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An Overview of Issues, Challenges and Opportunities of Scholarly Publishing in Information Studies in Africa

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Abstract

Scholarly publishing has been extensively used by many generations of scholars for self promotion and publicity, networking, the creation and development of new knowledge, announcement of ownership of research output, justification for funding, and proof of the existence of a scholar or department/research unit, among other reasons. Although scholarly publishing is not a new concept, e-scholarly publishing is, and many scholars still struggle to embrace it for promoting the dissemination and visibility of their research output. The digitisation of research publications and electronic publishing has made scholarly communication exceedingly versatile, accessible, effective and efficient. But these positive traits have also been obscured by the challenges. This paper discusses various issues, opportunities and challenges of e-scholarly publications, focusing on open access, institutional repositories and self archiving, conferences, electronic journals, the Web and the relevant ethical issues, particularly from the perspective of African countries and scholars.

Introduction

Publishing options and publications have increased significantly with the evolution of information technologies and communication networks, increased literacy, and the commercialisation of these important educational activities and facilities. Since the famous Gutenberg Press in 1440, publications have continued to proliferate with the Internet becoming the greatest publishing medium of all time. Because of the Internet, the publishing industry, which now spans three main categories - general, commercial, and academic publishing, is swiftly moving away from print to electronic -publishing, and from the traditionally large publishing firms to small or personal publishing initiatives, thereby introducing new challenges.

This paper discusses the status and challenges of scholarly publishing and e-scholarship in information studies. The paper focuses on two main issues: (i) conceptualising and contextualising publishing, scholarly publishing and e-scholarship; and (ii) the challenges of various aspects of e-scholarship, including peer review as a quality management activity, errors in scholarly publishing, mapping and auditing, self-archiving, Institutional Repositories (IRs) and Open Access (OA), publishing from theses, dissertations and conferences, visibility and web presence, etc.

Scholarly Publishing and E-Scholarship

Publishing is the process of making information and knowledge public or known by distributing and circulating that knowledge or information beyond the jurisdiction of its origin or source through the publication of content, mainly in print and electronic format. Of the three types of publications, i.e.

general, commercial and scholarly or academic, the latter is where e-scholarship resides.

A scholar is still viewed to be a learned person; he or she could be an academic or a person involved or engaging with investigative or knowledge based activities, mainly as a learner, researcher or teacher. Scholarship is what the scholar does in terms of activity or work. E-scholarship therefore would be an academic or research activity or work undertaken or fulfilled by a scholar using an electronic medium to enhance teaching, learning and research. Electronic scholarship (i.e. e-scholarship) is closely tied to digital scholarship. Digital scholarship can be "any element of knowledge or art that is created, produced, analysed, distributed, published, and/or displayed in a digital medium, for the purpose of research and teaching"(Kirsten Foot cited by Mutula, 2009:6). Most of the terms provided by Mutula (2010:6) for defining digital scholarship, such as the electronic handling of research articles, peer review, blended learning, evaluation of scholarly work, collaborative research, communication and e-resources, show that there are insignificant differences between the meanings of e-scholarship and digital research, although not all digitised publications are 'e-something' and vice versa. We note that e-scholarship and digital scholarship provide solid opportunities for e-research, enabling researchers to collect research data or information and share their research activities or output virtually.

The purpose of scholarly publishing is to promote and support scholarship, research, and academic or learning activities. A large number of scholarly publications now occur in both print and electronic format, and web-based publications are growing increasingly popular in the academic community for the rapid dissemination of research results. Scholarly publishing differs from other types of publications because of its characteristics. Most scholarly publications are conveyors of scientific research output and there are specific requirements for such output to belong to the scholarly output category, such as research quality and rigour, audience, readability and originality, and so on (Mabawonku, 2005)

Research output has been described as "textual output where research is understood as original, systematic investigation undertaken in order to gain knowledge and understanding" http://www.researchoffice.uct.ac.za/publication_count/overview/. The publication of research findings is a fundamental aspect of research dissemination and knowledge sharing processes, and such publications often go through a number of stages before they appear in the public domain for wider circulation and readership. Authors of research papers come from different backgrounds and scholarly and writing traditions. One of the main aspirations of scholarly publishing is the publication of quality papers, mainly in credible and prestigious peer-refereed scholarly journals and other publishing houses of good national and international standing. There is a diverse range of publications for scholarly research papers, the most common being books (largely monographs), articles in academic or professional journals, chapters in books, reviews and peer-refereed conference proceedings or papers, research reports (e.g. theses and dissertations), and patents and creative works (such as those originating from the visual and performing arts). However, journal articles in peer-refereed scholarly or academic journals with good national or international standing still dominate when measuring research output.

Motivation to Publish

Several widely cited reasons explain why scholars publish their research output (Ocholla, 2007; Stilwell, 2006). Calvert and Gorman (2002) observe that authors write "to disseminate new research findings or ideas. The publication of a paper establishes precedents in the formation of new knowledge, and puts new information in the professional domain where it can be scrutinised, criticised and either accepted or rejected. It may then contribute to further discourse. The author also makes personal gains by adding to a list of publications that can be used for tenure and promotion, for gaining professional acceptance that may lead to speaking engagement, consultancy work, perhaps even awards." Murray, in Stilwell (2006) summarises the reasons as follows: career progression or moving up to the next rung on the ladder, gaining recognition for work done, preventing others from taking credit for one's work or using one's materials, helping one's students gain recognition for their work, learning higher standards of writing, contributing to knowledge, building the

institution's status, and developing a profile. Other noteworthy reasons, in our view, include: to justify funding for an individual, department or institution; for tenure or permanent appointment, "publish or perish", or as a job requirement; career progression/ promotion and other forms of reward, gratification, or boosting one's ego through recognition/visibility; knowledge sharing; announcement of propriety or ownership; community practice and incentive; and education and training.

E-Scholarship Processes, Challenges and Opportunities

The processes, challenges and opportunities of e-scholarship can be viewed from different perspectives. This paper dwells on these issues in respect of peer review, errors in e-scholarship and publishing, mapping and auditing of research and scholarship, institutional repositories, self archiving and open access, publishing from theses, dissertations and conferences, and web presence.

Peer Review

Scholarly publication would not be what it is today without peer review, and e-scholarship is not exempted from this process. Peer review has a history that extends back to more than 300 hundred years of learned inquiry, acting as a traditional instrument of quality control that involves the screening of intellectual output for quality, reliability and credibility. Peer review is standard practice amongst scholars, where research output undergoes thorough evaluation by peers who are mostly in the same research domain or discipline. This is done in order to determine or vet the quality of output in terms of originality, relevance or significance and contribution to knowledge, methodology, awareness of research in the domain through the review of related studies, and readability, among other variables. Thus, peer reviews are important quality control mechanisms used by the scholarly community and most scholarly journals and publishers to establish the suitability of a manuscript for publication. In the words of Pouris (2006), "no analysis of research publishing can avoid underlining the critical role of editing and peer review in the maintenance of the global system of knowledge production, accumulation and use".

Peers are assumed to be credible scholars or qualified adjudicators in a discipline or subject domain, on whom scholars, editors or journals rely upon for views or comments on the content suitability of a manuscript up for publication in a scholarly publication or academic journal. The process of this 'review' service in the form of comments to the scholarly publisher or journal editor and/or author, is referred to as 'peer review'. It is built on the premise that research output (articles, monographs, research reports, patents, etc.) would earn more credibility, be more accepted, contribute more towards a society or discipline, command more respect, and be more reliable if peers (experts in the discipline) vet its quality by scrutinising, screening and evaluating its content and format. Peer review, therefore, should generally improve the quality of research output and the standard of scholarly communication, protect the public/scholarly community from unreliable or invalid information or knowledge, and safeguard the reputation and recognition of individuals, affiliate institutions and academic journals and scholarly publishing houses.

Although peer review is widely used to determine the quality of publication in journals, it is also liable to weaknesses. Most of these weaknesses are intellectual, such as insufficient knowledge in the subject domain, moral or psychological bias, and sociological (distance from context) and political arrogance and ignorance. Strong critics of peer review, such as Tipler (2003) when referring to and analysing cases involving prominent discoveries in science such as "Copernicus's heliocentric system, Galileo's mechanics, Isaac Newton's grand synthesis and Charles Darwin's evolution theory" as well as highly respected Nobel prize winning papers (such as Albert Einstein's theory of relativity), argue that "today, the peer refereeing process works primarily to enforce orthodoxy", and offer "evidence that 'peer' review is not peer review: the referee is quite often not as intellectually able as the author whose work he judges. We have pygmies standing in judgment of giants" (Tipler, 2003). However, Tipler does compromise by proposing that "leading journals in all branches of science establish a 'two-tier" system. The first tier is the usual referee system.

The new tier will consist of publishing a paper in a journal automatically if the paper is submitted with letters from several leading experts in the field (Tipler, 2003). However, in the view of this author, that still leads us back to the importance of peer review. Equally intriguing, but a fairly constructive and sometimes subversive take on this issue is offered by Harnad (1998) who argued that journals [scholarly work] should not be free from the "process of peer review, whose 'invisible hand' is what maintains its quality".

Peer Review Process

Peer reviewers are expected to be competent and credible scholars in order to be sufficiently eligible to participate in a review process that comes with critical challenges at each stage of the review process. Gorman (2000), for example, identifies three qualities of good reviewers: competent researcher, objective assessor, and comparative evaluator. Although there are variations in the peer review process from journal to journal and publisher to publisher, there exist strong threads concerning manuscript flow from author to editor to reviewer, as outlined in a study by Ocholla (2007) focusing on the *South African Journal of Libraries and Information Science* (*SAJLIS*). While guidelines are important for guiding reviewers, most journals unfortunately do not provide them, as is the case with LIS journals in Nigeria (Mabawonku, 2005). The main tenets of the peer review process are outlined graphically in Figure 1.

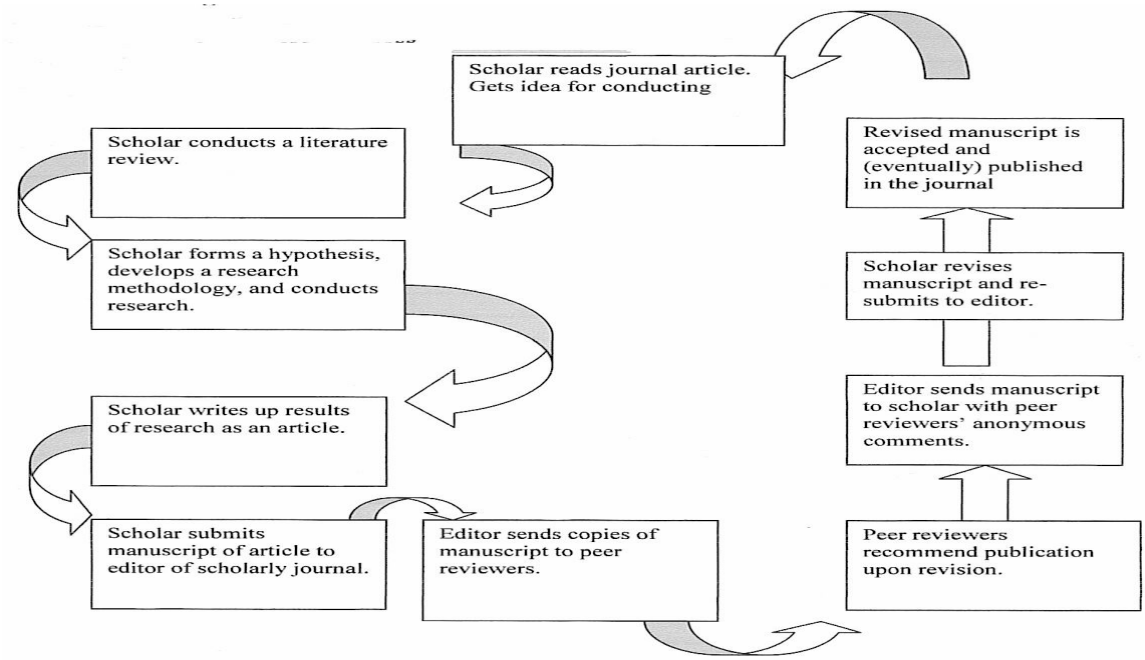


Figure 1: Peer review process
Source: http://www.lmunet.edu/library/INFL/materials/INFL100_InfoEval_Part2.ppt

Types of Peer Review

The nature, type and level of review are normally outlined in instructions to reviewers which are sent to the reviewers together with or separately from the manuscript. Reviewers are normally required to evaluate and rate the manuscripts and either recommend them for publication - without [any] corrections, with minor corrections, with substantial corrections that may demand a complete revision of the manuscript and a follow up review - or reject them. In most instances, reviews are required to determine or judge the quality of the manuscript in terms of theoretical and methodological validity, originality, significance and contribution, and readability. Tipler (2003) outlines three criteria informing judgment, listing them as the validity of the claims made in the paper, originality of the work

or whether similar work has already been done, and "whether the work, even if correct and original, is sufficiently 'important' to be worth publishing in the journal". Gorman, citing Gorman (2000), identifies six criteria for assessing submissions to Asian LIS Journals: the advancement of knowledge, new information or data; theoretical validity (use of appropriate theory or multiple theories); level of scholarship (quality of analysis and author's ability to generate new knowledge); acceptable research design and appropriate methodology and analysis that assists referees in establishing levels of "contribution in terms of knowledge or information conveyed"; originality of the contribution; and the soundness of the methodology, findings and structure.

