Higher Education Consultancy Group (HECG) (2006) which indicated that students used e-book in huge numbers at all times of day and night in the UK university libraries. It means that university libraries should therefore continue to digitise their valuable heritage materials and also work towards improving the flow of digital content into their holdings and allow users to interact with digital data. The finding also showed that libraries are no longer a silence zone because provision of space for plug in and information common is a noisy venture. This is in consonance with Diana (2015) who stated that such spaces could be equipped with varieties of technologies, computers and projectors, smart boards, video editing equipment, films, and café's. When a user remembers that he can come to the library to charge his phone and laptops, discuss with his colleagues, watch films, play games and at the same time carryout group learning/ discussion, he/she will be keen and enthusiastic to come to the library. The respondents who disagreed with discard of all books and stoppage of physical journals subscription with the percentage rates of 50.0 and 52.5 reflect that physical materials are still very important especially in a developing country such as ours, where lack of infrastructure and irregular supply of power is the order of the day.

Market-Oriented Approach for Reader Retention

The study sets to find out market-oriented approach for readers' retention in academic libraries. Respondents were given a list of marketing strategies and asked to pick as many as are applicable to their libraries. Table 5 shows the response rates in percentage values.

Table 5: Market-Oriented Approach for Readers' Retention

Items	Uni Lag	Uni. of Ilorin	Uni Jos		ABU Zaria	ATBU Bauchi	Uni. Ben.	FUT Yola	Uni Port	UDU Sokoto	NAU Awka	UNN	Overall (%)
Academic libraries in Nigeria should engage in consortia in other to have enhanced bargaining power with suppliers	81.2	73.5	86.8	82.2	84.2	75.0	75.0	86.0	76.5	80.5	85.0	88.5	81.8
Consortium would facilitate shared services among libraries and benefit their users maximally	84.5	79.8	81.5	85.8	94.8	82.2	79.0	89.0	86.8	86.0	76.2	85.8	84.0
Libraries should work hard to avail steady internet facility for the benefit of providing access to electronic content to their readers	87.5	83.2	92.0	94.8	93.5	87.5	88.2	92.2	94.0	86.0	87.5	87.5	89.5
Libraries should acquire and secure ownership of digital content through licences, to enrich users' needs.	84.5	80.5	81.5	82.2	89.5	85.8	86.8	90.8	85.2	83.2	88.8	81.2	85.0
Libraries should store resource contents on their local servers and make them regularly accessible on line to their community of users.	84.5	80.5	89.5	83.5	92.0	84.0	79.0	95.2	83.8	94.5	83.8	81.2	85.5
Academic libraries should operate a federated system in order to acquire and distribute content which they neither own nor manage	78.2	76.5	86.8	76.8	90.8	66.0	80.2	89.0	73.5	77.8	75.0	76.8	79.2
Engaging in collaborative digital reference services (CDRS) will enable libraries effectively manage enquiries submitted by users.	87.5	79.2	89.5	82.2	90.8	82.2	76.2	87.5	81.0	75.0	80.0	85.8	83.2
Incorporating selective dissemination of information (SDI) for better information delivery to users.	87.5	83.2	85.5	85.8	89.5	84.0	83.0	90.8	85.2	83.2	81.2	84.0	85.0

Data from Table 5 shows that all the respondents agreed that all the eight (8) items listed in the table were market-oriented approach for readers' retention in libraries. Ranking top on the list are: provision of Internet facility, storage of resources contents on their local servers, acquiring and securing ownership of digital content through licences and incorporation of selective dissemination of information (SDI) for better information delivery. These have percentage values of 89.5, 85.2, 85.0 and 85.0 respectively. Looking at the data of the university libraries specifically, they agreed on all the above strategies as relevant for readers' retention, as indicated by their scores.

The finding shows also that greater number of respondents agreed that: providing Internet facilities, engaging in consortium, selective dissemination of information and acquiring and owning digital content as market strategies will help to retain users in the library. With the lean budget and expensive cost of both physical and e-resources, libraries need to engage in consortium to enable them to share information resources they would not have been able to acquire. For instance, Science Direct was

purchased through consortium by many federal universities in Nigeria. As we write, users in these university libraries in Nigeria are enjoying access to this all important database. Internet facilities are paramount without which the consortium and SDI will be a fruitless endeavour. This is because online marketing is driven by technology according to Komolafe-Opadeji and Haliso (2012). In support of the above finding, Luqya (2011) counsels libraries to strive towards providing access to electronic content that they neither own nor manage. This statement is in line with Woodward (2009), who opined that European digital library adopted an initiative aimed at linking users directly to digitised heritage content accessible in a web 2.0 environment. As the digital technology continued to open up, a range of other collaborative activities which enable libraries to band together to acquire enhanced bargaining power with suppliers has emerged to provide shared services. Such cooperation is only possible in a 'wired world'.

Technology-Based Strategies needed to Attract Users back to the Library

The study sets out to find out technology-based strategies needed to attract users back to the library as one of the objectives. Respondents were given a list of items that translate to technology-based strategies and asked to pick as many as are applicable to them. Table 6 shows the response rate in percentage values.

Table 6: Technology-based strategies needed to attract users back to library

Items	Uni Lag	Uni. of Ilorin	Uni Jos	UI	ABU Zaria	ATBU Bauchi	Uni. Ben.	FUT Yola	Uni Port	UDU Sokoto	NAU Awka	UNN	Overall %
Expanded computer laboratories in libraries	84.0	83.5	94.7	84.0	93.5	87.5	90.7	90.7	88.2	83.5	93.7	94.7	90.7
Free internet access in libraries	93.7	85.0	94.7	87.5	96.0	87.5	85.5	95.2	88.2	85.0	91.2	90.2	90.7
High density computer servers	93.7	83.5	90.7	92.7	92.0	89.2	88.2	95.2	89.7	83.5	85.0	88.5	89.2
Scanners for resource digitisation	81.2	73.5	90.7	91.0	90.7	89.2	85.5	93.7	91.2	86.0	81.2	91.0	87
Available space for plug-in points for wireless computers	90.7	80.5	89.5	91.0	94.7	89.2	93.5	92.2	83.7	80.5	81.2	91.0	87.2
Open access databases such as: AGORA; HINARI; DOAJ; Sci ELO; SSRRN; PubChem; PubMed etc	93.7	84.7	92.0	91.0	93.5	92.7	83.0	92.2	82.2	83.5	87.5	91.0	88.2
Creating Open Access Resource services for users	84.5	83.5	92.0	85.7	89.5	91.0	84.2	92.2	93.5	83.5	90.0	84.7	87.5
Creating Electronic Reference Services (ERS) operation for users (distant and resident)	93.7	84.7	89.5	87.5	92.0	85.7	93.5	92.2	79.5	86.0	85.0	80.2	86.2
Publication of current collections (books, journal and special collections)	93.7	77.7	90.7	82.2	90.7	87.5	85.5	90.7	88.2	83.5	86.2	83.0	86.2
Exhibition of current holdings of specialised resources	97.0	77.7	85.5	85.7	88.2	87.5	93.5	86.0	93.5	83.5	92.5	91.0	86.7

The respondents from all the universities agreed on the 10 items on Table 6 as technology-based strategies needed to attract users back to the library. The highest percentage values were expanded computer laboratories in libraries, free internet access in libraries, followed by high density computer servers, open access databases such as AGORA, DOAJ, etc, with 90.7, 90.7, 89.2 and 88.2 percent respectively.

The finding also shows that the shifts in library user behavior and interests prompt the libraries to extend traditional services in the networked environment where the users are migrating to. Undeniably, the highest impact on the entire library profession has been technology (Bodi and Maier-Oshea, 2005 and Manoff, 2000). Technology avails numerous platforms for providing services, such as online chat and e-mail. Without these facilities, research, teaching, learning and scholarship will be an uphill task in institutions of higher learning. Current expectations, user friendly services, and marketing strategies are obviously driven by technology. The finding is also in line with the study done by Gbaje and Kotso, (2014) who posited that technology has given individuals access to unlimited information in cyberspace such that with broadband connection, mobile phones, laptops and other ICTs, people are no longer bound by time or space as information can be accessed from the comfort of their homes and offices almost at the speed of light.

Conclusion and Recommendations

The findings of this study have shown that users of Nigerian university libraries currently demand quick means of accessing current information for their teaching, learning and research. Open access and electronic-driven resources, digitisation of library bibliographic tools, availing wireless access and providing plug-ins for laptops are acceptable user centred strategies. Providing Internet facilities, storage of resources on local servers and SDI services were market-oriented strategies. Users demand expansion of computer laboratories and generating user free and unlimited Internet access as technology based strategies. These are considered to be capable of satisfying patrons.

University libraries, which do not meet their users' needs face the danger of losing customers. Their libraries will become reading centres rather than resource centres. Availability of current information resources on the Internet and digital platforms accessible online are pulling library patrons away from library use. To remain relevant to their users, libraries need to join the global race for digital information access. This way, they would have the capacity to provide the current needs of their patrons and retain their users. One of the surest and most economic ways of providing these resources, as recommended in this paper, is that university libraries need collaborate with their counterparts globally to access relevant databanks for resource provision to their numerous users. Another way is by licensing to open access databases which have abundant information resources. All these are possible with the aid of computers and Internet access. Application of the appropriate strategies as outlined in this paper will enable Nigerian university libraries to ensure that they attract back their users and give them better treatment than what is obtainable in Google and Yahoo Internet surfing.

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Use of Mobile Phones in Boosting Socioeconomic Information Access and Utilisation among Tanzania Rural Communities

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Abstract

This paper presents the findings of a study that examined the use of mobile phones in strengthening socioeconomic information in rural Tanzania. The study was carried out in Bagamoyo and Monduli districts. Employing mainly a qualitative research design, the study gathered information from 69 agro-pastoralists drawn from the two districts using a semi-structured interviews and focus group discussions. The data collected was subjected to content and thematic analyses. The key findings suggest that the applications of mobile phones towards strengthening socioeconomic information in the selected districts of rural Tanzania supported the provision of varied socioeconomic information services. In particular, the mobile phone technology was found to support market price, transactions, health, security, banking, transportation and risk mitigation. On the other hand, the application of mobile phone in the provision of information services was found to be beset with challenges that deter the effective utilisation of the technology in rural Tanzania. Thus, the study recommends that rural development strategies should have a built-in element of fostering the application of mobile phone technology for the information accessibility and usability so that the necessary infrastructure and support system can be put in place.