Avoiding Errors in Manuscripts for Scholarly Publication

Errors may occur not only during the preparation of a manuscript for publication, but also at the early stages of research design. Mistakes that occur during the preparation of LIS theses and dissertations by students, as discussed by Kaniki (2000), are frequently carried on to the final preparation and submission stage of manuscripts prior to publication. Hinchliffe (2003) advises that "thinking about your final manuscript begins when you start thinking about your project." In her view, this includes searching for or reviewing literature and placing the project in context; choosing a topic and determining the relevance of the topic; manuscript and component organisation; and technical preparation (proofreading, removing typographical errors, and adherence to the requirements provided by publishers in their 'guide to authors', etc.).

Smarby, Crews and Downing (1999), citing Dies, Henson and McGowen, identify the following areas under which technical writing errors are made by aspiring authors: selecting topics to write about; describing research methods; following the American Psychological Association (APA) format; citing related research; using the appropriate writing style; and responding productively to feedback on manuscripts from editors. Searing (2003) advises that in the case of journals, it is important to find out whether or not the journal is peer reviewed and whether the journal is prestigious (highly selective), and to assess the journal's audience. Foster (2003) is of the view that a good manuscript is created when the author has current and concise references, the manuscript is repeatedly revised, the paper is well edited and proofread, instructions to authors are familiarised (leading to finer submission requirements), the manuscript is read by others for comments, and the paper is accurately submitted. It is important to review recent issues of journals in order to be inline with their latest requirements.

An editor, according to Fischer (2004), functions as a "gatekeeper" that ascertains the suitability of a paper for publication in a journal, or separates what he calls "wheat from chaff", using the following criteria:(i) The paper does not fit the journal's editorial mission;(ii) The submission is poorly written;(iii) The use of out-of-date literature, (iv) Inadequate levels of scholarship (no academic rigour or opinion, no validation of viewpoints); and(v) Unwieldy writing (e.g. overly complex, poorly organised, etc.). Results from a related study conducted by Ocholla (2007) on "Common errors and challenges of publishing in a peer refereed Library and Information Science journal" based on the content analysis of reviewers' reports for research articles published in *SAJLIS* from 2002 – 2006, identified more or less similar errors, with the top five falling under research methodology, presentation/organisation, readability/language, literature review, and referencing. Based on this study, Ocholla (2007) highly recommends that authors for scholarly journals, and indeed scholarly LIS publications, take note of the following eight pieces advice as outlined by Fischer (2004) based on referees' and editors' comments: (i) One must pick one's level and build up (begin with less competitive publication sources or outlets and build on them); (ii) Diversify your portfolio of submissions (decide whether you want to go a mile wide and an inch deep or an inch deep and a mile wide); (iii) Follow your comparative advantage (explore and engage co-authorship for sharing expertise and to reduce your workload); (iv) Partake in apprenticeships (work with experienced authors); (v) Network to enable partnership and knowledge sharing; (vi) Learn from the best - access and read the 'best papers' in journals or as declared at conferences; (vii) Get critical feedback - benefit from the expertise of colleagues who offer critical feedback, some of which can be offered at conferences or other paper

presentation forums; and (viii) Learn critical evaluation skills - look at your own work critically and market your submission to the editor (a good covering letter clarifying items in the paper is worthwhile). Organising and participating in authors' workshops, seminars and conferences is essential. Above all, actively participating in scholarly communication at various levels regularly, learning from one's mistakes, and not being afraid of the peer review process produce good results. Error studies suggest that no author, not even the most experienced, produces error-free manuscripts.

Mapping and Auditing of Scholarly Research Output

Research auditing and mapping, like information auditing (see Robertson, 1994: Booth and Haines, 1993), should be viewed as "a routine process of gathering, sometimes limited to creating an inventory" of research resources that include both tacit and explicit knowledge (e.g. records of all formats) produced by individuals and organisations. An information audit maps the network of an organisation's information processes and flows, showing the links between the communication process, the users of information within the organisation, and the means by which information is transferred and used (Thornton, 2001), and research auditing and mapping should allow the same. Thus, a research audit should permit research mapping by enabling the mapping of the university's or organisation's research producers, processes, flows, links/ networks, dissemination and users.

It is essential for researchers and institutions to know what is going on around them in other words, who (individual/department/school) is doing what, why, how, where and when. It would be impossible to discern research capability and progress without the auditing and mapping of research. One of the purposes of the research audit is to evaluate the effectiveness of an existing research system and service in order to determine effective ways of making the research operation and services relevant, and also to establish the strengths and weaknesses of the existing research system by identifying the research culture, practices, activities and challenges. Some of the benefits of the research audit are closely tied to those of information auditing and mapping (Thornton, 2001), e.g. providing a comprehensive listing of existing research resources and output.

As the name suggests, mapping provides a blueprint of something, for example the research environment within an institution or organisation, by providing a map of all the research entities that exist within that organisation for its effective management and exploitation that is also achievable through digitisation. Similar to what Burk and Horton (1998) observed when referring to information mapping, research mapping is a process of discovery based on the research activities and entities within an organisation that includes people (researchers); facilities, equipment and technology; and energy (information flow processes), information (content) and other inputs that have the capacity to create, acquire, process, store or disseminate research information. Mapping normally involves several approaches (see Burk and Horton, 1998) and includes a survey that allows one to list all of the research resource entities currently in use and identify their strengths and weaknesses for improvement or intervention to occur. With research mapping, it is easy to do an inventory of all the research sources, services and systems in the organisation.

A recent study by Ocholla and Mostert (2010) captured data relating to individual, departmental and faculty research output and visibility through publication count by using research data reflecting on on-going and completed arts, humanities and social science research publications by staff and students from 1994 – 2008, based on research records originating from the University of Zululand's Research Office for the period. Data analysis was done by categorising research output by overall research publication by department, publication in accredited (SAPSE) journals by department, author productivity, and comparison of research output by categories. Results showed the status, strengths and weaknesses of research activities and output in the faculty that could be used to inform research decisions. Ultimately, research projects need to translate into quality publications. As noted in Table 1 and Figure 1, there is a strong correlation between research projects and publication output.

Table 1: Registered Research Projects and Research Publication Output by Categories and Departments at the University of Zululand, 1994 - 2008

Department	Dept	Ms	D	Total	Pub	SAPSE
Library & Information Science	27	13	15	55	220	85
English	17	4	5	26	170	100
Social Work	19	8	3	30	7	4
Criminal Justice	18	3	6	27	63	25
Centre for Arts & Culture/dram	19	5	2	26	13	5
Afrikaans	4	0	4	8	35	27
Communication Science	10	5	5	20	54	24
Sociology	4	0	4	8	12	7
Psychology	6	5	1	12	86	56
IsiZulu	6	5	9	20	17	6
Theology & Religion Studies	17	0	3	20	154	70
History	4	0	0	4	26	16
Anthropology & Development Studies	8	3	1	12	20	11
Centre for Recreation & Tourism	8	2	5	15	10	0
General Linguistics	8	1	1	10	32	16
Philosophy	0	0	4	4	26	17
German	5	0	0	5	11	1
IsiZulu Language Research & Development Centre	2	0	0	2	8	1
Zulu Dictionary Project	1	0	2	3	1	1
Totals	**183**	**54**	**70**	**307**	**965**	**472**

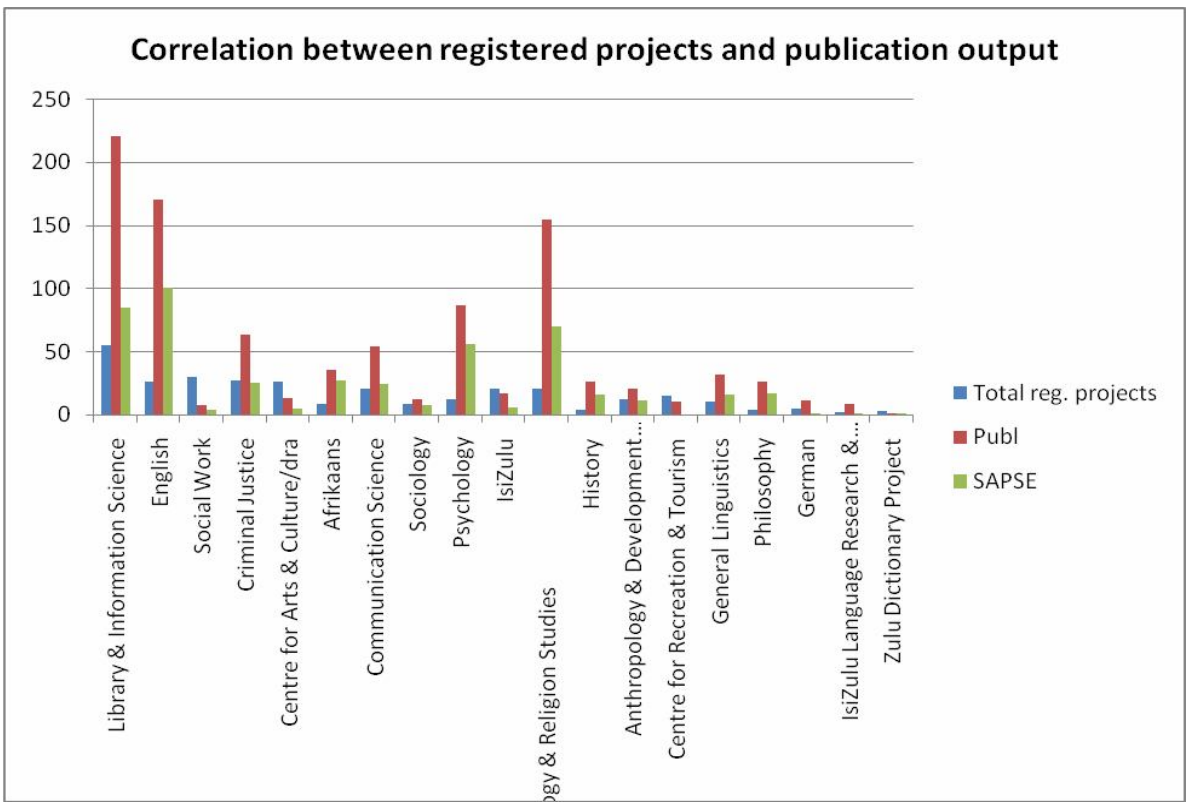


Figure 2: Correlation between registered projects and research output by categories and departments at the University of Zululand, 1994 - 2008

A related study enabling the auditing and mapping of LIS research was done by Ocholla and Ocholla (2007), entitled "Research in Library and Information Science in South Africa: an analysis of journals research output from 1993 - 2006". This study was based on a publication count and analysis of peer refereed articles indexed in the Library and Information Science Abstracts (LISA) and Thompson Reuters (TR) or ISI Web of Science databases (Science Citation Index or SCI, Social Science Citation Index or SSCI, and Arts and Humanities Citation Index or A&HCI) between 1993 and 2006 by 250 LIS authors, using journal, subject and author indicators for the analysis. The study provided information on some trends in LIS scholarly journal publishing in South Africa. Closely related to this was a study by Onyancha (2007), which examined library and information science (LIS) literature as produced and published by researchers in Africa in order to establish the productivity and impact of LIS research in the region by using publication count and citation analysis. The study also provided insight on the LIS research output and impact on the continent. Several other related studies have used informetric, bibliometric or quantitative methods for auditing and mapping of research at various levels.

Scholarly Publishing from Theses and Dissertations

A large part of scholarly research output emanates from postgraduate theses and dissertations at the master's and doctoral levels. Unfortunately, such scholarly output, particularly in Africa, rarely gets disseminated beyond the walls of the higher education institutions (HEI) of origin. For example, a study by Ocholla (2000) focusing on research output based on the analysis of 218 master's and doctoral theses and dissertations from 1993 to 2000 indexed in the Union of Theses and Dissertations (UTD) database (hosted by the South African Bibliographic Network, SABINET), revealed that approximately 52 per cent of this kind of research output gets published. This trend was confirmed once again in a study by Sitienei and Ocholla (2010) that investigated the publication pattern of academic librarians in Eastern and Southern Africa. Here it was found that scholarly research publications are often motivated by a reasons of career growth, tenure, promotion and financial gain. Unfortunately, in the experience of this author, most postgraduate students find it difficult to publish their dissertations because they lack knowledge on how to prepare their research output for publication in scholarly journals or outlets, and also because they fear possible criticism from peer reviewers. As we will learn later, archiving theses and dissertations in institutional repositories for open access is becoming standard practice in higher education institutions (HEIs), and promotes e-scholarship.

Generally, the nature, size, level, structure, quality and orientation of a thesis or dissertation largely varies from one research paradigm to the next, and in some cases from discipline to discipline. For example, variations between positivists or quantitative and interpretive/critical/analytical/ constructionist or qualitative research, as well as a blend of the two (mixed method, or quantitative and qualitative) paradigms, would influence the structure or appearance of a thesis or dissertation. The research articles emanating from these variations could be analytical, empirical, descriptive, evaluative, and so on. However, there are common structures in theses and dissertations that can be used to develop an easy publication formula, as illustrated below. From this author's extensive experience of joint publication with postgraduates, one can produce research publications by combining one or more of the following sections of the thesis or dissertation, using any of the formula provided:

1. Preliminaries (title, address, abstract and keywords)
2. Introduction
3. Problem statement, purpose, aim and objectives
4. Literature review
5. Methodology
6. Results
7. Discussions
8. Summary, conclusion and recommendations
9. References

Formula:

- A=1+2+4+5+7+8+9.

- B=1+2+3+5+6+8+9
- C=1+3+5+6+8+9
- D= 1+2+3+4+8+9
- E= 1+3+5+7+8+9
- 1+3+4+7+8+9

Successful publication from theses and dissertations calls for significant support for and mentorship of novice researchers by research supervisors, experienced peers and established researchers, and this calls for a great deal of collaboration, as alluded to earlier.

Publishing Opportunities from Conferences, Seminars and Workshops

Most research and scholarly publications appear in conference proceedings and either end there or get revised and published in journals. I visualise research conferences, seminars and workshops as the enablers of conference proceedings, which in turn act as a formidable supply chain for journal articles and other scholarly publications. Conferences offer opportunities for on-going and completed research to be shared, discussed, scrutinised and validated for further dissemination and use. As a matter of fact, many of the reasons behind why researchers publish relate to their engagement and participation in conferences and seminars. I find conferences, workshops and seminars to be extremely essential for research and publication management. Increasingly, I observe that they are strong research capacity building tools as well. Fisher's (2004) advice to researchers is that: "One must pick one's level and build up (begin with less competitive publication sources or outlets and build from them)." A lot of research papers published by scholars emanate from conference presentations, which are largely used to share knowledge on ongoing and completed research and enable peers to evaluate research output and activities and thereby improve research quality. In essence, for novice and even established researchers, conferences act as important forum for self development and research capacity building.

While conferences, seminars and workshops are important for scientific and scholarly publication, opportunities for participation in conferences are limited mainly by financial constraints. This is not the only constraint. Another major challenge is the possession of the knowledge, skills and courage or attitude necessary to prepare a conference paper. This is where a strong support system, such as mentorship and research collaboration between novice and established researchers, is required within a department, faculty or research unit.

There are many conferences announced nationally and internationally that invite LIS researchers to participate and present their research work. A large number of these conferences are organised by professional associations and societies as well as HEIs such as universities. For example, in the Eastern, Central and Southern Africa region, one can list the Southern Central Eastern Conference of African Libraries (SCECSAL), the Library and Information Association of South Africa (LIASA) Conference, Progress in Library and Information Science Research in South Africa (ProLISSA) Conference, and the ZA WWW Conferences. In addition to LIS schools and libraries, the University of Zululand, Moi University (Kenya), University of South Africa (UNISA), University of Johannesburg, University of Stellenbosch, University of Pretoria, and the University of Botswana are increasingly organising conferences, seminars and workshops that push LIS research. This means that there are avenues in Africa within closer proximity that translate to fewer expenses for those who wish to present and publish LIS research. The challenges of cost and knowledge for conference paper preparation still remain, however, and methods of intervention require attention. For example, the publication of less costly conference proceedings is a challenge that can now be addressed through electronic publishing and institutional repositories (see http://www.dissanet.com/jsp/index.jsp and http://www.lis.uzulu.ac.za/index.php/research/56-research-conferences for examples).

Electronic Publishing, Self Archiving, Institutional Repositories and Open Access

Electronic publishing is an activity and a process for all types of publications, such as scholarly or research work on the web by an individual or organisation for private or public access and use. Self-archiving, which involves posting or publishing one's research

output and documents in digital form, on private (e.g. blogging) and/or public web space (e.g. institutional repositories, websites), is increasingly popular in scholarly electronic publishing. Increasingly, the scientific or scholarly community is using self–archiving to enable better access, searchability, usability, and visibility of their research output by those with Internet access. It is, however, encouraged that such digital documents be compliant with the open access initiative (OAI) (http://www.eprints.org/openaccesss/self-faq/, accessed 10 October 2009). Figure 3 and Tables 2 and 3 illustrate the global, African and South African OA situation.

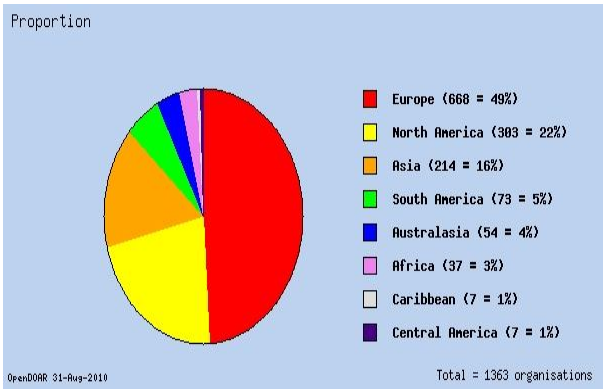


Figure 3: World Proportion of Open Access Repositories (OAR)

Source: http://www.opendoar.org/onechart.php

Table 2: Institutional Respository in Africa

Repository name	Country	Num. Recs.	Pubs	Confs	Theses	Unpub	Other	Base URL	Software
University of Botswana Research, Innovation and Scholarship Archive	Botswana	343							DSpace
Biblioteca Digital da Universidade Jean Piaget de Cabo Verde	Cape Verde	178	+	+	+	+	+		DSpace
AUC DAR Repository (Digital Archive and Research Repository)	Egypt	595		+	+		+		DSpace
Cairo University: جامعة القاهرة	Egypt	707	+	+	+		+	OAI	DSpace
Digital Assets Repository	Egypt	62000	+				+		[Unknown]
Institutional Digital Repository For Library and Information Department at Faculty of Arts, Menofia University	Egypt	49	+	+	+	+	+		Greenstone
The BUE e-print repository	Egypt	46		+				OAI	EPrints
Addis Ababa University Libraries Electronic Thesis and Dissertations Database	Ethiopia	1568			+			OAI	DSpace
knustspace	Ghana	1211		+	+		+		DSpace
KARI e-repository	Kenya			+			+		[Unknown]
Mahider	Kenya	88	+		+	+	+		DSpace
Sudan Open Archive	Kenya					+			Greenstone
Digital Collections of the University Library	Namibia						+		Greenstone
Ounongo Repository	Namibia	45		+	+	+		OAI	DSpace
University of Jos Institutional Repository	Nigeria	839		+			+	OAI	DSpace
University of Nigeria Nsukka	Nigeria	21102			+	+			[Unknown]
Biens Culturels Africains	Senegal	133	+	+		+	+	OAI	DSpace
African Higher Education Research Online	South Africa	165	+	+	+	+	+	OAI	[Unknown]
Boloka: Research Repository North-West University	South Africa	1391			+			OAI	DSpace
CSIR Research Space	South Africa	3257		+				OAI	DSpace
Digital Innovation South Africa	South Africa		+	+	+	+	+		[Unknown]
Digital Knowledge	South Africa	383			+	+			Digital Commons
DUT IR	South Africa	248			+				DSpace
Rhodes eResearch Repository	South Africa	1279		+	+			OAI	EPrints
Scientific Electronic Library Online - South Africa	South Africa								SciELO
Stellenbosch University SUNScholar Repository	South Africa	3390		+	+		+	OAI	DSpace
UCT Computer Science Research Document Archive	South Africa	290	+	+	+	+		OAI	EPrints
UCT Lawspace	South Africa	197		+	+	+	+		DSpace
UJDigispace	South Africa	405			+			OAI	DSpace
UKZN Institutional Repository	South Africa	551			+			OAI	DSpace
Unisa Institutional Repository	South Africa	2928			+	+	+		DSpace
University of Fort Hare Institutional Repository	South Africa	121			+				DSpace
University of Limpopo	South Africa	70			+				DSpace
University of Pretoria Electronic Theses and Dissertations	South Africa	4224			+			OAI	ETD-db
University of the Free State ETD	South Africa				+				ETD-db
University of the Western Cape Research Repository	South Africa	26		+		+		OAI	DSpace
University of the Witwatersrand Institutional Repository	South Africa	5405		+	+	+	+	OAI	DSpace
University of Zululand Repository	South Africa	31			+				DSpace
UPSpace at the University of Pretoria	South Africa	5562		+	+		+	OAI	DSpace
UWC Theses and Dissertations	South Africa	479			+			OAI	[Unknown]
Uganda Scholarly Digital Library at Makerere	Uganda	630		+					DSpace
Institutional Repository at University of Zimbabwe	Zimbabwe	227		+			+	OAI	DSpace

Table 3: Institutional Respository in South Africa

Repository name	Country	Num. Recs.	Pubs	Confs	Theses	Unpub	Other	Base URL	Software
African Higher Education Research Online	South Africa	165	+	+	+	+	+	OAI	[Unknown]
Boloka: Research Repository North-West University	South Africa	1391			+			OAI	DSpace
CSIR Research Space	South Africa	3257		+				OAI	DSpace
Digital Innovation South Africa	South Africa		+	+	+	+	+		[Unknown]
Digital Knowledge	South Africa	383			+	+			Digital Commons
DUT IR	South Africa	248			+				DSpace
Rhodes eResearch Repository	South Africa	1279		+	+			OAI	EPrints
Scientific Electronic Library Online - South Africa	South Africa								SciELO
Stellenbosch University SUNScholar Repository	South Africa	3390		+	+		+	OAI	DSpace
UCT Computer Science Research Document Archive	South Africa	290	+	+	+	+		OAI	EPrints
UCT Lawspace	South Africa	197		+	+	+	+		DSpace
UJDigispace	South Africa	405			+			OAI	DSpace
UKZN Institutional Repository	South Africa	551			+			OAI	DSpace
Unisa Institutional Repository	South Africa	2928			+	+	+		DSpace
University of Fort Hare Institutional Repository	South Africa	121			+				DSpace
University of Limpopo	South Africa	70			+				DSpace
University of Pretoria Electronic Theses and Dissertations	South Africa	4224			+			OAI	ETD-db
University of the Free State ETD	South Africa				+				ETD-db
University of the Western Cape Research Repository	South Africa	26		+		+		OAI	DSpace
University of the Witwatersrand Institutional Repository	South Africa	5405		+	+	+	+	OAI	DSpace
University of Zululand Repository	South Africa	31			+				DSpace
UPSpace at the University of Pretoria	South Africa	5562		+	+		+	OAI	DSpace
UWC Theses and Dissertations	South Africa	479			+			OAI	[Unknown]

Unfortunately, according to data obtained from the Directory of Open Access Repositories (DOAR, http://www.opendoar.org/countrylist.php) and Registry of Open Access Repositories (ROAR, [1]http://roar.eprints.org/), the development of Institutional Repositories (IRs) in Africa is weak: only 11 of the 53 independent African countries have established 42 IRs, which account for approximately 3 % of the world's total. South Africa has the largest number of IRs (23 of 42). Institutional repositories have become popular vehicles for self-archiving and e-scholarship. The self-archiving process is outlined in Figure 4 below, while Table 4 provides scholarly publishing/open access routes and options.