Keywords: Mobile phone, Community information services, Rural Tanzania, Socioeconomic information

Introduction

Rural-based communities constitute a significant percentage of the population whose members are predominantly agro-pastoralists. These communities largely depend on crop farming and livestock-keeping for their livelihoods (Uzuegbu, 2016). In general, rural communities depend directly or indirectly on natural resources such as land, forest and water resources for their livelihoods (Uzuegbu, 2014). In developing countries, these rural communities experience poverty associated with poor and low agricultural production, poor market access and social services (Kazi *et al*., 2017). The situation is compounded by the fact that the development needs of these communities tend not to be adequately taken care of, as they fail to participate productively in the development process and enjoy the attendant benefits (Chester and Neelaghan, 2006; Kamba, 2007). In consequence, these communities suffer from an acute shortage of social amenities and other important services that can make their life bearable (Harande, 2009). In fact, the success of rural development programmes depends on effective access and use of information in the daily activities of these communities (Harande, 2009). Scholars such as Uzuegbu (2016), Mittal and Mehar (2016), De Silva, Goonetillake, Wikramanayake and Ginige (2017) contend that accessibility and usability of information enhances the decision-making pertaining to markets, services and products, hence fostering the development of rural

communities. Crucial as such information provision might be, the vast majority of the rural populations are subjected to the vagaries of their highly inefficient information asymmetric (Abraham, 2007).

The overriding question concerns why rural communities in Tanzania remain socioeconomically-disadvantaged despite concerted efforts to improve their lot dating back decades since the country gained its independence in 1961. In fact, the country has had prioritised rural development as its mainstay remained agriculture and, hence, has been over-dependent on the agrarian economy. Generally, for information related to socioeconomic and natural aspects, governments in developing countries tend to employ rural extension services, the mass media and print-based services. These systems tend to rely on a top-down approach, which prevents them from achieving a full effect on the rural communities (Mtega, 2012; Ifukor, 2013; Bachhav, 2012; Sturges and Chimseu, 1996). Similarly, Owen (2009) found that poor programme selection and design coupled with poor implementation tend to undermine the effectiveness of accessing socioeconomic information and poverty-reduction strategies. With developments in mobile phone technology that has permeated even areas once-considered as remote and inaccessible areas has offered new opportunities for information dissemination to the rural dwellers. Yet, empirical studies (see, for example, Sife, Kiondo and Lwimo, 2010; Krone, Dannenberg and Ndulu, 2015) indicate that there is relatively little systematic research on the links between mobile phone technology and provision of information in support of socioeconomic activities to improve the welfare of Tanzania's rural communities. As there are hardly any studies that have examined the support that the mobile phone technology renders to meeting the information needs of Tanzania's rural-based socioeconomic services, the present study explored the use of mobile phone technology in strengthening socioeconomic services through information provision to aid poverty reductions programmes in rural Tanzania. Specifically, the study examined the importance of mobile phone in socioeconomic information service provision and determined the challenges limiting the effectiveness of the mobile phone in strengthening socioeconomic information in the rural settings.

Related Literature

This section reviews literature related to the use of the mobile phone in supporting information access

Use of Mobile Phone in Socioeconomic Services

Mobile phone can help address the challenges of information access and application in socioeconomic services to alleviate poverty. There is evidence that aspects of poverty cannot be addressed without mobile phone technologies in the current age (Greenberg, 2005). For example, mobile phone technologies have served as effective tools in providing security information (Rao, 2007). Also, the delivery of after-sales services and support can directly lower the costs (Gurstein, 2000). With appropriate communications, the seller can learn about market prices and demand a higher wholesale price. Fishermen, for example, can use mobile phones to determine the port at which to sell their catch. Moreover, a mobile phone can provide access to markets in nearby villages and towns, thereby increasing income for smallholder farmers and producers (Srinivasan and Burrell, 2015; Greenberg, 2005). Furthermore, both farming and non-farming communities can access information on products they want to purchase (Mwantimwa, 2017; Sife, Kiondo and Lyimo, 2010) such as seeds, fertilisers, machinery and pesticides in addition to having access to crucial weather forecasts under climate change challenges (Das, Basu and Goswami, 2012; Etwire *et al*., 2017; Kazi *et al*., 2017).

The mobile phone also enhances the convenience and confidence for travelling it provides relevant information in real-time (TMC, 2010). As mobile remittances also have the potential of reaching the 'unbanked', they are considered to constitute a tool for supporting socioeconomic activities, hence alleviate poverty in many a developing country (see Siegel and Fransen, 2010; World Bank, 2008; Porteous, 2006; Scott, Batchelor, Ridley and Jorgensen, 2004; McNamara, 2009; Munyua, 2000). The mushrooming kiosks, for example, do not only sell prepaid phone vouchers and cards, but also—as agents—receive and send money for customers (Litondo, 2010; Meso *et al* 2005). Weather forecasts, in particular, are invaluable for rural or isolated

settings as they facilitate the monitoring of and response to disease outbreaks (Greenberg, 2005). Indeed, the possessions of the mobile phone technology with which to contact a hospital and describe the symptoms of a critical patient can enhance the survival chances as the doctors can prescribe and describe what to do in the interim period (Accascina, 2000). In this regard, the two-way communication coupled with instant feedback and affordable costs makes the mobile phone a useful tool in crisis management. Additionally, mobile-commerce provides value-added services even in the face of infrastructural limitations (Hamilton, 2001). Furthermore, mobile ICT also serves as a business venue for exponential growth in pre-paid billing in cash-based economies such as the one operating in Tanzania as customers do not always have reliable addresses or bank accounts. The farmers could thus promote their products and handle simple transactions such as orders over the mobile phone but let the payments be handled off-line (O'Farrell, Norrish, and Scott, 1999). In other words, the effective use of the mobile phones can stimulate productivity and enhance commerce to improve local economies (Djohy, Edja, and Schareika, 2017; Peterson, 2009).

Generally, the use of the mobile phone technology reduces transactional costs, time, and space barriers. It can also inform on small-scale enterprises, money transfer, applications for credit, product diversification, market conditions, product specifications, price and input availability, transportation alternatives and schedules, and alternative production techniques (Gupta, Yun, Xu, and Woong, 2016; Das, Basu and Goswami, 2012; Litondo, 2010; Hellstrom, 2010; Siegel and Fransen, 2010; Sife *et al*., 2010; McNamara, 2009; Bhavnani, Won-Wai Chiu, Janakiran, and Silarszky, 2008; Jensen, 2007; Sinha, 2005; Munyua, 2000). With the mobile phone, rural communities can acquire the capacity to improve their living conditions and become motivated through training and dialogue with others to a level where they can make decisions towards their own development (Karimuribo, Batamuzi, Masawe, Silayo, Mgongo and Mgongo, 2016; Balit, 1998). In fact, the telephone is by far the most common communication technology to effect tangible positive change among rural livelihoods such as the market and trade information, emergency and disaster communication and strengthening of kinship relations and health services (De Silva, Goonetillake, Wikramanayake, and Ginige, 2017; Dannenberg and Lakes, 2013; Sife *et al*., 2010). The rapid development of the mobile telephony has a significant role to play in the developing countries where these technologies have become available. Their extensive use is a manifestation of the success that can accrue from providing a climate that encourages innovation and growth in socioeconomic aspects. These information technologies are, indeed, basic tools that also constitute an enabling sector in the poverty alleviation process, which opens up hitherto unknown possibilities for the poor at affordable rates. The flexible nature of these technologies can also allow the poor to address their problems related to health, education and livelihoods. Furthermore, they can empower people in the development process (Kazi *et al*., 2017; Karimuribo, Batamuzi, Masawe, Silayo, Mgongo, and Mgongo, 2016; Greenberg, 2005).

Challenges of Deploying Mobile Phone

Apart from its potentials, the use of mobile phone technology to support socioeconomic information service provision is exposed to the factors that undermine its effectiveness. Dannenberg and Lakes (2013) observe that the flow of information through mobile phones was characterised by limited volume of data exchange. This shows that the data and information exchanged via the mobile phone do not fulfil the information needs of rural communities. A study by Krone, Dannenberg and Nduru (2015) established that knowledge and skills and low level of education are barriers to effective use of mobile phones in supporting and enhancing the access to socioeconomic information services in the rural areas. Moreover, the use of mobile phones limits the access to complex knowledge and sophisticated markets, the authors contend. In the same vein, Wyche and Steinfield (2016) found that low literate rates and poor skills were barriers utilisation of text messaging among the rural communities of Kenya. Furthermore, many of the rural dwellers who participated in the study faced difficulties in reading the content of the message received from the source. Kazi *et al.* (2017) opine that several challenges that stand in the way

of people living in remote settings. For many of the rural inhabitants, mobile phone networks and charging costs remained beyond their reach in remote regions of Northern Kenya. In fact, Uzuegbu (2016) argues that rural communities in developing countries live mainly on their 'ignorance rather than on knowledge-based information due to lack of awareness on different potential sources of information. On the whole, the main barriers to effective use of mobile phones include inadequate knowledge, skills, low literate rates and low awareness of the viable information sources about the rural sector (Mwantimwa, 2012). These barriers tend to undermine the effective and efficiency use of mobile technology to support access to and utilisation of information services among rural communities in developing countries.

Research Methodology

The study mainly deployed a qualitative research design to collect and analyse data on the use of mobile phones to strengthen information provision to support rural-based socioeconomic services, hence contribute to poverty reduction in rural Tanzania. Partly, the quantitative design was only used to collect and analyse data pertaining to demographic characteristics of the respondents and the extent to which mobile phones are utilised to strengthen socioeconomic services. The study looked at the use of qualitative design has the advantage of generating better insights into the intricate details of research phenomena that are difficult to convey with the sole use of the quantitative design (see Hecken, 2011; Eliab, 2016).

The study was carried out in Tanzania, particularly in Monduli and Bagamoyo districts of Arusha and Coast regions respectively. The selection of the areas was based on findings from other studies (e.g. Mutega, 2012; Mwantimwa, 2012; Lwoga, Stilwell and Ngulube, 2011; Matovelo, 2007) which revealed that Tanzania's rural communities that depend mainly on agriculture are information poor. This implies that rural communities in different districts experience inadequate access to information resources which results in their low usage. Further to that, Mwantimwa (2012) found that rural communities in Bagamoyo and Monduli districts are not immune to problems associated with inadequate access to and low usage of information resources. Basing on this information, the two districts were purposively selected as research settings to gauge the usage of mobile phones to promoting the accessibility and usability of socioeconomic information among rural communities.

Out of 320 respondents randomly selected from eight villages of Monduli and Bagamoyo districts, 214 rural dwellers that own and use mobile phones were eligible for participation in the study. Of these, 120 were from Bagamoyo and 94 from Monduli district. It is from this pool that 69 respondents were drawn for the study using multiple sampling methods. The sampled agro-pastoralists owned a mobile phone and used it in business transactions and other socioeconomic activities. These mobile phone users were divided into two groups representing Bagamoyo and Monduli, respectively. From the two groups, 21 key village informants were selected for interviews whereas the remaining 48 participated in focus group discussions. On the whole, each village was represented by key informants. The selection of the key informants was based on their experience of using mobile phones in different socioeconomic activities. The snowball sampling technique was used to select the key informants from different households. The key informants were those who represent cross-sections of the cultural and gender groups (e.g. male and female) and socioeconomic activities (crop farming and livestock keeping). Using snowball sampling, the researcher made initial contact with people who met the research criteria (for example owned phones and used them in their socioeconomic activities). These respondents facilitated access to many other potential respondents fitting the selection criteria (see also Bryman, 2001). Purposive sampling, on the other hand, was deployed to select a Village Executive Officer (VEOs) from each village participating in the study.