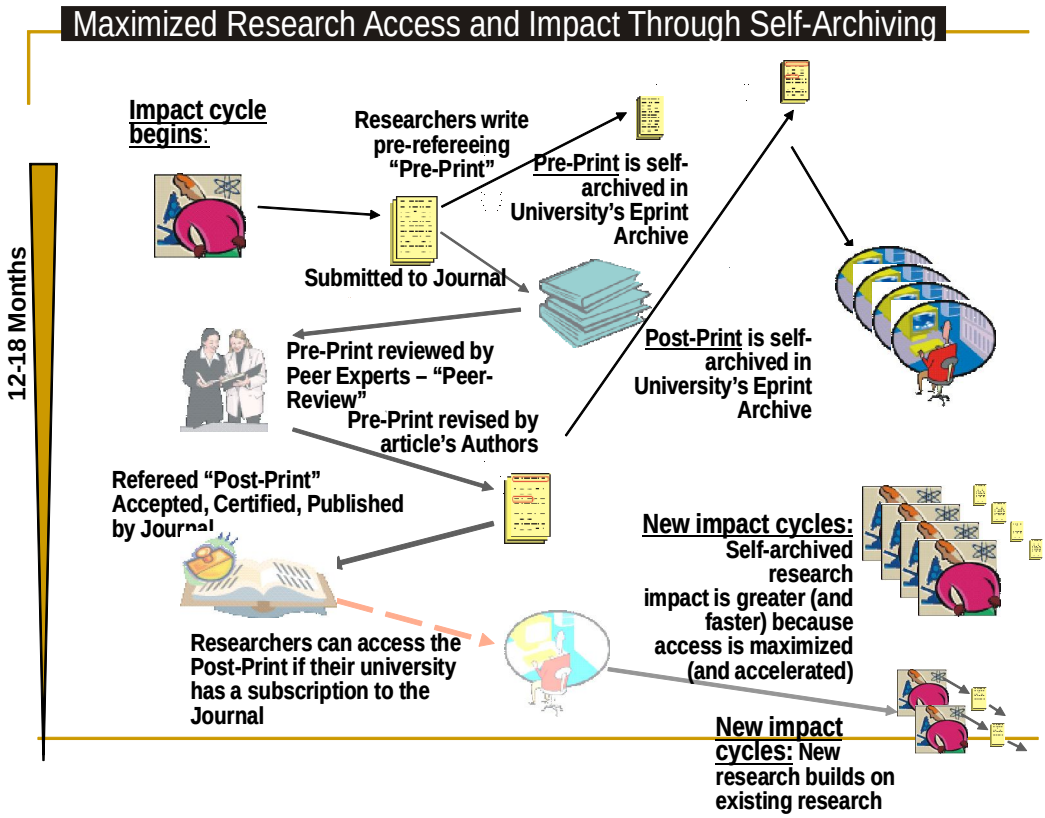


Fig. 4: Maximized research access and impact (Source: Brody & Harnard,

Table 4: Scholarly publishing/open access routes/options

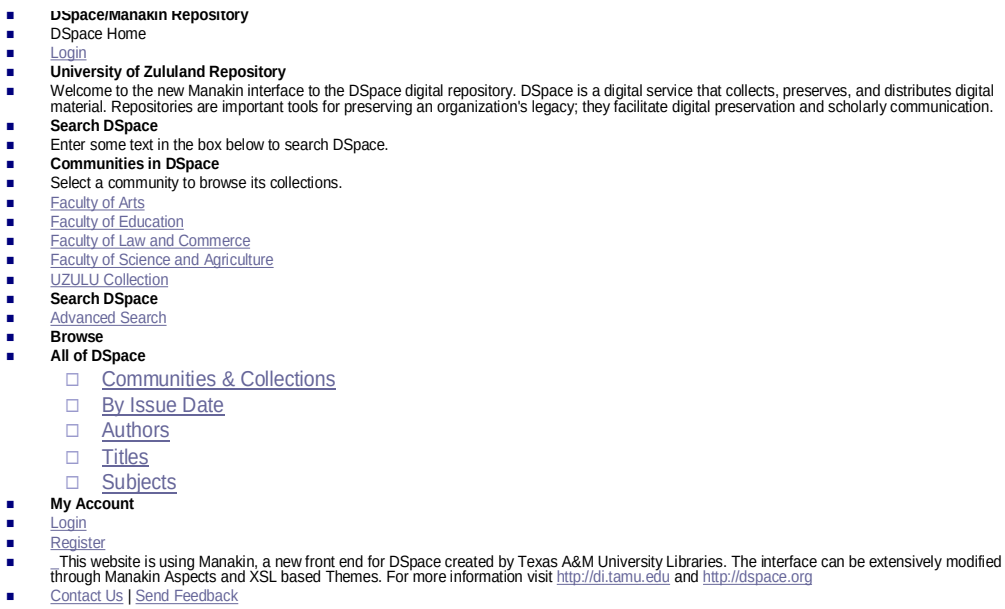
Green Route	The author can self-archive at the time of submission of the publication whether the publication is grey literature, a peer-reviewed journal publication, a peer-reviewed conference proceedings paper or a monograph
Golden Route	The author or author institution can pay a fee to the publisher at publication time, the publisher thereafter making the material available 'free' at the point of access.
Preprints	Preprints are articles that are pre-peer-review
Postprints	Postprints are articles that are post-peer-review
eprints	eprints can be either preprints or postprints but in electronic form
White Literature	White literature is peer-reviewed, published articles
Grey Literature	Grey literature is preprints or internal 'know-how' material

A recent study by Onyancha (2008) entitled "Self-archiving by LIS schools in South Africa: practices, challenges and opportunities", cites Eprints' (Eprints.org, n.d.) recommendation for collaboration between stakeholders where the institutions' or universities' role could be installing an OAI-compliant EPrint archive; encouraging staff to deposit their scholarly work, both pre-print and post-print, in departmental or institutional repositories; and training digital librarians who may assist as 'proxies' in self-archiving.

Onyancha's study noted that some institutions (or departments) conduct self-archiving activities by posting documents on their websites,

but while such initiatives are encouraging access to digital documents, such as online scholarly publications, Onyancha observes that they pose challenges with respect to preservation and the permanence of the material archived on the websites. His advice is therefore to develop an OAI-compliant EPrint archive or repository. For example, in the process of developing a new LIS departmental website at the University of Zululand, South Africa, some documents that were posted on the website are removed. From this author's experience, the lack of an OAI-compliant Eprint repository should not prevent self-archiving as an interim measure. The Department of Information Science of the University of Zululand (http://www.lis.uzulu.ac.za) has been fairly successful in enabling online access to some content, benefiting from the advantages of IRs and sensitizing the university towards the development of a compliant repository (see http://uzspace.uzulu.ac.za), as reflected below.

Fig 5: UZ Space



Source: http://uzspace.uzulu.ac.za

Essentially, Onyancha's (2008) proposal and suggestion for workshops and seminars on IRs, the evaluation of existing IRs, and enabling OAI-compliant EPrint archives, among others recommendations, are highly essential for the development of LIS scholarly publishing. Moreover, the involvement of HEIs' libraries in this activity is fundamental because of their strong academic role.

Web Presence and Visibility

E-scholarship plays a major role in pushing web presence and visibility that, to some extent, translates into the widely published and often controversial university rankings (see http://www.webometrics.info/). Webometric studies on in-links, co-links and out-links to institutional websites, such as those done by Onyancha and Ocholla (2007, 2008), also rely a lot on e-scholarship activities on the web. For instance, in Onyancha and Ocholla's study in 2008, the authors executed a co-link analysis of 95 (out of a total of 142) institutions of higher education in Eastern and Southern Africa. Data was collected using a uniform search strategy, i.e. two search queries were used to extract relevant data

from the Yahoo! search engine. UCINET version 6 (comprising several analytic technologies) was primarily used to analyse the data in order to find out the number of external in-links for each institution; determine the most co-linked institutions; map the co-linkages; measure the strengths of co-link ties; examine co-link relationships; and establish the motivations for co-linking. For the presentation of the findings, 40 institutions that recorded a normalised co-link count of 1.5 and more were selected. Results indicated that most South African institutions have the highest number of in-link and co-link counts. Institutions belonging to the same geographic region established closer relationships amongst themselves than institutions located in different geographic regions. Institutions that yielded fewer in-link and higher co-link counts produced stronger co-link ties. Strong web presence and visibility played a major role for higher counts.

Onyancha and Ocholla's (2007) study used link analysis to compare Kenyan and South African universities according to several web-based indicators, including the number of pages and the number of in- and out-links. Here the authors examined the external out-links in order to determine the institutions targeted by South African and Kenyan universities. Also investigated were the networks or links between universities. Web impact factors (WIFs) were calculated and reported in order to compare the universities' web influence. Results indicated that Kenyan universities, like most African universities, have embraced the Internet and its constructs fairly recently, therefore most of their websites are at initial stages of construction. Comparatively, South African universities have made remarkable progress in their web presence, which is at an advanced stage of development when measured against institutions in more developed countries. The study's recommendation was that regional webometric studies should be conducted periodically in order to investigate and map the web-related developments of African universities. The authors' conclusion was that African universities, although not at the same level as institutions in developed countries, can have their websites evaluated webometrically.

There have been significant improvements in the web presence and visibility of the studied institutions since those studies were conducted and reported. It may be assumed that the development of websites is becoming increasingly important for HEIs for visibility, and that web content is increasing, driven by e-scholarship, such as publications in institutional repositories. Whether university rankings have anything to do with this burgeoning interest in web presence and visibility is difficult to tell, but websites and web presence are becoming common practice and a showcase of achievement and credibility among institutions. We believe that e-scholarship should spearhead web content or publications, strengthen web presence and increase visibility, and continue to influence all types of institutional rankings.

Conclusion

Electronic publishing is increasingly the catalyst behind scholarly publishing's phenomenal growth, mainly because of web-based publications. Library and information science is one of the disciplines that are benefiting heavily from this burgeoning publication outlet. Because unpublished research is the equivalent of 'dead research', reasons why researchers conduct research and publish have to be regularly evaluated to ensure maximum benefits are accrued from research activities. Therefore research quality control through the peer review process, among other emerging quality measures, has to be maintained. But peer review should not only be viewed from a quality control or assurance point of view. Peer review should also be used as an instrument for research capacity building. In this case, peer reviewers must be prepared to go a step further by understanding that their job as peer reviewers also involves pushing researchers to be better authors and publishers. Researchers therefore need to know what types of errors they make, why they make them, how to correct the errors and improve their manuscripts and increase the quality and volume of publications.

The challenges and opportunities identified in this paper are fundamental for library and information scholarly publications. We need to explore, use, evaluate and strengthen self–archiving, institutional repositories, and open access. As a matter of fact, self-archiving and institutional

repositories without OA are unattainable, particularly in Africa which has been suffering an 'information famine' for ages. Institutional repositories (IRs) act as the mirror that allows the world to interact with our stories or content and enable the sharing of knowledge and creation of better understanding. I think that enabling knowledge sharing should be our (information science's) primary activity. For this reason, publication from theses and dissertations should be encouraged and supported, at least through IRs. We should also create regular and relevant platforms for conferences, seminars and workshops and support participation in such scholarly gatherings by bringing conferences closer to those who cannot afford far-off locations. Conferences should be seen as research capacity building platforms aimed at better knowledge and information dissemination. We most certainly have to keep our options open in exploring and exploiting new additions to e-scholarly publishing that may also extend to rapidly expanding social networks.

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Acceptance and Usage of Open Access Scholarly Communication by Postgraduate Students at the Sokoine University of Agriculture and the University of Dar es Salaam, Tanzania

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Abstract

This study assessed the awareness and usage of Open Access (OA) for scholarly communication by postgraduate students at the Sokoine University of Agriculture (SUA) and the University of Dar es Salaam (UDSM). A semi-structured self-administered questionnaire survey was undertaken using a convenience sample of 230 postgraduate students of whom 128 (55.6%) participated in the study. The open access concept was familiar to 58.6% of the respondents; however, although 60.9% of them acknowledged having accessed OA content, only 10.9% of them had disseminated research findings through OA. The respondents' perceptions toward OA were generally positive. Low awareness of the OA concept, inadequate online scholarly communication skills, and the slow Internet connectivity were possible factors affecting the exploitation of OA in the study area. The review and formalisation of the existing postgraduate information literacy training modules at the two universities is recommended in order to improve the adoption of OA and exploitation of the online resources in general.

Introduction

Scholarly communication involves creating new knowledge, filtering quality knowledge through the peer review process and disseminating that knowledge to intended audiences (Mann *et al*, 2008; Whitworth and Friedman, 2009). Open access (OA) is an alternative form of scholarly communication that has emerged from the traditional business mode of scholarly publishing. The basic concept of open access is the online accessibility to scientific literature for readers at no charge and without any technical barriers (Mann *et al*, 2008). Developments in information and communication technologies (ICTs) have been cited as among the key factors that have catalysed the emergence of open access (Ng'etich, 2004; Adogbeji and Akporhonor, 2005; Moller, 2006).

It is currently estimated that only 15% of the annual research output is immediately made freely available through open access (Brody *et al*, 2007; Bjork *et al*, 2009). This means that a greater portion of the research output is still published using the conventional system. It is acknowledged that it will take sometime for OA mode of scholarly communication to gain substantial adoption due to the fact that open access is disrupting the already well established system (Johnson, 2002; Fullard,

2007). This has necessitated the interventions by proponents of open access to promote its adoption. Accordingly, various initiatives, statements and declarations have been made at national and international levels to speed up the spread of OA. One of these is self-archiving of scholarly publications by institutions and individual researchers and the creation of institutional repositories. The creation of new open access journals and the conversion of subscription-based journals into open access so that they are freely available to the scholarly community are other means to foster the development of OA (Harnad, 2005; Suber, 2006). Also important are interventions by different scholars to investigate the factors that promote open access adoption in the research community, with the ultimate goal of devising means to improve the uptake of this means of scholarly communication.

There is evidence of several international and national large scale surveys that investigated the researchers' awareness and usage of open access and the facilitating and inhibiting factors of open access adoption (See for example, Rowlands *et al*, 2004; Picton, 2005; Schroter *et al*, 2005; Swan and Brown, 2005; Moller, 2006; Kim, 2006, Lwoga *et al*, 2006; Fullard, 2007, Deoghuria and Roy, 2007; Mann *et al*, 2008; SARUA, 2008; Dulle, 2010). These studies are important as they provide the findings that contribute ideas to the implementation of appropriate strategies for enhancing open access uptake. However, most of the studies failed to recognise postgraduate students as important stakeholders in the scholarly communication process. Postgraduate students are important because they are being trained to become future researchers. Also, in the process of preparing and writing their theses and dissertations, postgraduate students need access to scholarly, accurate and timely information. Furthermore, the theses and dissertations produced by postgraduate students form an important output for open access repositories. Postgraduate students are therefore among the key beneficiaries of open access opportunities. Open access is of particular importance to postgraduate students in developing countries like Tanzania since access to scientific literature using the conventional commercial scholarly communication system is constrained by inadequate subscriptions to information resources due to the poor economies of such countries (Dulle, *et al*, 2001; Moller, 2006; Harle, 2009).

This study, therefore, sought to find out the extent to which postgraduate students from the two universities (SUA and UDSM) in Tanzania have been benefiting from open access opportunities. The two universities were selected for the study because they have had many years of postgraduate training experience, and also attract the largest number of postgraduate students among the higher learning institutions in Tanzania (SARUA, 2009).

The study focused on the following three research questions:

- What is the level of open access awareness among the postgraduate students?
- What are the perceptions by the students towards open access?
- What is the level of usage of OA by the students?

Methodology

The study targeted postgraduate students who were registered for Master's and PhD degrees, and had progressed to the writing of their theses and dissertations at the main campuses of the Sokoine University of Agriculture (SUA) and the University of Dar es Salaam (UDSM) in Tanzania. Postgraduate students who were still undertaking their coursework were excluded from the study. A semi-structured, self administered questionnaire was distributed to a conveniently selected sample of 230 postgraduate students - 83 at SUA and 147 at UDSM. The convenient sample selection approach was used because it was difficult to establish the sampling frame for students actually in residence and available on campus at the time of the study.

Some of the students were completing their research from home or their places of full time employment, or were doing their field work. Such students are not compelled to stay in the university campuses when undertaking the research part of their studies. The researcher assigned research assistants to distribute the questionnaire to eligible and available postgraduate students who where found in the libraries or departments at the two universities. This approach minimised the potential biases of the convenient sampling approach as pointed out by Neuman (2007). Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS), Version 16.

Results and Discussion

This section presents and discusses the research findings. The profile of the respondents is highlighted before the presentation and discussion of their awareness and usage of open access. The remaining part is postgraduate students' perceptions of open access and constraints they face while using this form of scholarly communication.

Profile of the Respondents

Of the distributed 230 copies of the questionnaire, 128 (55.6%) were returned completed. Among the completed copies of the questionnaire, 45 (35.2%) and 83 (64.8%) of the respondents were from SUA and UDSM respectively. Among the 128 respondents, more than three-quarters 98 (76.6%) were males. Of these respondents, 94 (73.4%) were registered for master's degrees while 34 (26.6%) were pursuing doctorate degrees. The distribution of the respondents by institution and age is summarised in Table 1. It can be noted from Table 1 that majority (63.3%) of the respondents were aged between 30-40 years, followed by those belonging to the 41-50 age group (20.3%). This kind of the distribution of the respondents was expected for individuals registered for higher degrees.

Awareness and Usage of Open Access Scholarly Communication

The study sought to find out whether or not the respondents were aware of the open access concept before investigating their usage of this form of scholarly communication. It was found that 75 (58.6%) of the respondents were aware of the open access concept. A similar study by Picton (2005) also established that 55.9% of research graduate students were awareness of open access. Similarly, Dulle (2010) indicates that majority (72.1%) of the academic researchers in Tanzanian public universities were not aware of open access concept. Other studies that targeted researchers in the Southern Africa region also show more awareness of open access by the respondents than that of postgraduate students in the current study (Moller, 2006; SARUA, 2008). Contrary to the above observations, Christian (2008) found that academicians and graduate students in Nigeria had

Table 1: Distribution of the Respondents by Age [N=128]

Institution	Age Profile				Total
	20-30 yrs	31-40 yrs	41-50 yrs	51-60 yrs	
SUA	5 (3.9%)	22 (17.2%)	16 (12.5%)	2 (1.6%)	45 (35.2%)
UDSM	14 (10.3%)	59 (46.1%)	10 (7.8%)	0 (0)	83 (64.8%)
Total	19 (14.8%)	81 (63.3%)	26 (20.3%)	2 (1.6%)	128 (100%)

the lowest level of open access, as only 3% of the 66 respondents knew about this form of scholarly communication. With the level of open access awareness slightly above half in the current study, there is a need for more efforts to raise the postgraduate students' understanding of this concept in the study area.

Among all 128 respondents, 60.9% of them reported to have used open access outlets in accessing scholarly content and the rest (32%) indicated the contrary. The opposite was true with respect to dissemination of scholarly content through open access means by the respondents. It was revealed that only 14 (10.9%) of 128 respondents acknowledged to have published in open access media.

The study was also interested to find out whether there were differences regarding open access usage among the respondents from different research disciplines. Table 2 presents the results with respect to open access usage by the respondents based on their research disciplines. It should be noted that eight respondents did not indicate their research disciplines and hence were not included in the analysis. Research disciplines were broadly classified into natural sciences and social sciences. The former comprised biological sciences that included agricultural sciences, aquatic sciences, animal sciences, biology and forestry sciences. Biomedical sciences including human medicine and veterinary medicine, as well as other applied sciences: physics, mathematics, engineering, computer science, chemistry, geography and environmental sciences were also part of natural sciences group. The sub-disciplines in social sciences included economics, sociology, languages, library and information science, education, management and all other subjects not belonging to the natural sciences identified above.

As shown in Table 2, 59.2% of the respondents indicated to have accessed open access scholarly content, while only a minority (10.8%) disseminated their research findings in similar avenues. Among the respondents who claimed to have used open access content, 30.8% were from the social sciences as compared to 28.3% from natural sciences. In other words, respondents from the social sciences were only slightly more involved in accessing open access content than those from natural sciences. However, in respect of using OA to publish content the relative proportions are reversed, with 6.6% of the respondents from natural sciences having published in open access outlets

Table 2: Usage of open access scholarly communication by discipline (N = 128)

Research discipline	Open access usage			
	Scholarly content access (N = 120)		Scholarly content dissemination (N= 120)	
	Yes	No	Yes	No
Biological sciences	17 (**14.2%**)	11 (**9.2%**)	3 (**2.5%**)	24 (**20%**)
Biomedical sciences	4 (**3.3%**)	1 (**0.8%**)	1 (**0.8%**)	4 (**3.3%**)
Other applied sciences	13 (**10.8%**)	8 (**6.7%**)	4 (**3.3%**)	14 (**11.7%**)
Social sciences	37 (**30.8%**)	28 (**23.3%**)	5 (**4.2%**)	59 (**49.2%**)
Total	71 (**59.2%**)	49 (**40.8%**)	13 (**10.8%**)	91 (**75.8%**)

compared to 4.2% from social sciences. However, the differences between these proportions are not significant, which is contrary to the findings of a similar study of researchers from the six Tanzanian public universities where significant differences were found between different research disciplines (Dulle, 2010). Conflicting results regarding higher usage of open access by researchers in the natural sciences than those in social sciences, and vice versa, have also been reported in several other studies (Macfie, 2006; Zuber, 2008; Melero et al, 2009). For example, Melero et al (2009) found out that researchers in the humanities and social sciences were more involved in publishing in open access outlets followed by those in engineering, life sciences, natural sciences and fine arts and performing arts. Based on these findings, it can be argued that as open access scholarly communication becomes widespread, it would not be surprising for researchers in the social sciences (research disciplines which were previously lagging behind in open access adoption] become more highly involved in using this kind of scholarly communication.

The findings of this study that the respondents were more involved in accessing than disseminating scholarly information in open access outlets are consistent with those of previous studies (Deoghuria and Roy, 2007, Mann et al, 2008, Dulle, 2010). This is probably due to the fact that less effort, is involved in accessing than in publishing open access content. For example, while it is possible for one to use open access content by chance through a simple search on the Internet, publishing on, through the channel is more involving, as one must have something to publish and possess adequate online publishing skills.

Perceptions of Open Access

The final research question of this study concerned finding out about the perceptions by respondents on the OA form of scholarly communication. This kind of assessment is important because positive perception about an innovation is one of the key determinants of its eventual adoption and use (Rogers, 2003). The respondents' perception about open access was determined using three criteria: their perceptions of the (a) quality of open access publications, (b) perceived usefulness of open access, and (c) value of institutional repositories at their respective institutions. The following subsections present and discuss the findings with respect to the respondents' perceptions of open access.

Table 3: Postgraduate Students' Assessment on the Usefulness of Open Access (N = 128)

Statement	Ratings (Number & Percentage)				
	Strongly agree	***Agree***	***Disagree***	***Strongly disagree***	***Don't Know***
Open access outlets enable scholars to publish more quickly	36 (28.3)	55 (43.3)	12 (9.4)	1 (0.8)	23 (18.1)
Open access outlets increase research impact by such works being highly used and cited	53 (42.1)	55 (43.7)	10 (7.9)	2 (1.6)	6 (4.8)
Open access outlets improve accessibility to scholarly literature because it is free	53 (41.4)	50 (39.1)	15 (11.7)	4 (3.1)	6 (4.7)
Open access enables researchers from developing countries to access literature more easily	49 (38.3)	64 (50)	5 (3.9)	4 (3.1)	6 (4.7)
Publishing in open access outlets exposes scholarly work to a large potential readership	51 (39.8)	57 (44.5)	4 (3.1)	5 (3.9)	11 (8.6)

Quality of Open Access Publications

The respondents who acknowledged to have used open access content were requested to provide the general evaluation of the documents they accessed. It was revealed that among the respondents who answered this question, 48 (73.8%) said that such publications represented adequate standards of high quality and had scientific merit, 34 (50.7%) said open access documents were original and of high quality, and 12 (18.2%) considered open access publications as mediocre or of little scientific merit. These findings conform those of a similar study targeted to researchers from the two institutions (SUA and UDSM) (Dulle, 2010). In that study, open access publications were evaluated positively along the pattern reported above. The findings from this study support the view that open access publications are being subjected to some form of quality control processes, contrary to what is claimed by some of the opponents of open access movements (Prosser, 2005; Sale, 2006). Opponents of OA movements claim that open access publications are inferior due lack of vigour peer review as compared to traditional publications.

Value of Open Access in Scholarly Communication

The respondents were also requested to provide their views on whether they considered open access useful or not in supporting the scholarly communication process. Table 3 summarises the data on the usefulness of open access.

Table 3 shows open access was considered very useful in facilitating accessibility to and the dissemination of scholarly content. With exception to the first statement, which was supported (strongly agreed/agree) by 71.6%, the other four statements were supported by more than three quarters of the respondents. A similar trend was reported by Dulle (2010). Other studies have also reported strong support of open access as an alternative to the business mode of scholarly publishing because of the potential of OA to facilitate wider dissemination of scholarly content (Swan and Brown, 2005; Schroter and Tite, 2006; Warlick and Voughan, 2006).

Respondents' Views on the Need for Institutional Repositories

In order to establish whether or not the respondents placed high value on the building of institutional repositories at their universities as a strategy to improve the dissemination of local content, they were first required to comment on their levels of accessibility to research content generated from their universities and other research institutions in the country. Most of the respondents acknowledged that it was extremely difficult to find and access local content relevant for their research.

Among the 128 respondents, nearly all (97.6%) supported the statement that the low visibility of local content was attributed to the fact that a major portion of such content is documented as grey literature in print formats that are not accessible through the global information infrastructure. The challenge for low visibility and accessibility of such local content can partly be solved by the establishment of institutional repositories for documenting and improving access to local research output (Chan *et al.,* 2005). The establishment of institutional repositories was also supported by almost all the respondents (97.6%) as a solution to increase the visibility and accessibility of local content. Other studies have also reported that their respondents mostly supported open access institutional repositories as means for facilitating wider dissemination of locally generated content (Christian, 2008; Dulle, 2010).

The respondents in this study (postgraduate students) recommended the following documents (in decreasing order of priority) for the institutional repositories when established: theses and dissertations (81%), peer reviewed articles

published in journals (75.4%), conference/ workshop papers (73.8%), teaching materials (58.7%), and non-peer-reviewed articles (32.5%). However, other studies among the researchers and policy makers in the two universities focused upon in this study preferred for the institutional repositories, conference papers, peer-reviewed articles published in journals, theses and dissertations and teaching materials, in decreasing order of priority (Dulle, 2009; 2010). These findings suggest that accessibility to earlier theses and dissertations was most important to the postgraduate students in the current study than other types of documents.

From the findings of the study reported above, it can be concluded safely that the research community at the two universities generally support open access scholarly communication. This is due to the fact that all the three categories of universities' research stakeholders (policy makers, postgraduate students and researchers-academics) had similar positive views about open access. What needs to be done next is for the various stakeholders in the institutions to put open access into effective practice by implementing appropriate measures to popularise the use of the OA innovation in the institutions.

Constraints to Open Access Usage

Several constraints were revealed as affecting postgraduate students in their scholarly communication activities. The most prevalent constraints include: inadequate online scholarly communication skills, lack of awareness of open access, and poor Internet connectivity. These constraints are highlighted and discussed in the following subsections.