In-depth interviews and focus group discussions were the instruments used for carrying out this study. Out of 69, twenty-one respondents from the sampled villages were involved in face-to-face interviews from the two districts. These key informants were involved in interviews on the application, attitudes and perceptions of the usefulness of mobile phones in socioeconomic activities. An in-depth and semi-structured interview protocol with open-ended questions was used to collect data from key village

informants. Bailey (1997) affirms that interviews tend to have a better response rate than the questionnaire. In fact, even illiterate persons participated in the interview as opposed to a self-administered questionnaire that requires a person to know how to read and write. Moreover, interviews are also flexible and provide control over the situation.

To obtain more contextual data about each village, focus group discussion (FGD) sessions were held to generate more information. The household representatives were invited to participate in the FGDs. On the whole, 48 participants were involved in these FGDs. The FGDs involved a group of 6-8 participants. Efforts were made to ensure that there was diversity among FGD participants by taking into account the sub-village, age and gender of the participants. The discussion focused on the application, opinions, attitudes and perceptions on potentials of mobile phones in socioeconomic activities as part of efforts to alleviate poverty. A voting procedure was used to ensure different opinions were captured, with scores noted down on the opinions expressed.

During the analysis process, the data were organised categorically and chronologically. The data were reviewed repeatedly and continually coded. The recorded interviews were then transcribed. Field-notes and diary entries were also regularly reviewed. The respondents' verbal answers to open-ended questions were recorded in writing by the researchers. Generally, thematic, narrative, and content analyses were applied to the responses from open-ended questions. The responses from the open-ended questions were grouped according to their themes. They were summarised or presented as they were. Content and thematic analyses, which were applied in the study, are two commonly used approaches to qualitative data analysis, according to Vaismoradi, Turunen and Bondas (2013). Braun and Clarke (2006) contend that thematic analysis helps to identify, analyse, describe and report the themes emerging within the data collected from the field. In addition, demographic characteristics and the extent of mobile usage data were analysed using excel as quantitative data based on frequencies and percentages.

Results and Discussions

Table 1 shows the demographic characteristics of the respondents. In general, 40 (58%) of the key informants, who participated in the study, were from Bagamoyo whereas 29 (42%) were from Monduli district. In terms of gender, 41(59%) were male and 28 (41%) were female. Regarding age, the results indicate that 27 (39.1%) of the respondents were of ages between 41 and 50, 21(30.4%) belong to 31-40 age range, 9 (13.2%) were between 21 and 30 years, 7 (10.1%) were aged between 51 and 60, while 5 (7.2%) were above 60 years old. Apart from that, the participants were asked to indicate their main occupations and sources of income. Regarding occupation, the results show that 35 (50.7%) of the participants were involved in crop farming, 23 (33.3%) practised livestock keeping, 7 (10.1) owned small business, and 4 (5.8%) were public employees. In terms of income, the results disclose that 36 (52.2%) of the participants had incomes that ranged between Tshs 46,000 and 100,000, 22 (31.9%) of them had incomes that ranged between 0 and 45,000, and 11 (15.9%) of them had incomes of above Tshs.101,000/=.

Table 1: Demographic characteristics

Characteristics (N = 69)		Frequency	Per cent
District	Bagamoyo	40	58
	Monduli	29	42
Gender	Female	28	41
	Male	41	59
Age	21-30	9	13.2
	31-40	21	30.4
	41-50	27	39.1
	51-60	7	10.1
	60+	5	7.2
Education level	Never to school	18	26.1
	Primary school	44	63.8
	Secondary	5	8.7
	University/college	1	1.4
Occupation	Crop farming	35	50.7
	Livestock keeping	23	33.3
	Public salaried jobs	4	5.8
	Entrepreneurial business	7	10.1

At the district level, the majority (58%) of the participants were drawn from Bagamoyo whereas the minority (42%) came from Monduli. There is a difference in sample size between male and female respondents in the villages under study. Overall, the majority of the key informants of the agro-pastoralists surveyed were males. Besides that, the findings suggest that for most of the participants, their ages ranged between 31 and 50 years old. This is associated with the fact that most of the villagers were young adults and adults, the kind of people known to deploy mobile phones actively for different purposes relating to business, family, and other matters. In addition to age, the findings also reveal that majority of this study's participants generally had a low level of education as confirmed by the majority of the participants who had only completed primary school education. This can be attributed to the fact that some of the surveyed communities, especially those with nomadic lifestyle, usually do not prioritise higher education, let alone value it the same way educated communities do.

Apart from that, the findings suggest that most of the participants, who participated in the study, were mainly involved in crop farming and livestock-keeping. The results also show that the majority of the households in Monduli depended on both crop farming and livestock-keeping as their main sources of income; whereas for those in Bagamoyo, only a few households were involved in both occupations. Also, the majority of the households in Bagamoyo depend on crop farming activities as their source of income and livelihood. For other respondents—a rather small group—in the two districts, their livelihoods were in form of public sector salaried jobs and entrepreneurship. Thus, the major mainstay of the rural communities in Monduli and Bagamoyo were agricultural activities. Despite agro-pastoralist activities being the mainstay of these communities, non-agriculture and off-farm activities were increasingly being adopted by a significant number of the people in the area. In fact, these were found to constitute coping mechanisms in response to weather vagaries and climate variation. Furthermore, the overall findings signify that the level of income of the rural communities is too low to support effectively a decent living standard. However, it has to be recognised that determining the income of rural

households is not easy (Mwantimwa, 2012). As a result, the range of income does not necessarily represent the exact incomes of the participants as they are largely approximations. Based on the findings it can be seen that an insignificant portion of the participants indicated that their monthly incomes were above Tshs. 100,000 which is equivalent to 44 US Dollar per month. This fact can be attributed to the rural households' reliance on crop and livestock farming (the main employment source for rural areas) as their main source of income and their low education which limits participation in other economic activities.

Use of Mobile Phone to Strengthening Socioeconomic Information Services

The respondents were asked to indicate the extent to which mobile phones contribute to strengthening the accessibility and usability of socioeconomic information in their villages. The percentage was calculated to show the extent as indicated in Table 2.

Table 2: Mobile phone usage in socioeconomic information services

Extent	Per cent
Definitely, the usage of mobile phones boosts the accessibility and usability of socioeconomic information	28.6
To a large extent, the usage of mobile phones boosts the accessibility and usability of socioeconomic information	52.4
To somewhat extent, the usage of mobile phones boosts the accessibility and usability of socioeconomic information	19

A noticeable per cent (52.4) of the respondents shows that, to a large extent, it can contribute to improvements. This is followed by those who said 'definitely' and 'somewhat'. The overall results show that mobile information services can be used in and contribute to the improvement of socioeconomic activities in the sample villages of the two districts. They further explain that the effective utilisation of mobile phones to access and disseminate information supports socioeconomic services and poverty reduction programmes. These findings are in line with the findings by De Silva *et al*. (2017) that mobile phone application support livelihood activities of the people in developing countries. Evidently, Abraham (2007) supports the view that a significant percentage (80%) of his respondents perceived mobile phones to be useful to enhance the accessibility of information. The following sections discuss different information and socioeconomic activities and services that benefited from the use of mobile phones providing support in their villages through information access and utilisation.

The application of mobile phone was found to enhance information on security among rural communities. Some of the respondents sampled reported that the mobile phones were now commonly used to report on livestock theft in their villages. For example, an individual could send a text message or call the neighbours to inform them about cattle-rustling. Also, in other circumstances, the mobile phone is indirectly used to protect wildlife in Monduli District. As respondent no.16 explained:

> *One day, three poachers killed two giraffes near Lwenja Village of Monduli. There was someone from Lwenja Village who informed our village executive officer about that event. After being tipped off, the village executive officer used his mobile phone to inform the staff of TANAPA [Tanzania National Park]. The TANAPA staff responded immediately and were able to arrest the poachers and impound their car. In this case, mobile phones helped to save the national trophy.*

This narration demonstrates how mobile technology was being deployed in providing security information to enhance security. In Bagamoyo, especially in villages located between Bagomoyo town and Msata (e.g. Kiwangwa and Msinune), it is common for the bandits to block the road and way-lay the travellers. The villagers would alert the authorities whenever this happened. Moreover, participatory security guards (community policing), known as *Sungusungu,* use the phones to communicate diverse security-related information. Respondent no.4 puts it this way:

> *I used to keep all mobile phone numbers of the village leaders, village executive officers, and our* Sungusungu *leaders. When I suspect something, I just text them. This is the way we used to inform each other in our villages. In many occasions, mobile phone serves our life.*

On the whole, the findings show that there were many cases in which mobile phone were being used to report thefts, banditry and other insecurity problems to the police, drivers, travellers and other members of the community.

The application of mobile phones in information service provision improves access to and use of relevant information such as market price from diverse databases hosted by various civil society organisations, mobile service providers, private companies and small-scale farm information networks (for example, *Mtandao wa Vikundi vya Wakulima Tanzania* (MVIWATA), as Swahili for National Networks of Farmers' Groups in Tanzania). The information on the producer and the market prices helps to improve sales and markets, especially among rural communities, that are for the large part hitherto exploited due their lack of information. The ready availability of information on market prices helps farmers and non-farmers alike in Monduli and Bagamoyo to understand, analyse market prices, decide and facilitate the sale of produce such as milk, livestock, animal skins (for the livestock keepers) and maize, beans, pineapples, cashew-nuts, and cassava (for crop growers). A farmer in the sampled villages may advertise his/her products on the MVIWATA networks and BR Solutions (Basic and Rapid Information Solutions) company's database by sending an SMS with information on the types of products, quantity, location and contact details of the sellers as respondents no.13 explains:

> *Products such as milk, livestock and crops were being sold to middleman. The elimination of the middlemen [disintermediation] due to enhanced information flow via phones lowers the transaction costs [including marketing, sales, transaction processing], reduce overheads, inventory and labour costs.*

The rural communities have access to market price information from family, friends and network members present in local markets. As a result, the primary producers could raise more income from these direct sales. In fact, BR Solutions database provided fast and reliable demand-driven information through mobile phones which assisted users in making informed decisions. Similarly, Das et al. (2012), Mittal and Mehar (2016) and Karimuribo *et al*. (2016) have observed that mobile phones help rural communities to pull the market price information from the sources. It is evident that the mobile phone provides opportunities for accessing different markets for their livestock and crops.