Inadequate Online Scholarly Communication Skills

The rapid changing online information environment requires users to acquire new information search and publishing skills in order to benefit from the technological developments (Eger, 2008; Harle, 2009). In the current study, among the 128 postgraduate students, 88.3% rated themselves able to search information on the Internet, 43.2% able to design personal websites, and 42% able to publish on the Internet without assistance. These statistics reveal that most of these students had no problem with respect to accessing information online. Moreover, 29.4% of the respondents in this study cited lack of knowledge on open access publishing as among the reasons for them not publishing using such means. In practice, despite of high self-rankings, many Internet users realise to have inadequate knowledge upon attendance of specific training on effective usage of the online environment in scholarly communication (Dulle, 2010). As it can be noted from Table 4, few of these respondents had learnt the usage of the Internet using formal means such as the university computing centres or libraries. This suggests that these respondents are likely to be lacking important knowledge in terms of their effective usage of the online information environment in scholarly communication.

Table 4: Respondents' Training Means on Internet Usage (N = 128)

Training means	Number of of respondents	%
Self-learning	96	75.6
The university computing centre	54	42.5
The university library	44	34.6

Lack of formal training programmes targeted at the postgraduate students in the respective universities is likely to contribute to less effective usage of the online information environment in scholarly communication. As a result of insufficient skills, they most often find themselves spending much of the productive time in trying to get relevant information from the Internet than it could have been the case if equipped with the necessary knowledge (Eger, 2008). It should also be noted that most of the trainings offered especially by university libraries are done informally by inviting interested students to attend and in most cases address the information literacy part without taking into account the dissemination aspect (Chilimo, 2008). It is thus necessary to re-design such training to make them more formal and take aboard the dissemination aspect as well.

Lack of Open Access Awareness

Awareness is critical for individuals to adopt or use any kind of a service or technology (Rogers, 2003; Suber, 2004). In this study, 40.5% of the respondents acknowledged that they had not heard about open access before this survey. This was also cited by the respondents as among the reasons for their non-usage of open access in their scholarly communication undertakings. As noted previously in the section about the awareness and usage of open access, lack of open access awareness was found to be more predominant to the postgraduate students when compared to researchers from same institutions. Training designed to enhance postgraduate online communication skills as recommended above should also be used in raising the awareness of open access to this category of the respondents. This can be achieved by trainers to use specific open access sources as examples for possible sources of scholarly content to postgraduate student.

Slow Internet Connectivity

Slow Internet connectivity was also a major constraint cited by the respondents as contributing to their ineffective usage of this media in scholarly communication. Close to one- third (27.8%) of all the respondents cited the problem of slow Internet as an impediment to them while accessing scholarly content from the Internet. This problem was also reported as a major constraint by the researchers in a similar study (Dulle, 2010). Slow Internet connectivity is a challenge for the adoption online scholarly communication and open access in particular to most of the developing countries as a result of their dependence on the most expensive satellite connectivity (Christian, 2008). It should be noted however that the ongoing efforts of getting connected by the universities involved in this study to the Eastern African Submarine Fibre Optic Cable connecting Tanzania to the rest of the world is likely to end this problem of slow Internet connectivity.

Conclusions and Recommendations

This study attempted to understand open access awareness, usage and perceptions of postgraduate students at SUA and UDSM. The findings indicate that more than half of the postgraduate students were aware of open access. The students however support the open access scholarly communication and used it to access scholarly content than disseminating research findings. Low awareness of open access, inadequate online scholarly communication skills, and slow Internet connectivity were identified as key constraints for postgraduate students to exploit open access opportunities and the online information environment in general. The fact that a similar study that was targeted to researchers found same constraints suggests the need for the responsible institutions to seriously address these hurdles in order to improve scholarly communication at their respective institutions.

It is recommended that the existing modules of information literacy targeted to these students at the two universities be revised and formalised. In their current state, such modules pay more attention to improve students' skills in terms of online information access while leaving the dissemination

aspect which is equally important. Postgraduate students should also be trained to be disseminators rather than net consumers of information alone as they form the future of the scholarly community. There is also a need to formalise the revised curriculum so that all the postgraduate students participate in these important trainings. Since the current training modules are offered informally , it makes some of the postgraduate students miss such trainings as a result of considering themselves competent in such skills while in the real sense they are not. A scholarly communication module encompassing both the access and the dissemination of information in an online environment should be undertaken by all postgraduate students. Such a module can be part of the research methodology course. Among other aspects of information literacy, this module should also introduce open access as an alternative to the business mode of scholarly communication. In this way, the targeted students will be made aware of both open access and the traditional model of scholarly communication so that they make informed decisions on various sources for information access and dissemination avenues for their research findings.

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Knowledge Transfer through Internship: The EASLIS Experience in Strengthening the Governance Decentralisation Programme in Uganda

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Abstract

Makerere University, Kampala,Uganda has attempted over many years to integrate knowledge transfer programmes into its higher education programmes through various strategies, including internship and fieldwork studies. The internship programmes have gained popularity, especially through the interventions from the Innovations at Makerere Committee of the University that supported a number of academic units to enhance the decentralisation of the internship to the local governments in Uganda. The East African School of Library and Information Science (EASLIS) has implemented knowledge transfer of information management practices through its internship programme since 2006. This paper highlights the activities undertaken by EASLIS students during the internship and the perceptions of the field supervisors on the performance of students in terms of the students' competences and performances, benefits to local governments, challenges being faced, and aspects requiring improvement. This internship programme has brought about significant changes, including improved perceptions in the community about the library and information science profession, the balancing of theory with practice in the delivery of EASLIS programmes, and improved professional confidence and abilities of its students and graduates. The paper is concluded with various recommendations addressed to the University and local governments for improving the benefits of the programme.

Introduction

The Makerere University, Kampala, Uganda has attempted over many years to shift from the traditional instruction-dominated paradigm toward paradigms that enable its students to acquire both traditional and generalist, as well as practical skills so that its graduates can compete in the dynamic knowledge-driven economies of the world (Makerere University, 2008). The University philosophy is founded on the following three pillars: Learner centeredness, research driven university and knowledge transfer partnerships and networking to meet the needs of its local community, the university began in 2001 to implement decentralised service delivery through its innovation committee nicknamed I@MAK.COM, supported by World Bank and the Rockefeller Foundation (Makerere University, I@MAK.COM, 2008). The innovation focuses on enhancing service delivery that directly affects the lives of the poor, good governance and transparency, among others. In the spirit of the innovation, the East African School of Library and Information Science (EASLIS) has also pledged to promote knowledge transfer of information management practices through various strategies, including internship for

its students (EASLIS, 2007). This is one of the strategies towards meeting the goals of an earlier study on "Information manpower capacity building for decentralization in Uganda through Industrial Training", by Magara and Bukirwa (2002), that provided strategies for the implementation of industrial training (internship) in local governments to enhance the knowledge transfer partnership and strengthen the decentralised system of governance in Uganda.

Earlier, in 2003, EASLIS had revised its curriculum to incorporate internship, technically referred to as practicum (Makerere University, 2003). The internship is conducted during the recess term after the second year of the Bachelor of Library and Information Science programme. The aim of the internship is to expose students to the real work environment and to enable them gain practical skills in information systems and services management. The internship programme is further intended to expose students to the real work environment alongside its challenges and to provide an opportunity to the participating institutions to benefit from the skills these students have acquired from the university. During the internship, students get attached to established libraries, registries, record centres, archival institutions, information service centres, documentation centres, community telecentres, publishing houses, statistics databanks and financial institutions. Students are required to get involved in the day-to-day information management activities of the institutions and are supervised by both the field personnel (in the host organisations) and EASLIS academic staff. Students are required to produce a report about what they have done and learnt in the field. The report and the field supervisor and academic staff assessments are considered for awarding the final grade for the practicum. In order to ensure a conducive internship environment, a pre-planning exercise is conducted by EASLIS staff to assess the suitability of the various prospective internship placement sites.

EASLIS has conducted internship in various organisations including the decentralised local governments since 2006. This paper considers selected cases for students that undertook their training in the local governments between 2006 and 2008. The cases selected are those that were supported by the I@mak.com, whose aim was to enhance service delivery in local governments in Uganda. This paper highlights the effect of the internship programme on knowledge transfer towards strengthening decentralisation programme in the Uganda. Towards that aim, the paper: (a) assesses the activities undertaken by EASLIS students during internship; (b) explains the perceptions of the field supervisors on the performance of students in terms of the students' technical competencies and personalitym and proposed areas for improvement; (c) assesses the benefits of internship to local governments and their opinions on the considerations for participation in the internship programme; (d) assesses the problems experienced during internship; and (e) makes suggestions for the improvement of the internship programme.

Knowledge Transfer in a University Environment

In most universities, the core mandates include teaching and learning, research and innovation, and knowledge transfer. Knowledge Transfer (KT) has significantly influenced the learning process among learners (Geuna and Muscio, 2008). Knowledge falls into two categories — tacit and explicit knowledge. Explicit knowledge comprises the formal and written knowledge, while tacit knowledge is personal, based on an individual's experience, insights and intuition (Mchombu, 2006) within a defined environment. The tacit knowledge approach emphasises understanding the kinds of knowledge that individuals in an organisation have, moving people to transfer knowledge within an organisation, and managing key individuals as knowledge creators and carriers (Sanchez, 2004). By contrast, the explicit knowledge approach emphasises processes for articulating knowledge held by individuals, the design of organisational approaches for creating new knowledge, and the development of systems (including information systems) to disseminate articulated knowledge within an organisation. The central strategies to seed and develop such values include: nurturing critical thinking skills and widening creative expression among the learners and their integration into the environment in which learning takes place.

Knowledge Transfer (KT) concerns all activities that generate, use, apply or exploit knowledge and other university capabilities outside the academic environment and includes access to the university's knowledge base by external organisations, communities and individuals (University of St. Andrews, 2008). To put it simply, KT involves interaction between people and movement of knowledge from one place to another (Malhotra, 2002).

A review of KT models, frameworks and theories by Graman, Logan, Tetroe and Robinson (2005) indicates that KT has a potential to increase the utilisation of existing knowledge as a useful tool to best practices in the implementation of endeavours. Some of these knowledge movements include technological transfer initiatives, fostering linkages, and stimulating private sector participation. The fundamental factors that support KT include cooperation, belonging, skills, leadership, knowledge and practice (Ssekamwa, 1997). This is why Collins (1993) as cited by Blackler (1995) contends that for KT to evolve, knowledge is "embrained (conceptual and cognitive skills), embodied (action oriented with conceptual practices), encultured (shared understanding), embedded (resides within systematic routines) and encoded (conveyed through appropriate technologies)." On the other hand, KT, according to Mahitra (2002), requires specialisation, externalisation, combination and internalisation. The challenge is to develop supporting schemes to transfer such knowledge between universities and industry (private and public sector) to facilitate the learning process. This requires a collaborative learning environment to enable learners exploit the outcome of their learning processes.

A number of different knowledge transfer models have been used in universities, including collaborative research and development, teaching and learning, information exchange, and innovation and intellectual property commercialisation (Geuna and Musco, 2008). One of other means to facilitate KT has been engaging learners in the internship programme, so that both the learners and the organisations where the internship takes place benefit.

The term 'internship' has been used interchangeably with such other terms as cooperative education, field studies, field attachment, service-learning, practicum and industrial training. Internships require students to apply classroom learning, theories, and experiences to professional settings with a general goal of having students apply learning and linking it to the curriculum (London University, 2009). For instance, according to Galagedera (2005), industrial training methods as used by Sri Lankan universities can be classified as structured, problem-oriented or informal. Of the three categories, structured training appears to be the most effective, while problem-oriented training places much reliance on the commitment of the trainee. The least effective is the informal type, which can only be successful by chance.

Baird (2008) acknowledges, anticipates, and addresses the everyday questions and concerns of interns, and recommends that internship should help to bridge the gap between academic coursework and the knowledge, skills, and emotional challenges that are found beyond the classroom. As noted by Dreuth and Dreuth-Fewell (2002), many universities and colleges in the USA integrate student classroom learning with interaction in the community**.** They also observed that KT programmes require a strategy of integrating community service learning with professional practice, and suggested that a developmental model of learning that ranges from basic understanding of the subject matter to the application of community-based learning models. At the City University London, KT is described as a two-way process from placement (internship) to partnerships. It is therefore important to assess how a university unit like EASLIS of the Makerere University is making use of the existing learning models to enhance knowledge transfer among its students, local communities and organisations.

Methodology

This paper is based on a practical programme by the East African School of Library and Information Science (EASLIS) Makerere University that has been done over four years regarding the Internship (Field attachment). The internship programme was held in 22 districts which include Arua, Bugiri, Luwero, Masaka, Bushenyi, Gulu, Iganga, Jinja,

Kampala, Kayunga, Kiboga, Masindi, Mbale, Mbarara, Mpigi, Mubende, Mukono, Nakasongora, Rakai, Soroti, Tororo and Wakiso. The table below shows the analysis of students allocated to districts in the respective placement areas. Placement sites identified included registries, record centers, libraries, data processing centres and resource centres. The central registry, education departments and hospital registries were of major concern in most of the districts that were covered. Overall, 109 students did their internship in the local governments that were supported by I@MAK.COM.

Table 1: Distribution of Placement Areas by District in Uganda

Districts in Uganda	Library/ Resource Centres	Registres/ Records Centres	Total
Arua	1	1	2
Bugiri		2	2
Bushenyi	1	4	5
Gulu	3	1	4
Iganga	1	1	2
Jinja	6	2	8
Kampala	17	11	28
Kayunga	1	2	3
Kiboga		1	1
Luwero	2	2	4
Masaka	4	4	8
Masindi		1	1
Mbale	1	3	4
Mbarara	9	3	12
Mpigi		2	2
Mubende	1	2	3
Mukono	1		1
Nakasongola		2	2
Rakai	1		1
Soroti		4	4
Tororo	2	6	8
Wakiso	2	2	4
Total			**109**

Each student was allocated two supervisors: a field supervisor and a faculty supervisor. The field supervisors were identified at the time of internship pre-planning. The supervisors were responsible for monitoring and guiding students' day to day work at the internship institutions and also report the welfare of the interns in the respective districts. Prior to their departure to the field, the interns are briefed on the expectations of the internship programme in the districts, and the academic staff are also reminded of their roles and responsibilities in terms of supervision and assessment of the performance of the interns. Students are given letters of introduction from the University indicating the placement area and the activities the students were expected to be involved in. Field supervisors, faculty supervisors and students are also given instructions to follow during the internship (EASLIS, 2006; Makerere University, 2007). Students report in their respective places of internship in the first week of the recess term, and the Chief Administrative Officers of the local governments write to the respective departments to allocate work to the interns.

The field supervisors are required to fill in an assessment form provided at the time of a visit by the faculty supervisor in order to make a general assessment of the internship programme. The assessment involved the evaluation of the student's performance and include request for both quantitative assessment data and qualitative comments on each student supervised. The faculty supervisors visit the students at least twice during the internship period. Students are also required to provide detailed reports on their internship experience, including records of their daily activities in a dairy. Most of the students sign their daily attendance in the organisations, as well as in their personal diary, which is countersigned by the field supervisor as proof of the execution of the activities by the interns.

The selection of field supervisors was mainly based on the level of professional training they possessed and/or the employment responsibilities held. The professionals that participated as field supervisors included librarians, ICT officers, senior records officers, assistant librarians, senior

librarians, assistant records officers, records assistants, records officers, senior assistant records officers, information management assistants, assistant data management officers, and information and reference services officer. Some of the students were supervised by officers who were not necessarily library and information professionals. These included commercial officers, office superintendent, inspector of schools, secretary district service commission, assistant town clerk, hospital administrator, senior nursing officer, deputy registrar, court clerk, secretary district service commission, director, district health services, district staff surveyor, chief administrative officer, headmasters, and officer in-charge of registry.

The faculty supervisors also assess the interns on their performances in their respective duty stations. After the internship, a one-day seminar is organised at EASLIS for the interns to provide feedback and experiences to their fellow students. From this exercise, two students are selected to present their internship experiences to a forum of library and information science stakeholders as a way of sensitising the LIS profession on the EASLIS internship programme.

Findings

This section summarises findings in respect of various aspects of the EASLIS internship programme. The findings were compiled from various reports provided by the interns, field supervisors and faculty supervisors.

Activities Undertaken by Students

Students were involved in a number of activities in library and information services and in various institutions including libraries, information centres and records centres/registries. Those students who were attached to district hospitals participated in data collection, analysis, processing and interpreting, record keeping and reporting. Students who were attached to registries and records centres were engaged in records management activities like opening new files, file referencing, file indexing, filing, control of file movement, file routing, file classification, file census and management of electronic records. The majority of such students were involved in cleaning of records centres, file labeling, file routing and movement and tracking. Other students were involved in updating databases, generating reports, organising records, training and orienting other staff and file coding.

The majority of students who did their internship in libraries were engaged in stock selection, budgeting, processing of library materials, shelf arrangement, issuing and circulation, weeding, stocktaking, and promotional activities. Some of the students participated in book ordering, handling book deliveries, collecting library statistics, establishing a resource centre. Others participated in shelf reading, data entry, sending overdue notices and library orientation. In a few instances, some students were engaged in database design and management. Some students were engaged in desktop publishing activities such as designing and publishing bulletin and newsletters of the respective organisations. Unexpectedly for some of the students, they found themselves involved in dusting and cleaning of books on the shelves, and opening and closing the library.

Field Supervisors' Assessment of the Students' Performances

The internship programmes required the field supervisors to guide and expose students to the day to day operations of the work units where they were deployed. The field supervisors were also required to use different parameters to evaluate the performances of the students at work. In order to do this, the field supervisors were asked to rate students on 10-point Likert scales, with the response options interpreted as follows: 1 to 3 = "needs improvement", 4 and 5 = "fair", 6 to 8 = "above average" and 9 and 10 = "outstanding". The assessments by the field supervisors are summarised in Table 2.

Table 2: Assessment by Field Supervisors on the Performance of Students (N=109)

Parameters	Needs Improvement	Fairly good	Good	Outstand
Organisation of work/ regular attendance	7 (6.4%)	13 (11.9%)	39 (35.8%)	50 (45.9%
Timely completion of assignment and punctuality at work	1 (0.9%)	8 (7.3%)	58 (53.2%)	42 (38.5%
Innovativeness and resourcefulness	4 (3.7%)	1 (0.9%)	62 (56.9%)	42 (38.5%
Accuracy of work	-	-	55 (50.5%)	54 (49.5%
Adaptation to working conditions	18 (16.5%)	5 (4.6%)	70 (64.2%)	16 (14.7%
Ability to work with others	-	3 (2.8%)	40 (36.7%)	66 (60.6%
Follow up on assignments	-	2 (1.8%)	54 (49.5%)	53 (48.6%
Ability to communication with superiors	15 (13.8%)	4 (3.7%)	52 (47.7%)	38 (34.9%
Ability to apply theory in practice	-	6 (5.5%)	58 (53.2%)	45 (41.3%
Ability to judge and take decisions	-	7 (6.4%)	65 (59.6%)	37 (33.9%

Generally, it is apparent that the students' performances during the internship were rated mostly good (i.e. above average) in demonstrating adaptation to working environment (64.2%), ability to take decisions (59.6%), innovativeness (56.9%) and ability to apply theory and practice (53.2%). A clear majority of the students were also rated outstanding in their ability to work with others (60.6%), which almost half of them were rated outstanding on accuracy of work (49.5%) and following up with assignments (48.6%). However, very few students were rated outstanding on adaptation to working conditions (16.5%), ability to communicate with superiors (13.8%) and organisation of work (6.4%). There is therefore need for improvement in these areas.

Technical Competencies of Students

According to the field supervisors, most of the students were competent in technical work. Those who worked in libraries were competent in classification and cataloguing, library administration, compiling user statistics, newspaper indexing, accessioning, reference service and information work, and binding. In addition, the faculty supervisors thought that the students possessed some customer care skills in managing library services.

Those students who worked in registries and records centre exhibited abilities to translate the theories and principles learned in the classroom into specialised information management systems (e.g. Health Management Information Systems). Such students got involved in record keeping, filing and supervision of other lower cadre staff. Majority of students attached to registries/records centres were involved in the establishment and/or re-organisation of registries/records centres. Majority of students also exhibited knowledge and skills in computer use, data management and database management systems.

Students' Personality

Field and faculty supervisors were requested to comment on how they would describe the students' personality to others. According to the field

supervisors, majority of the students exhibited excellent communication skills and were willing to take up new challenges. The students were also described as having ability to execute and follow up assignments without much supervision. Some of the students exhibited good time management, public relations and high commitment to the work, while some others demonstrated teamwork ability to learn fast and follow. In many cases, students were observably self confident, self-motivated, and exhibited interpersonal skills. The majority of students were friendly, trainable and credible.

In terms of character traits, the field supervisors described the students as disciplined, straightforward, honest, humble, courteous, polite and respectful with a commitment and positive attitude towards work. Majority of the students were also described as creative, participatory and industrious, and quickly adapted to the new working environment.

Students' Assessment of the Internship Programme

The majority of the students reported that they learned a great deal about how local governments operate. They also claimed that they were able to apply what they learnt in class into practice. Their reports show that, as a result of this internship training, students gained a significant deal of experience in several aspects of information management and technology. Students also learned teamwork, clients handling and public relations skills, customer care, and minutes and report writing. Students also reported that they have acquired communication skills, interpersonal relationship skills, records and information management skills, word processing skills, etc, and made new friends.

According to the students, the training was relevant to the BLIS programme. Students expressed satisfaction with the various skills acquired from the exercise, and perceived the training as completely successful as they were warmly welcomed and managed to adapt to the work environment. Furthermore, students noted that some of the activities were intellectually engaging because they required a quick memory and a good knowledge of the collection, policies and regulations of the information centre. According to them, appropriate conduct is a very important requirement in the working environment, including mode of dressing, punctuality and presence.

The students were confident that they had gained some abilities in teamwork and ability work and associate with other people, and respect professional ethics. Some of the students appreciated that they had become better informed on existing documents, manuals and policies relevant to local government, which has made some of them understand the way local governments work.

Areas that Need Improvement

There were significant mentions and concerns regarding some special skills and professional aspects of information management in which the students were weak and were needed to be improved. In the library domain, it was felt important for students to strive to have a better understanding of theoretical base of library classification. Majority of students were reported to have lacked binding skills. According to the field supervisors, students lacked some tacit and explicit knowledge in information management. Some of the students also needed to improve on their knowledge and skills in library automation and other library ICT related aspects, and in abstracting and indexing.

The students who worked in records centres/ registries required knowledge in the areas of classification systems for local government records and in the legal aspects of records management in Uganda. There was a general lack of knowledge in specialised records management systems, e.g. Health Management Information System (HMIS) where the students lacked some knowledge in the medical vocabulary and the coding system. In few instances, lack of adequate knowledge in registry procedures and personal file classification was identified.

The field supervisors noted that students needed improvements in leadership skills and innovativeness, human resource management and office management and practice. The filed supervisors considered it important that students should be exposed to information and data analysis techniques should be able to apply computer

applications/software in the library environment, and should be able to communicate well, develop work discipline and ethics and adapt to harsh working conditions. Faculty supervisors emphasised the need for the students to be able to handle many clients, answer client's queries, handle monotonous routine tasks, and develop communication and advocacy skills.

Benefits to the Local Governments

In most of the districts, field supervisors indicated that their departments/organisations benefited from the skills the interns had acquired from university. To most of them, students boosted the operations of the departments by clearing backlogs. This was further manifested by a student who explained that "*the host institution received extra and free labour and my presence reduced the work load of the limited staff.*" Majority of the students initiated and/ or participated in the establishment or organisation of information centres such as registries, records centres, archives, databases and resource centres. For instance, in Kitagata Hospital in 2006, a Senior Nursing Officer (2006) reported:

> *Students have activated the hospital records management system, upgraded the health management information system, opened a registry for the hospital, the first of its kind since the hospital was started in 1969, trained and oriented our records staff to new methods of records keeping and management.*

The students who were interns at records centres affirmed that they contributed greatly to the organisations. Due to lack of adequate staff in most of the districts, some of the students took over full responsibility of some of the centres in the absence of the designated officers. The field supervisors also affirmed that information materials were now properly organised, easily accessible, and were being optimally utilized. Overall, field supervisors believed that the internship programme has marketed both the local governments and the skills of the students. According to the students, some of the regular staff received some new skills from them, and this made some local governments to develop interest in employing library and information workers. Many of the faculty supervisors agreed with the views above, and that the majority of the organisations had backlog of work which they were able to clear with the help of the students.

The field supervisors were required to indicate whether they would consider having one or more interns in future runs of the programme, and all of them expressed the need for more interns than were allocated to them, although they also wanted improved gender balancing of the interns.

Problems Experienced during the Internship

Field supervisors were required to mention any problems they had experienced with the students during the internship period. In very few incidences, it was noted that students lacked time management, understanding of office behaviour, ethics and etiquette. Some students required unnecessarily too much supervision. In many of the organisations, there were inadequate or lack of facilities, equipment and appropriate software to enable the students to practise the information management skills and procedures that they had been taught in class. For example, in some libraries, there was absence of classification schemes, lists of subject headings and computers. Where computers existed, there were inadequate specialised applications for library management and records management. This made most of the practical training more or less manual than computer-based.