Mobile phone application to access transport information depends on an individual's transport information needs. The study findings suggest that the use of mobile phones by agro-pastoralists in the villages surveyed facilitates access transport information. In fact, most of key informants agreed that the mobile phone was a key ICT tool that facilitates the use of transport information. On this aspect, one of the key informants (no. 9) says:

> *A mobile phone simplifies and helps in many things. For example, it reduces the cost of travelling. Today, one thousand shillings [Tanzania shillings 1,000] gives me an ability to communicate with many people in different parts of the country.*

In fact, the majority of the agro-pastoralists are increasingly using the motorcycle as their main means of transport. Motorcycles are cheaper than buying a car, hence affordable for many households in Tanzania, including the rural areas. Moreover, its

far lower fuel consumption and versatility on rough and impassable roads – that dominate the rural landscape – have naturally made this mode of transportation popular in rural areas. Mobile phones are now being used for communication between motorcyclists and their clients. The researcher also relied on this mode of transportation during fieldwork in some of the hard-to-reach villages. He had to use his mobile phone to contact the motorcyclist in many of the villages he surveyed. One of the respondents said: "In our village, we use our mobile phones to access information on transport". Also, the mobile phone is used to access information on the bus schedule and other transport agents for vehicles plying between the villages and other areas. They communicated with the bus-drivers, conductors and other travel agents via the phone. As a result, they reduced the cost of time and physical exertions of travelling over some distance just to make an enquiry. The time saved through such communication cannot be measured in monetary terms but many of the rural dwellers could deploy the time to perform other socioeconomic activities in their villages, in addition to reducing the cost and hassle of travelling frequently. This opinion was mostly prevailed with small business entrepreneurs who have been helped by mobile phones to cut down on their frequent travelling since they can now remotely perform tasks such as buying products and making payments without having to travel.

In Tanzania's rural areas today, mobile phones are being used to send and receive remittances. The sampled rural communities may remit or receive money and airtime from their daughters, sons and other relatives from the cities and towns. Also, they may receive payment for their business transactions conducted with retailers in towns and cities by remote-control. The findings show that most of the agro-pastoralists surveyed have used mobile money services at one time. In fact, rural communities with bank services or without them have access to mobile phone banking systems of the mobile service providers. These convenient and affordable services include M-Pesa (Vodacom), Tigo Pesa (Tigo), Airtel Money (Airtel) and Ezy Pesa (Zantel). Ezy Pesa, with an additional innovative approach, allows customers to pay for micro-insurance policy. This policy targets the informal sector, which accounts for the bulk of employment opportunities in Tanzania. The commercial motorcyclist (*Bodaboda*) and the casual workers could access such medical insurance at a cost a low as Tshs 150 per day. One of the respondents (no. 18) says:

> *Nowadays, when I need financial support from my son, who lives in Dar es Salaam, I just ask him to send me some money via the phone. I always receive the money the same day. In the past, I used to write a letter and await his response.*

In other words, mobile phones are simplifying the life of parents with children in big cities and towns. Even for rural communities in Bagamoyo and Monduli with relatively low access to transportation and financial services, sending mobile remittance remains an option because of its affordability, accessibility, fastness and universal attractiveness. In fact, mobile remittances have the potential to reach the 'unbanked' and are, therefore, considered a tool for poverty alleviation in developing countries (see also Porteous, 2006; Siegel and Fransen, 2010; Gupta, 2016). Basing on the findings of the present study, small business entrepreneurs and other rural dwellers, aware of and in possession of knowledge on the usage of mobile phones, have an advantage of using them as banking tools. Participants of this study were found to mainly use these devices to support mobile money transactions and mobile banking.

The increase in the use of mobile phones in rural Tanzania provides direct and indirect employment for some youths. In the villages surveyed, there are kiosks with big advertisements provided by the service providers to indicate that airtime vouchers were available for sale. In this regard, respondent no. 2 explains:

> *Today, youths and young adults in our villages are employed in small vending kiosks. As you can see, the kiosks are everywhere in our village centre, clubs and near the dispensaries and schools. In those kiosks, you find different services on offer such as charging mobile phones, vouchers, sending and receiving money.*

This testimony implies that the application of mobile phone technology among the selected rural communities provides multiple opportunities, for example, employment and transactions (e.g. information, money and business), which all involve information exchange and commercial transactions. It appeared that many youths in the surveyed areas sell such vouchers to earn income. In addition, access to mobile phones encourages entrepreneurship culture. The mushrooming kiosks do not only sell prepaid phone vouchers and cards, but also receive and send money for customers. It was also observed that, some of the kiosks sell mobile phones, SIM card, covers, chargers, earphone, USB and other mobile phone products, hence spreading the use of these gadgets in the rural areas and broadening the catchment area of people with mobile phones and associated products who can access information via mobile technology. Apart from that, mobile phones support multiple information services by providing job seekers with information on vacancies. Indeed, the application of mobile phone offers both direct and indirect employments in addition to providing an easy-to-access information avenue.

Mobile phone technology is also becoming an indirect tool for climatic risk mitigation. Users can access information on local weather conditions. During the dry season (drought), for example, the Maasai in Monduli district used their mobile phones to access information on the availability of pastures and water for their livestock from fellow Maasai in other districts. As one of the respondents (no.17) explains:

> *In 2010, there was a great drought. A large number of our livestock died. The drought caused a serious famine in most of the villages in Monduli. That event left many Maasai communities without livestock because large herds of livestock perished. We used our mobile phones to access market price information of maize and other types of food available in other villages and in towns. Also, our brethren, who are in other regions, were able transfer money through mobile money services. Mobile phones also helped us to gain information on where there were good pastures in neighbouring districts, where we could take our livestock for grazing.*

It is evident from these findings of the multifaceted nature of the benefits that accrue from the use of mobile phones. Weather forecasts, in particular, are invaluable for rural or isolated settings (see also Das *et al.*, 2012). One of the villages (Mindutulieni) surveyed, for example, experienced floods as rivers in the vicinity swelled their banks. There is no bridge to connect the village to nearby villages. The villagers used the mobile phone as early flood warning tool to inform villagers away from the village to find an alternative way of reaching the village. The livestock keepers also warned others about the threat of floods to their livestock. From these findings, it is worth noting that mobile phone technology is useful to both farmers and livestock keepers. For instance, information on the availability of rains is important for timely preparation of farms for a planting season and helps in selecting the right crop to grow properly with the amount of expected rains. On the other hand, the technology helps livestock keepers with access to information about the growth of pastures.

Effective use of mobile phones can lead to progress in health such as counselling services. The findings show that the rural dwellers use their mobile phones to call doctors or nurses and other people who provided social services within and outside the village. The mobile phones are also found to be commonly used to report disease outbreaks, within and outside the villages. In fact, one of the male respondents (no.20) recollects:

> *In the late of 2010 and the beginning of 2011, there was an outbreak of cholera in Alkaria and Lepurko [Engarooji] villages of Monduli. About two people died. Mobile phones were used to disseminate information and seek medical help from district and regional hospitals. More than 50 people from these villages were saved from death during the outbreak of the disease. Without the mobile phone, no one knows what could have happened. The phones were also used to disseminate information on the cholera outbreak in these villages.*

The mobile technology does not provide direct health benefits that drugs or access to a health-care professional can; however, it has a large potential in helping to improve health care. It can also facilitate the monitoring of and responding to disease outbreaks. Indeed, the possession of the technology with which to contact a hospital and describe the symptoms of a critical patient can enhance the chances of survival since the doctors can describe what to do in the interim period. These findings are supported by Karimuribo *et al.* (2016) who also established that mobile phones were being used to make a linkage between health practitioners and rural communities. In this regard, the rural communities may communicate on plant and animal health and diseases. According to the findings, male participants were found to more actively deploy mobile phones than their female counterparts. Some of the respondents attributed this trend to the two sex's ability to own these devices where it was noted that male participants were more likely to afford a mobile phone, airtime, and Internet bundle as compared to female participants.

Rural communities can also pay their bills, school fees for their sons and daughters and conduct mobile-commerce through the use of the mobile phone technology. Indeed, mobile phone facilitates business transactions between rural and urban areas. For the rural dwellers, using mobile phone services to trade is cheaper and faster than using online or paper-based options. Indeed, new ICTs enable entrepreneurs in rural areas to access market information and open up new markets that fetch better prices to increase their earnings (see also Munyua, 2000; Krone *et al.*, 2015; Das *et al.*, 2012; Mwantimwa, 2017). As respondent no.3 who owned a small business puts it:

> *A mobile phone is a better technological tool; it helps in different occasions… in business, simplification of travel, and communication with people in other places.*

Another respondent (no.1) explains:

> *One day, I cut pineapples in my field for selling to one of my customers who promised to come to buy them. But that day he was unable to come. The next day, he did not come either. By the evening of the following day, I tried to call him using my mobile phone but he was not reachable. I remembered that I had a number of mobile phone of another buyer. I called him. He came the following morning to buy the pineapples. My cell phone saved my produce, my money and my energy that was used in producing those pineapples.*

The two-way communications coupled with instant feedback and affordable cost, makes the mobile phone a useful tool in such crisis moments. Mobile-commerce provides value-added services despite infrastructural limitations (see also Hamilton, 2001; Etwire *et al.*, 2017). Mobile ICT also serves as a business venue for exponential growth in prepaid billing in cash-based economies such as the one operating in Tanzania as customers do not always have reliable addresses or bank accounts. In other words, effective use of the mobile phones can stimulate productivity and enhance commerce to improve local economies (Peterson, 2009; Djohy *et al.*, 2017). In addition to boosting the accessibility and usability of socioeconomic information, mobile phone technology provides direct and indirect benefits for income generation among the rural dwellers involved in small businesses. For example, effective usage of mobile phones increase sales through accessing viable markets, and removes middle men who exploit farmers by offering them low price on their agricultural products (Mwantimwa, 2017). In fact, effective usage of mobile phones among rural communities can boost their incomes.

Challenges Faced in Utilising Mobile Phone in Rural Information Services

Despite the many benefits accruing from the use of mobile phones to access information, there is a downside to the application of this mobile technology and attendant challenges that need attention. Indeed, there are different barriers to using mobile phone in strengthening information and socioeconomic services to the rural communities in the sampled villages. In this regard, the respondents were asked to identify the obstacles to effective usage of mobile phone in accessing development-related information to

enhance the quality of rural livelihoods. Responding key respondent no.19 explains:

> *The use of mobile phone to support socioeconomic services is impeded by network problems of some mobile service providers in our villages. In some locations the mobile services are not accessible. Sometimes, we are forced to climb onto hills for proper reception of the signals and communication.*

Another key informant (no.7) observes:

> *Today, the risk of abuse and cheating through mobile phone is increasing. Conmen and women are using the mobile phone for abusing and cheating others. Two weeks ago, I received a text message that was requesting me to transfer a certain amount of money to person whose name I know. I tried to call her but she was not responding to my call. The same day I met the person with that name. I asked her about whether she had sent any text message [SMS] asking me for some money. She curtly replied, 'No!! It is not me; it could be someone who knows about our relationship'.*

Accordingly, key informant no. 11 asserts:

> *The main obstacle to effective utilisation of the mobile phone in socioeconomic activities and services is lack of awareness on the sources of development information. Information to enhance socioeconomic activities could be available and accessible but the problem is lack of awareness. Other mobile phone users in our villages lack enough knowledge and skills on utilising mobile technologies and tools. Some own mobile phones with high capacity [smart phones] but end up just using them for calling and text messaging.*

Generally, the potential contribution of mobile phones to enhancing socioeconomic activities in Bagamoyo and Monduli is hindered by different factors. In fact, the mobile phone application, like any other method, might not be immune to challenges in socioeconomic information services and poverty reduction strategies. Some of the challenges to effective applications of this approach in poverty reduction programmes identified from the field include network problems (weak, overloaded), the risk of abuse by mobile phone service providers, and charging costs (as many of the rural dwellers do not have electricity in their homes). Other challenges mentioned are high running costs (for households that usually do not depend on a cash economy), mobile phone user misbehaviour (such as lack of trust), lack of awareness of some useful information (available via the phone) and applications (that could add value to their information access via the mobile phones, particularly smart phones), and low education of the mobile phones users in rural communities. Apart from that, mobile phones can also be used for nefarious activities including committing fraud and organised crime. Other challenges have been noted by Krone *et al.* (2015), who contend that mobile phones are not useful when it comes to sharing complex knowledge such as production techniques. Yet, in the study, the findings point at a different reality on the ground as some of the FGD participants indicated sharing poultry production information and knowledge through text messaging and WhatsApp. On the other hand, the findings from the current study concur with those of Wyche and Steinfield (2016) who identified low literate rate and skills as barriers to effective use of text messaging among rural communities in Kenya. These challenges tend to reduce the effectiveness of the application of mobile phones in improving information services in socioeconomic activities in rural communities.

Conclusion and Recommendations

The study has established that mobile technology presents a unique opportunity for enhancing access to and utilisation of information related to socioeconomic activities in the rural areas. Using the mobile phone in socioeconomic activities facilitates access to and use of massive information produced from different sources to enhance socioeconomic services and poverty reduction

programmes. In fact, a considerable amount of light has been shed on the potentiality of mobile phone technology in enhancing information access and utilisation in socioeconomic activities conducted in rural areas. Indeed, the application of mobile phones can be translated directly or indirectly into socioeconomic development strategy with the expectation that short-term economic benefits would result. More significantly, productive applications are, for large part, not on the cutting edge of the mobile phone media. The usage behaviour of mobile phones on accessing and using socioeconomic information does not differ among the rural communities in Monduli and Bagamoyo districts. In this regard, ICT interventions that target rural poverty reduction would work best if they are integrated in the wider poverty reduction agenda. Other important development facilitating factors include electrification, provision of accessible all-weather roads and other basic services that can improve the poor's living standards, sustain their efforts to escape poverty, and make them self-reliant. On the whole, poverty reduction policies, strategies, approaches, reforms and programmes should also have a built-in component for fostering the use of mobile technology to enable the marginalised majority of the rural poor to enhance their access to relevant and appropriate development-related information and engender sustainable development among their ranks. The provision of knowledge and skills for application of mobile phones is quite important among rural communities with low literacy rates. This should be accompanied by raising awareness on the relevant government and non-government sources of socioeconomic information that could actually be accessed via mobile phone technology and how to access it.

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Impact of Scientific Productivity and Trend on Publication Output of Nigerian Authors in Web of Science from 2006 to 2016

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Abstract

Citation is one of the most important instruments in analysing the impact of scientific productivity of researchers and research institutions. Citation is driven by scientific publication and substantially increases by collaboration. This study aims at assessing the trend in publication output and the impact of scientific productivity in Nigeria. The results reveal that publication output has continued to increase moderately with a mixed growth pattern. Most institutions recorded an irregular rise and fall in their publication output. This fluctuation has led to weak and moderate monotonic trend in their publication output. The results also reveal that citation is highly associated with the number of publications and collaborations.

Keywords: Scientific productivity, Nigerian authors, Citations, Collaboration, Web of Science

Introduction

The recognition and advancement of researchers rest greatly on the quantity and quality of the output of their scientific productivity (Yusuf, 2012). Scientific productivity is the foundation of the techniques that boost researchers ranking and rating (Denise and Isabel, 2016). Thomaz et al. (2011) noted that impact of scientific productivity is measured by researcher's citation count. Citation has been a favoured measure for the assessment of scientific productivity. Citation refers to a measure of "impact" or "utilisation" or "influence" of an article, researcher, and institution. Bornmann and Marx (2014) explained that citation measures the impact of publication. Martin and Irvine (1983) describe citation as the actual influence of a publication on the surrounding research activities. Also, Nieminen et al. (2006) describe citation as a measure of the utilisation and contribution of the published article. Citation allows for the quantification and measurement of the impact of scientific productivity of individuals, journals, researchers and institutions (Hurley et al., 2013). Das (2015) explained citation as the predominant method for measuring the impact of scientific publications for researchers and institutions. Citations help in identifying the role of highly cited papers in expanding the universe of knowledge, the formation of new scientific disciplines and strengthening scientific communities. Citation is driven by scientific publication and substantial increases by collaboration (Bosquest and Combes 2013).

Scientific publications are the tangible output of academic dissertations, research reports, monographs, conference papers, books, journal articles, and book chapters that appear in peer-referenced journals indexed by reputable agencies (Ynalvez, and Shrum, 2011). Scientific publications are channels through which researchers contribute their quota to existing body of knowledge by disseminating their research findings as a necessary act of informing and expanding knowledge in any discipline or field of study (Sarah, 2015). These publications help in sustaining the development of new ideas and knowledge that contribute ultimately to the growth of a discipline by employing the best

practices and theories in problem-solving and decision-making (Winston and Williams, 2003). Studies have shown that publication and citation are primary parameters used in the assessment of scientific activity and productivity of researchers and institutions (Huang, 2016; Abramo et al, 2014; Noruzi and Abdekhoda, 2014; Van Raan, 2008). Bornmann and Daniel (2009) explained that the relationship between publications and citations could measure scientific productivity. Similarly, Russell and Rousseau (2010) explained that publication and citation are generally used for assessing and measuring the scientific productivity of researchers and research institutions. Donaldson and Cookie (2013) explained that impact of scientific productivity incorporates elements of both publications and citation. They noted that to yield an "impactful" research and advance scientific knowledge, researchers must rely on networking and scientific collaborations. Scientific collaboration has a role in determining publications and citations.

Scientific collaboration is a form of interaction among researchers, allowing for effective communication, and working together to generate and report their research findings by sharing ideas, expertise, and resources (Ynalvez, and Shrum, 2011). Denise and Isabel, (2016) define scientific collaboration as the working together of researchers to achieve the common goal of producing new scientific knowledge.

Scientific collaborations are necessary for progress in academic research. Collaboration generally leads to an increase in citation. Aldieri et al. (2017) noted that collaborative research usually receives a higher number of citations than single-authored papers. O'Leary et al. (2015) explained that academic departments with greater collaboration had the highest level of citations. Fu et al. (2012) explained that research with a high level of international collaborations is highly cited. Chuang and Ho (2015) explained that international collaborated research publications produced higher citation rates.

Literature Review

A number of studies have examined research productivity in Nigeria. Most have concentrated on a particular subject area or/and region in Nigeria. Few of the studies employed bibliometric approach while others adopted a descriptive survey design. Using bibliometric analysis, Ani and Onyancha (2012) evaluated the research performance and productivity in Nigerian universities from 2000 to 2010. They noted that Nigerian researchers preferred publishing in foreign journals as opposed to regionally published journals. Their findings indicate that there is a significant level of growth in research and publication output in Nigeria in general, and in Nigerian universities in particular. Similarly, Ani et al. (2017) used bibliometrics to examine patterns of publication output in library and information science (LIS) research in Nigerian universities from 2000 to 2014. The findings show that there is no consistent or significant growth in publication in LIS research in Nigeria. Nwagwu (2006) tested the validity of Lotka's Law on four author categories of the biomedical research in Nigeria published in Medline for the period 1967 - 2002. The result shows that only the 'co-author' category differed from the inverse power version of the law. The categories of 'all authors', 'first authors', 'non-collaborative authors' did fit the Lotka's inverse power law with different parameters. Kpolovie and Onoshagbegbe (2017) examined the research productivity of academic staff of Nigerian universities. Research productivity was measured using Google Scholar h-index and i10-index. The findings revealed a statistically significant difference in h-index and i10-index.

Using survey data, Agboola and Oduwole (2005) investigated the effect of staff seminars on the publications productivity of library and information science (LIS) professionals in academic libraries in Ogun State, Nigeria. Their findings show that seminars have positively influenced the publication outputs of LIS professionals. Similarly, Okafor and Dike (2010) analysed the research output of academics in the science and engineering faculties of Federal government-owned universities in Southern Nigeria using survey data. Their results show that the academics published more in local journals than in overseas journals. Okiki (2013) assessed the level of research productivity of academic staff in Nigerian federal universities. The study adopted a descriptive survey design. The findings of the study show that socio-demographic variables have significantly contributed to the research productivity of the academic staff at federal

universities in Nigeria. The finding also reveals that financial constraint and slow Internet connectivity were major inhibitors to their research activities. Oduwole and Ikhizama (2007) examined the research output of librarians in Nigerian agricultural research institutes using survey data. They found that the librarians' research output, although generally low, was related to their work experience. Sarah (2015) reports the publication output of librarians in public universities in Southwest, Nigeria. The descriptive survey method was used for the study. They reported that librarians published more in international journals than local journals. They also identified time constraints, poor interpretation skills, and exorbitant publication fees by journal outfits, and indiscriminate rejection of manuscripts by journals as challenges to publication efforts. Findings indicate that the publication output of librarians between 2009 and 2014 was relatively high. Okiki and Mabawonku (2013) examined the influence of information literacy skills on academics research productivity in federal universities in Nigeria. Their findings show that academics possessed high information literacy skills and these had greatly influenced their research productivity. Ogbogu (2009) examined the research productivity of female academics in Nigerian universities. He stated that female academics made contributions that are more significant to teaching than research. The findings show that marital status, religion, academic position and the number of hours of lectures per week had an impact on research productivity. Using Ex post facto design, Usang et al. (2007) examined the research productivity of academic staff in South-South universities of Nigeria. The findings indicates that gender, marital status, and area of specialisation of an academic staff have a great influence on their research productivity. Isola et al. (2011) carried out quantitative analyses of researchers' productivity using partial productivity approach and an assessment of factors influencing research productivity. Findings from the study indicate that qualifications of researchers, years of experience, research collaborations, and time spent on research significantly contribute to research productivity.

Purpose of the Study

This study attempts to answer the following research questions:

- What is the trend in publication output in Nigeria?
- What is the trend in publication output of Nigerian institutions?
- What is the publication output per research area in Nigeria?
- What is the impact of their scientific productivity?

Methodology

Given that there is no citation database in Nigeria, this study opted to use the Web of Science database as the source of data. Web of Science is the oldest citation database; it has strong coverage with citation data and bibliographic data, which goes back to 1900. The Web of Science includes over 10,000 journals and comprises of seven different citation databases, including different information collected from journals, conferences, reports, books and book series (Boyle and Sherman, 2006).

Publications with an address from "Nigeria" for the period of 2006 to 2016 were identified. The document type was limited to "Articles". Thereafter, total annual publications, annual publications for prolific institutions, and publications per research area were retrieved. Data were also retrieved for prolific authors who have published at least 50 articles in the study period. Data retrieved for each author include the affiliated institution, total publications, total citations, author collaboration, and country collaboration. Author collaboration was determined by the number of persons that have co-authored an article at least once. Country collaboration was counted based on countries where the co-authors' institutions are located. A country is counted once irrespective of the number of authors from that country. For example, if an author has co-authored with seven authors, four from Canada, one from Ghana and two from Austria, the number of country collaboration is counted as three.

Mann-Kendell test was used to analyse the trend in publication output in Nigeria and Nigerian institutions. Mann Kendell test is widely employed to assess if there is a monotonic upward or downward trend of the variable of interest over time. It tests whether to reject the null hypothesis (H_0) and accept the alternative hypothesis (H_a), where:

- The null hypothesis (H_0) indicates that there is no monotonic trend
- The alternative hypothesis (H_a) indicates that a trend exists. This trend can be upward or downward.

By running a Mann-Kendall test at 95 confidence level with a significance level of (α = 0.05), p-value and Kendall's tau can be obtained. For p-value greater or equal to the significance level (α = 0.05), H_0 is accepted. Accepting H_0 indicates that there is no monotonic trend in publication output. On the other hand, for p-values less than the significance level α = 0.05, H_0 is rejected and H_a is accepted. Accepting Ha indicates that there is a significant trend in publication output. Kendall's tau, however, takes values between minus one and plus one, the closer tau is to ±1, the stronger the trend. A positive tau indicates an upward trend and a negative tau indicates a downward trend.

To determine the relationships between the citation in terms of collaborations and publications, correlation analysis was conducted. Correlation coefficient *r* measures the strength and the direction of a linear relationship between two variables. *r* usually takes values between minus one and plus one. The closer *r* is to ±1, the stronger the relationship between the measuring variables.

Linear regression was conducted to measure the strength of the association between citations and collaborations, and citations and publications. By running the regression test coefficient of determination (r^2), standardised residual and p-value can be obtained. The coefficient of determination (r^2) represents the per cent of the data that is the closest to the line of best fit. The closer r^2 to one, the better the regression line fits the data. P-values < 0.05 shows that the result is statistically significant.

Findings of the Study

The findings of the study are presented below.

What is the trend in publications output in Nigeria?

The total articles published during the study period was 22,945. Figure 1 reveals an increase in publication output from 2006, with a decrease in 2010 through 2013; however, there was an increase again between 2013 and 2016. This indicates a mixed growth pattern in the publication output in Nigeria.

The results of the Mann-Kendall test on trends in

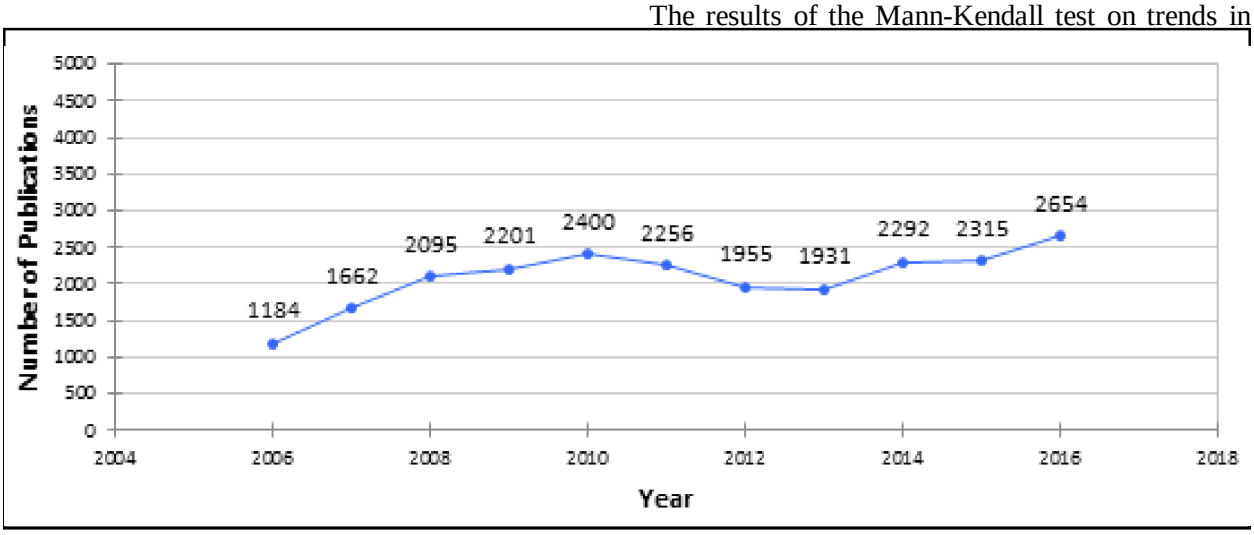


Figure 1: Trends in publication output in Nigeria, 2006 to 2016

publication output in Nigeria is given in Table 1. The results indicate that p-value is less than the significance level ($\alpha = 0.05$), therefore H_0 is rejected and H_a is accepted. Accepting H_a indicates that there is a significant trend in publication output. Kendell tau, however, reveals an upward and moderate trend in the publication output. This implies a moderate growth in publication output.

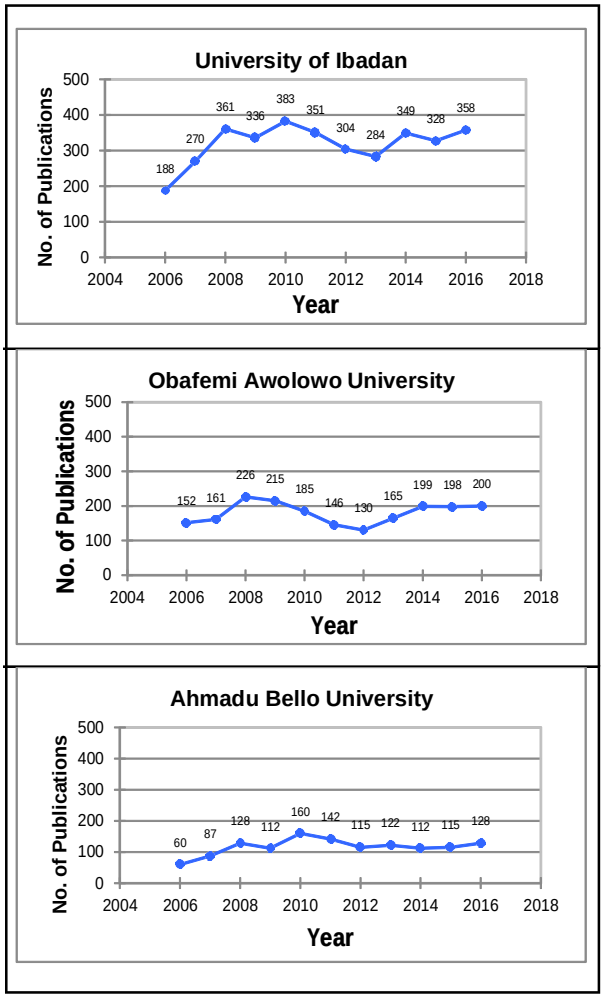
The results of the Mann-Kendall test on trends of

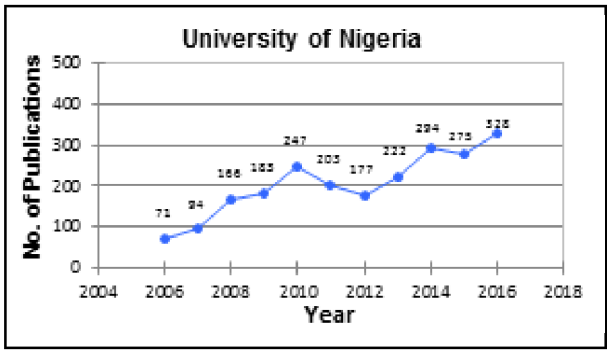
Table 1: Mann-Kendall test for trends in publication output in Nigeria

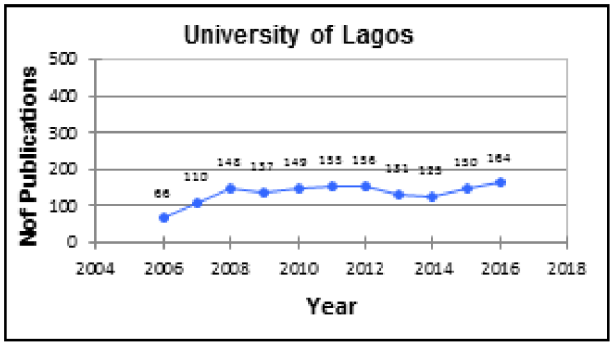
Year	Total Publications	Kendall's Tau	p-value	Test Interpretation
2006 - 2016	22,945	0.564	0.008	Trends exist with moderate growth

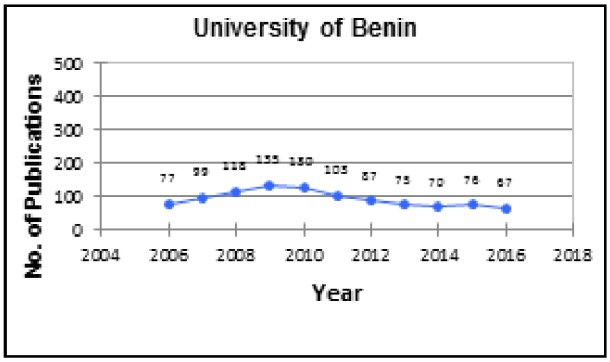
What is the Trend in Publication Output of Nigerian Institutions?

Figure 2 reveals that the publication output of the institutions has continued to increase with a mixed growth pattern. Most of the institution recorded an irregular rise and fall in their publication output. This indicates fluctuation in the publication output of Nigerian institutions.









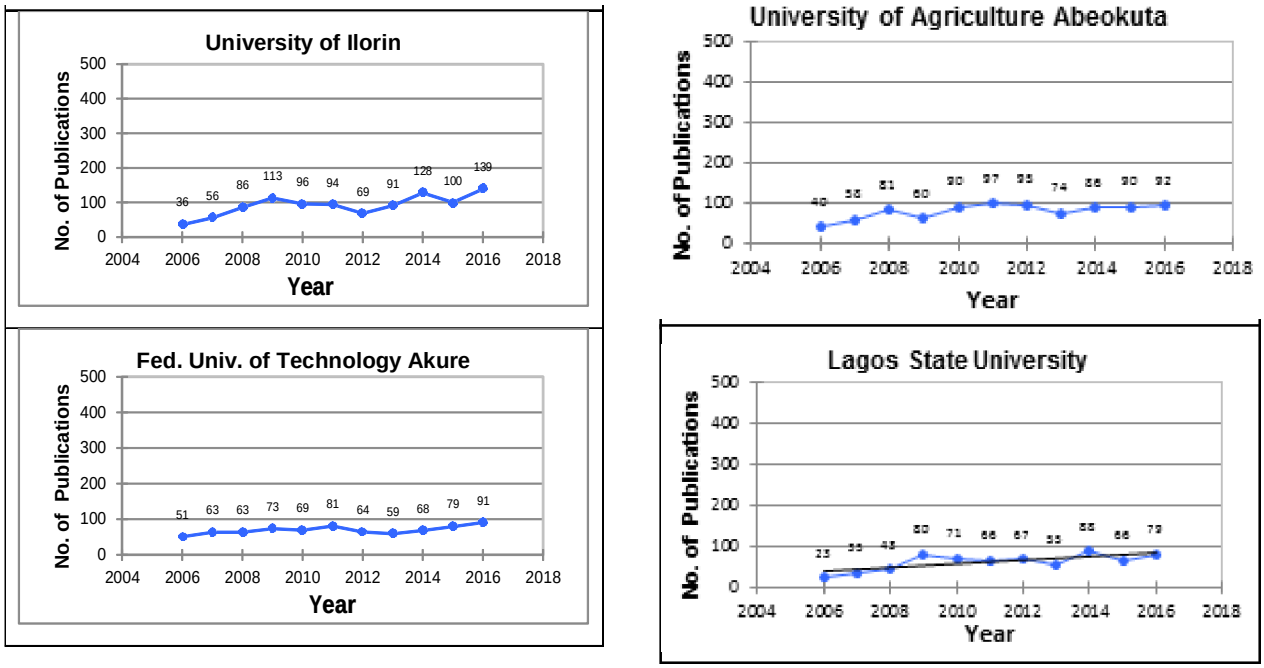


Figure 2: Trends in publication output of top 10 institutions, 2006 to 2016.

publication output of the top 10 institutions are given in Table 2. The results reveal that there is no monotonic trend in publication output of the University of Ibadan, Obafemi Awolowo University, Ahmadu Bello University, and the University of Benin. However, the results reveal a strong growth in publication output of the University of Nigeria, a moderate growth in publication output of the University of Ilorin and the University of Agriculture Abeokuta, and a weak growth in publication output of the University of Lagos, the Federal University of Technology Akure and Lagos State University. Figure 3 shows the regression model for citation by

Table 2: Mann-Kendall test for trends in publication output of top 10 institutions

Publishing Institutions	Total Publications	Kendall's tau	p-value	Test Interpretation
University of Ibadan	3512	0.200	0.196	No monotonic Trend
University of Nigeria	2260	0.782	**0.000**	Trends exist with strong growth
Obafemi Awolowo University	1977	0.127	0.230	No monotonic Trend
University of Lagos	1491	0.491	**0.018**	Trends exist with weak growth
Ahmadu Bello University	1281	0.262	0.101	No monotonic Trend
University of Benin	1037	-0.491	0.982	No monotonic Trend
University of Ilorin	1008	0.564	**0.008**	Trends exist with moderate growth
University of Agriculture Abeokuta	863	0.514	**0.014**	Trends exist with moderate growth
Fed Univ. Technology Akure	761	0.477	**0.021**	Trends exist with weak growth
Lagos State University	673	0.440	**0.030**	Trends exist with weak growth

What is the Publication Output per Subject Area in Nigeria?

Table 3 shows the publication output per subject area in Nigeria. Medicine General Internal is the most research field in Nigeria. It is obvious from the results medical, health, technology and sciences dominate the top 10 fields of research in Nigeria.

Table 3: Publication output per subject area, 2006-2016

WOS categories	Total Publications	Percentage
Medicine General Internal	1582	6.90
Public Environmental Occupational Health	1541	6.72
Biotechnology Applied Microbiology	1519	6.62
Environmental Sciences	1270	5.54
Food Science Technology	1214	5.28
Pharmacology Pharmacy	1165	5.08
Tropical Medicine	812	3.54
Multidisciplinary Sciences	785	3.42
Plant Sciences	779	3.40
Infectious Diseases	741	3.22

What is the impact of Scientific Productivity in Nigeria?

Table 4 shows the total number of publications, citation count, country collaboration, and author collaboration and institution of the prolific authors who had published at least 50 articles in the study period.

Table 4: Scientific Productivity of most prolific Nigerian authors

Author	Institution	No. of Publi-cations	Total Citation	Country Collabo-ration	Author Collabo-ration
Gureje O.	University of Ibadan	166	7210	92	967
Ogunwande I. A.	Lagos State University	98	348	7	52
Farombi E. O.	University of Ibadan	94	1110	3	48
Ebenso E. E.	Obafemi Awolowo University	93	2182	8	44
Oboh G.	Federal University Technology Akure	91	871	4	34
Olusanya B. O.	Centre for Healthy Start Initiative, Lagos	82	3127	9	1254
Ikot A. N.	University of Port Harcourt	74	303	1	23
Ayo J. O.	Ahmadu Bello University	66	346	0	31
Luiselli L.	Rivers State University	66	175	8	36
Esimone C. O.	Nnamdi Azikiwe University	64	357	3	37
Ogunniyi A.	University of Ibadan	64	1019	18	174
Umoren S. A.	University of Uyo	63	2207	5	19
Obot I.B.	University of Uyo	61	2261	7	24
Onwujekwe O.	University of Nigeria	60	613	10	47
Sowunmi A.	University of Ibadan	59	583	5	39
Folayan M. O.	Obafemi Awolowo University	58	210	6	40
Shehu Y.	University of Nigeria	58	144	6	11
Singh J.	Ahmadu Bello University	59	384	0	9
Happi C. T.	Redeemers University	57	718	7	96
Eneji A. E.	University of Calabar	56	417	5	50
Menkir A.	Int. Inst .Trop. Agr. Ibadan	56	509	8	43
Attama A. A.	University of Nigeria	55	560	4	29
Gbotosho G. O.	University of Ibadan	55	577	3	36
Asiedu R.	Int. Inst. Trop. Agr.	53	201	11	35
Loto C. A.	Covenant University	53	163	1	17
Adebowale K. O.	University of Ibadan	50	1157	4	12
Bandyopadhyay R.	Int. Inst. Trop. Agr. Ibadan	50	822	14	29
Ezema F. I.	University of Nigeria	50	227	4	29

To test the relationship between citations, the number of publications and collaboration, correlation and regression analysis was conducted. Table 5 shows the coefficient for the Pearson correlation analysis. The results reveal that total citation is highly correlated with the number of publications, author collaboration, and country collaboration.

Table 5: Coefficients for Pearson correlation analysis

		Total Citation	No of Publica-tions	Author Collabo-ration	Country Collabo-ration
Total Citation	Pearson Correlation	1	.795**	.756**	.854**
	Sig. (2-tailed)		.000	.000	.000
No of Publications	Pearson Correlation	.795**	1	.594**	.776**
	Sig. (2-tailed)	.000		.001	.000
Author Collaboration	Pearson Correlation	.756**	.594**	1	.612**
	Sig. (2-tailed)	.000	.001		.001
Country Collaboration	Pearson Correlation	.854**	.776**	.612**	1
	Sig. (2-tailed)	.000	.000	.001	

****.Correlation is significant at the 0.01 level (2-tailed).**

the number of publications and histogram of residuals. Figure 3(a) reveals a significant linear trend, with moderate variability. This indicates that number of publications explains 63.3% of the variation in citations. It can be observed from figure 3(b) that out of 28 observation, only one residual falls outside the range [-2, 2], an analysis that does not reject the normality assumption.

Figure 4 shows the regression of total citation by

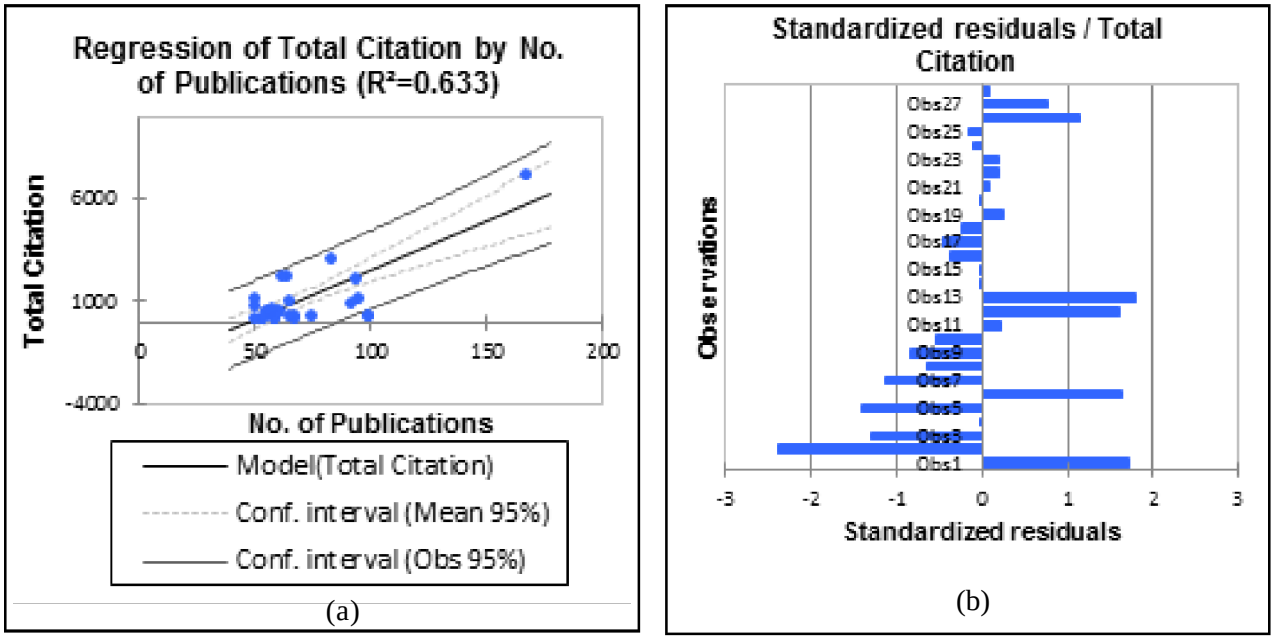


Figure 3 (a) Regression of total citation by number of publications and (b) histogram of residuals

author collaboration and histogram of residuals. Figure 4(a) reveals a significant linear trend, with moderate variability. This indicates that author collaboration explains 57.1% of the variation in citations. It can be observed from figure 4(b) that out of 28 observation, only 2 residuals fall outside the range [-2, 2], an analysis that allows for rejection of normality assumption.

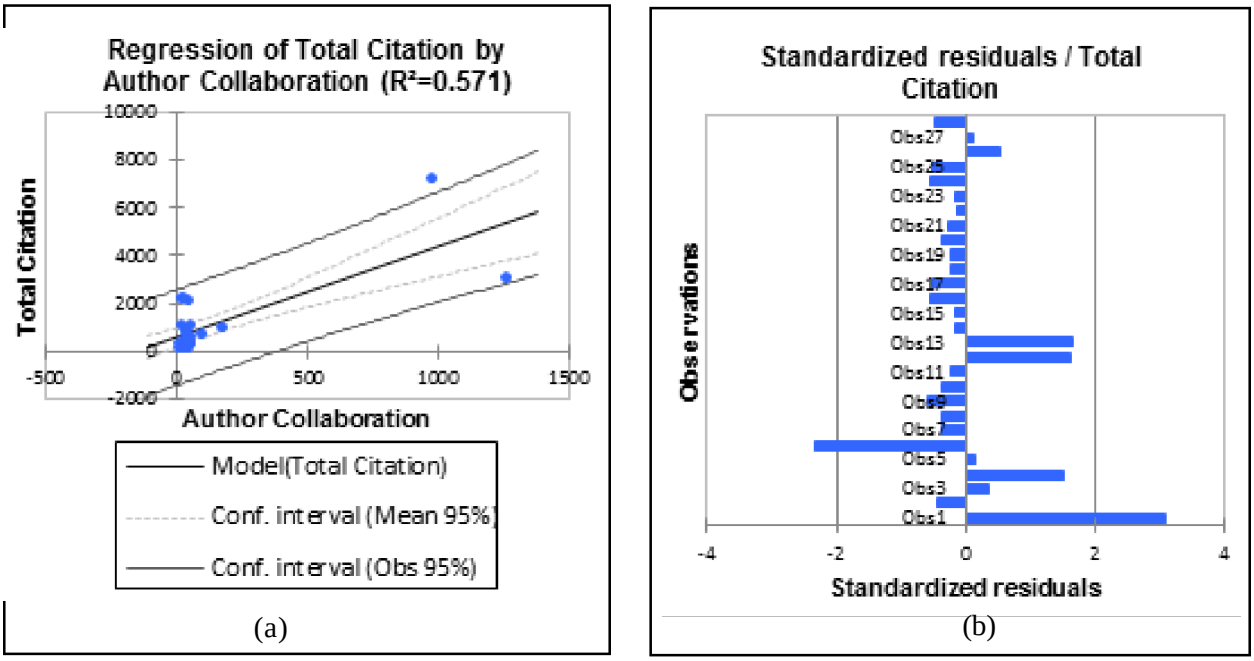


Figure 4 (a) Regression of citation by author collaboration and (b) histogram of residuals

Figure 5 shows the regression of total citation by country collaboration and histogram of residuals. Figure 5(a) reveals a significant linear trend, with high variability. This indicates that country collaboration explains 72.9% of the variation in citations. It can be observed from figure 5(b) that out of 28 observation, only 1 residual falls outside the range [-2, 2], an analysis that does not reject the normality assumption.

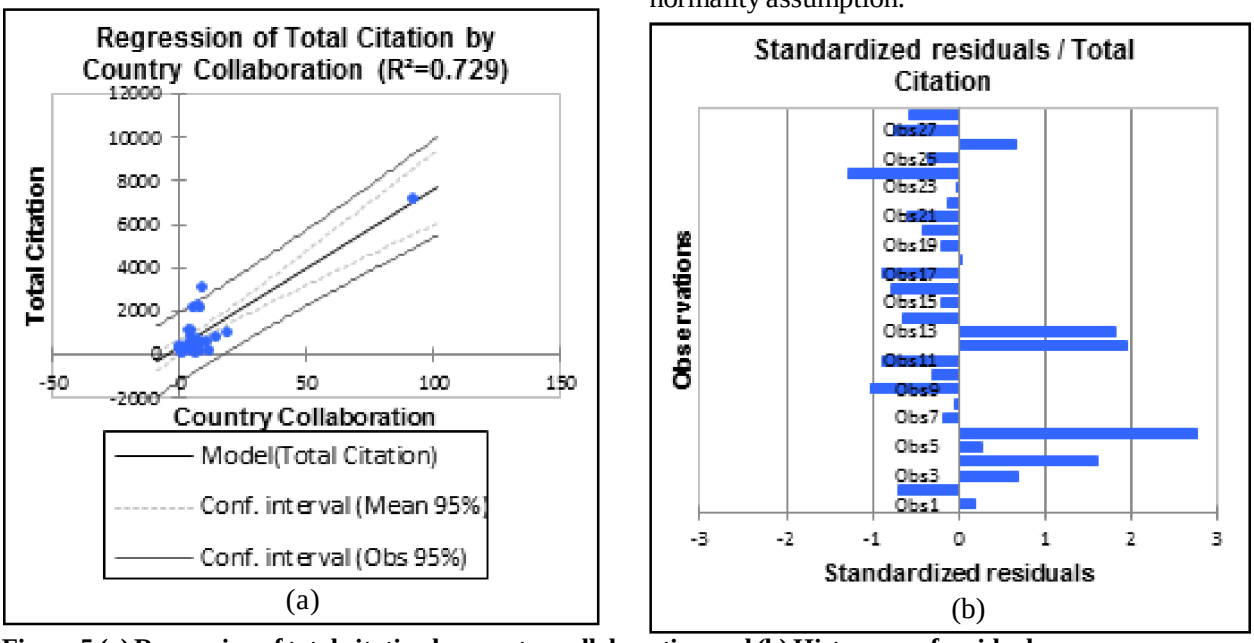


Figure 5 (a) Regression of total citation by country collaboration and (b) Histogram of residuals

Discussion

This study has examined the trends in publication output and the impact of scientific productivity in Nigeria.

Trends in Publication Output in Nigeria

The scientific output of researchers and research institutions provides government agencies, universities and other research institutions with useful information to make the decision about funding, tenure, and promotion. Scientific output in Nigeria, as noted in this study, is dominated by medical, health, technology, and science research fields. Findings reveal that Medicine General Internal is the most researched field in Nigeria, contributing 6.9 per cent of the total articles published in the study period. An analysis on the trend of publication output in Nigeria reveals that publication output has continued to increase moderately with a mixed growth pattern. Most institutions recorded an irregular rise and fall in their publication output. This fluctuation has led to no, weak and moderate monotonic trend in their publication output. Ani and Onyancha (2012) observed a similar pattern of growth in publication output in Nigeria between 2000 and 2010. They found a significant increase in publication output in the late 2000s, with a slight decrease in 2010. They attributed the pattern of increase in research activity to the improvement of government funding. Donwa (2006) explained that government accounts for 98.81% and foreign agencies account for 1.19% of research funding in Nigeria institutions. He noted that research funding in Nigeria is inadequate, not regular and therefore, not dependable. Yusuf (2012) attributed the mixed growth pattern in scientific output to inadequacy and irregularity of research funding. The inadequacy and irregularity of the research funding might have been attributed to the mixed growth pattern of publication output in Nigeria as noted in this study. To improve the growth pattern of publication output, government and funding agencies need to allocate enough funds for research activity as it is not possible to increase scientific output substantially without access to a regular and adequate research fund. Regular and adequate research funding can promote increased scientific output in Nigeria.

Impact of Scientific Productivity in Nigeria

Scientific productivity remains a prime source of scientific knowledge and innovation at national and global level. Impact of scientific productivity has been assessed for national science policies and development. To assess the impact of scientific productivity in Nigeria, the relationship between citation and collaboration, and the relationship between citation and number of publications were examined. An analysis of the relationship between citation and collaboration (author and country) reveals that citation and collaboration are strongly correlated, with moderate and strong linear relation. An increase in the number of collaborations leads to a proportional increase in the flow of citations. This is in line with many studies (Aldieri et al., 2017; O'Leary et al., 2015; Fu et al., 2012; Chuang and Ho, 2015) that an increase in collaborative activity is associated with high citation impact. Denise and Isabel (2016) reported that a greater number of co-authorship are associated with a greater volume of citations. Aldieri et al. (2017) noted that co-authored publications tend to receive more citations. Aksnes (2003) reported that a large number of scientists, often involved international collaboration, typically author highly cited papers. Bornmann (2017) noted, "Citation impact is typically greater when research groups collaborate, and the benefit strengthens when co-authorship is international". From this analysis, it can be noted that collaboration is a strong predictor of impact. Thus, Nigerian researchers must collaborate more to yield an "impactful" research and to advance scientific knowledge.

It is discernible from the analysis of this study that there is a strong correlation, with a moderate linear relationship between number of publications and citations. This implies that scientists who publish much also tend to publish works of high impact as measured by citations. A similar conclusion has been formulated by many studies. Haslam and Laham (2010) reported that the most influential researchers might be those who publish the most. Likewise, Larivière and Costas (2016) reported that the higher the number of papers a researcher publishes, the higher the proportion of these papers is amongst the most cited. Donaldson (2013) explained that total publications lead to higher citation rates. In line with this, Bosquest and Combes, 2013; Abramo et al 2014;

Van Raan, 2008; and Haslam and Laham, 2010 found a positive correlation between number of publications and citations, which supports the view that scientists who publish much also tend to publish works of high impact. Therefore, Nigerian researchers must endeavour to publish more in order to have a large impact on their field. This will in turn generate effective expertise in the various disciplines.

Conclusion

This study has evaluated the trends in publication output and the impact of scientific productivity in Nigeria from 2006 to 2016 using the Web of Science database. Findings of the study reveal that there are irregular rise and fall in the publication output which has led to no, weak and moderate monotonic trend in the publication output in Nigeria. The findings also reveal that citation is highly associated with number of publications and collaborations. Thus, this study recommends that government and funding agencies should allocate enough funds for research activity, as this will improve the growth pattern of publication output in Nigeria. This study further recommends that Nigerian researchers need to collaborate and publish more in order to yield an "impactful" research and to advance scientific knowledge.

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