When students were required to indicate the problems experienced during the field attachment, it was clear that they faced the problems of long distances from their places of residence to the work places, language and food problems, high cost of living in some places, lack of skilled personnel in the districts and lack of stationary and financial resources in the work places. According to students, it appeared that some special needs of students were not considered while allocating the interns, and that, in most of the information centres, there were inadequate considerations of those needs. The students were also bothered by the bureaucracy in

the local governments. "Sometimes you have to contact more than four people for a single task to be done", one student lamented. Moreover, according to the students, some of the officers were not ready to adhere to new ideas brought in by the interns. One student reported: "*I introduced the idea of clients showing identity cards or written documents from people who have sent them to collect documents, but most of them saw that as a problem …*"

According to the students, some staff did not want to work with students which they considered to be "brushing shoulders with kids". In addition, the working environment in many cases was not conducive. For example, for those students who were attached to hospitals, they noted that "working with sick people, seeing patients and/or dead bodies almost all the time" without prior orientation was not easy for many students, and this affected some of them psychologically. Some students also exhibited allergies to some of the places which were very dusty.

On the side of the faculty supervisors, having to supervise students in the field in addition to the routine teaching and research work was a challenging task.

Suggestions for the Improvement of Internship Programme

The field supervisors, faculty supervisors and students provided the following suggestions for improving the internship programme to boost its benefits for the university, the organisations and the students:

a) **Programme coverage, timing and supervision:** EASLIS should define more clearly the work areas where they require students to practise and provide those areas to field supervisors in advance. According to some students, there should be a clear analysis of the activities to be done. The internship should be undertaken during the second and third years of study to increase the students' exposure, as well as chances of getting employment upon completion. In addition, students on formal employment should request for leave from their employers so that they can concentrate fully on the internship programme. The time allocated should be revised to provide a more convenient opportunity for students to gain hands on experience. Both the faculty and the students expressed the need of having more than two visits from faculty supervisors during the internship.

b) **Accommodation and welfare for interns:** Both the field supervisors and the students suggested that prior arrangements between the faculty and the host organisations should be made concerning the students' accommodation for their safety and convenience. The host institutions should plan to provide some support to the interns in respect of appropriate accommodation, feeding and out of pocket expenses. Furthermore, the health status and special needs of individual students should be considered before sending them to the placement areas.

c) **Students; commitment**: Students should be more committed to the assignments and the work given during the internship. According to field supervisors, students need to be prepared to face the challenges in the work environment.

d) **Improved facilities for information management services in local governments:** Local governments should acquire ICT equipment to enhance effective information management and provide functional and purpose-built buildings for information management centres. Districts should also develop policies governing the access to and management of information, e.g. library and records management policies.

e) **Sensitisation and awareness promotion**: The university should organize a sensitisation programme of the intended beneficiaries to inform them about the different aspects of the internship programme. EASLIS should sensitize the public about library and information science careers because the interns often had to explain what the

discipline can contribute to the organisations and the society. In addition, EASLIS should sensitise the host institutions about the importance of internship and the institutions' expected roles and responsibilities.

Observations and Conclusions

The internship programme has shown clearly that the level of knowledge and skills acquired by students before their internship, and the preparations made for the programme both contribute to the success of the programme and, consequently, the host institutions' perceptions of the library and information science profession. The interns bring to the internship mostly explicit and some tacit knowledge in the university. These must be combined with explicit knowledge passed on to them through the internship guidelines provided to them by their field and faculty supervisors. However, real life practical work demands the development and use of high levels of tacit knowledge, and this enables interns to develop their levels of tacit knowledge. Also important for the development of the tacit knowledge are the attitudes, perceptions, motivations, and commitment of the interns prior to and during their internship experience. The quality of the explicit knowledge passed on to the interns by the field and faculty supervisors also contributes to the level of harnessing of tacit knowledge by the interns. Indeed, such matters as the assignment of tasks, supervision and motivation provided by the various parties (supervisors, host institutions, interns themselves) have a bearing on the interns' satisfaction with programme and, possibly, their future career prospects in profession.

LIS training schools therefore require balancing theory and practice to ensure that students demonstrate competences in the workplace. The abilities exhibited by students during the internship also contribute to the abilities by the organisations in appreciating the roles played by the profession in enhancing good governance. Therefore, advance preparation of both the students and the field supervisors promotes the need for internship programme in the local governments. Furthermore, the success of the programme depends on the benefits gained by all participating stakeholders including the faculty, the students, and the host institutions. This however depends on the facilitation (e.g. funding) availed to students, the environment in which the internship is taking place and the level of social acceptance by the host institutions. Universities should therefore streamline funding of the internship programme to ensure that an appropriate environment is provided. In addition, there is a need for lobbying Government to promulgate a corporate social responsibility policy for all public and private sector institutions to enhance the internship programme in the country. Such arrangements will ensure that internship programmes enhance on the knowledge transfer towards strengthening decentralisation programme in Uganda.

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Modelling the Relationships between Knowledge Sharing, Organisational Citizenship, Job Satisfaction and Organisational Commitment among School Teachers in Botswana

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Abstract

This study argues that knowledge sharing behaviour is a kind of organisational citizenship behaviour as such: (i) the two variables should be strongly positively correlated and (ii) strong predictors of organisational citizenship behaviour should also strongly predict knowledge sharing behaviour. Since the organisational behaviour literature identifies job satisfaction and organisational commitment as robust predictors of organisational citizenship behaviour, the study investigated the interrelationships among knowledge sharing behaviour, organisational citizenship behaviour, job satisfaction, and organisational commitment. Empirical data were sourced from secondary school teachers in a number of schools in and around Gaborone, Botswana. Knowledge sharing behaviour and organisational citizenship behaviour were significantly positively correlated; organisational commitment was a significant predictor of organisational citizenship behaviour; and job satisfaction and organisational commitment were significantly positively correlated. Contrary to expectations, however, both job satisfaction and organisational commitment were unrelated to knowledge sharing behaviour. While it would be premature to conclude on the strength of the evidence presented in this paper that knowledge sharing behaviour indeed is a kind of organisational citizenship behaviour, the positive correlation between the two suggests that the role of organisational citizenship behaviour in organisational knowledge sharing is worth investigating further.

Keywords

Organisational citizenship behaviour, knowledge sharing behaviour, job satisfaction, organisational commitment, knowledge management.

Introduction

The fundamental question in the field of strategic management is how organisations achieve and sustain competitive advantage (Teece, Pisano and Shuen, 1997). Over the years, strategy researchers have developed a number of frameworks intended to help organisations achieve competitive advantage. In the 1980s, the dominant approach was due to Michael Porter (Porter 1979, 1980). Seminal though it was, Porter's industry analytic approach,

particularly as exemplified by his Five Forces model, was later criticised (e.g. Zack, 1999) for ignoring the role of individual firm characteristics in achieving competitiveness. Consequently, from the mid 1980s onwards, researchers (Barney, 1991; Wernerfelt, 1984) began to look within the organisation for sources of competitive advantage, in the process developing what has come to be known as the 'resource-based view'.

The resource-based view perceives the organisation as a bundle of resources and capabilities that may potentially lead to competitive advantage. In this context, resource refers to 'anything that could be thought of as a strength or weakness of a given firm', or, more formally, 'those (tangible and intangible) assets which are semi-permanently tied to the firm' (Wernerfelt, 1984:172), such as machinery, skilled personnel and efficient procedures. However, resources on their own are not productive; the organisation needs to have the capacity (i.e. knowledge) to mobilise resources and put them to productive use (Grant, 2005).

Isolating knowledge as the key source of sustainable competitive advantage. Researchers (Grant, 1996; Nonaka, Toyama and Nagata, 2000; Prahalad and Hamel, 1990; Spender, 1996) have further refined the resource-based view to form the knowledge-based view. To be sure, in arguing that resources and capabilities determine an organisation's strategy and performance, the resource-based view does acknowledge the role of knowledge – embedded in routines and capabilities – in organisational success. However, the knowledge-based view goes further and argues that organisations exist to integrate knowledge, i.e. 'organisations are social communities in which individual and social expertise is transformed into economically useful products and services by the application of a set of higher-order organizing principles' (Kogut and Zander, 1992:383). This interest in knowledge as a factor of production has in turn given rise to the discipline of knowledge management, which as Botha and Fouché (2002:282) noted, is concerned not with how to manage knowledge (knowledge per se cannot be managed!), but with managing "the organisational environment in which knowledge resources are levered to become a critical production factor".

An important area of research activity within knowledge management field is knowledge sharing which is concerned with transferring expertise from one individual to another within – or even across – organisations (Wang, 2005). Empirically, knowledge sharing has been shown to be positively related to a number of desirable organisational variables, including organisational performance (Du, Ai and Ren, 2007; Jacobs and Roodt, 2007; Lin, 2007; Pai, 2006; Yang, 2007). However, although knowledge sharing in the workplace is in fact organisational behaviour (i.e. behaviour that people engage in within the context of organisations), knowledge sharing researchers have generally not directly and explicitly drawn from the discipline of Organisational Behaviour. In an attempt to address this anomaly, the current study draws from Organisational Behaviour to explore the antecedents of organisational knowledge sharing behaviour. Specifically, the study perceives knowledge sharing behaviour as a type of organisational citizenship behaviour, and as such argues that: (i) the two variables should be strongly positively correlated, and that (ii) predictors of organisational citizenship behaviour should also be predictors of knowledge sharing behaviour.

Literature Review

Knowledge Sharing Behaviour

Formally, knowledge sharing refers to 'behaviour by which an individual voluntarily provides other social actors (both within and outside the organisation) with access to his or her unique knowledge and experiences' (Hansen and Avital, 2005:6). Two aspects of this definition immediately stand out. Firstly, knowledge sharing occurs between individuals, and is thus different from knowledge transfer which occurs between larger organisational entities such as departments and organisations themselves (see Ipe, 2003). Secondly, knowledge sharing is voluntary – and we come back to this point later in this paper when we link knowledge sharing to organisational citizenship behaviour.

Empirical studies have identified a number of antecedents of knowledge sharing behaviour. Ipe

(2003) conveniently placed them into four main groups, namely: (i) the nature of knowledge, (ii) motivation to share, (iii) opportunity to share, and (iv) the culture of the work environment. For instance, explicit knowledge being easily modifiable would be easier to share than tacit knowledge. With respect to motivation to share knowledge, empirical studies have shown that factors such as enjoyment, helping others, and self-efficacy can be strong motivators of knowledge sharing behaviour (Lin, 2007). However, even when individuals feel motivated to share knowledge, such sharing will be subject to the availability of the opportunity to do so, with information and communications technology – frequently in the form of electronic knowledge repositories – routinely used to facilitate knowledge sharing (Cabrera, Collins and Salgado, 2006). The culture of the work environment, too, plays an important role, with researchers reporting that dimensions such as communication climate and organisational justice do in fact influence knowledge sharing behaviour (Kim and Lee, 2006).

The definition of knowledge sharing alluded to earlier viewson knowledge sharing as organisational behaviour, i.e. behaviour that individuals engage in within organisations. One particular concept studied in organisational behaviour that appears closely related to knowledge sharing behaviour is organisational citizenship behaviour: both are considered discretionary, and both have been shown to be positively related to organisational performance. Indeed, some knowledge sharing researchers (Bock and Kim, 2002; Cabrera and Cabrera, 2005; Connelly and Kelloway, 2003; Kelloway and Barling, 2000) have hinted at this similarity, with Cabrera and Cabrera (2005) even suggesting that antecedents of organisational citizenship behaviour may turn out to be antecedents of knowledge sharing behaviour. Nevertheless, empirical research into the relationship between knowledge sharing behaviour and organisational citizenship behaviour remains scarce.

The research hypothesis guiding this study is that knowledge sharing behaviour is a kind of organisational citizenship behaviour. Now, if knowledge sharing behaviour is a type of organisational citizenship behaviour, then: (i) the two must be correlated, and (ii) antecedents of organisational citizenship behaviour must also be antecedents of knowledge sharing behaviour. The organisational behaviour literature indicates that the main antecedents of organisational citizenship behaviour are job satisfaction and organisational commitment (Organ and Ryan, 1995; Podsakoff *et al*, 2000). This study, therefore, empirically investigates the relationships among knowledge sharing behaviour, organisational citizenship behaviour, job satisfaction, and organisational commitment.

Organisational Citizenship Behaviour

Formally, organisational citizenship behaviour may be defined as 'individual behaviour that is discretionary, not directly or explicitly recognized by the formal reward system, and in aggregation promotes the efficient and effective functioning of the organisation' (Organ, Podsakoff, and MacKenzie, 2006). As Konovsky and Pugh (1994:658) observe, it is 'employee behaviour that is above and beyond the call of duty and is therefore discretionary and not rewarded in the context of an organisation's formal reward structure'. Thus, the fundamental distinction between organisational citizenship behaviour and in-role behaviour is that while the latter is formally required and expected of the employee as part of their duties and responsibilities, the former is voluntary and goes beyond normal role expectations (Allison, Voss and Dryer, 2001).

Within the literature, different types of organisational citizenship behaviours have been identified. Indeed, the review by Podsakoff *et al* (2000) identified some thirty or so discussed in the extant literature. Nevertheless, Pierce, Gardner, and Dunham (2002) list a handful of features common to all organisational citizenship behaviours, namely, that they are (i) voluntary on the part of the employee, (ii) intentional i.e. the employee consciously decides to perform them, (iii) intended to be positively valued by the employee and the organisation, and (iv) primarily benefit the organisation (or co-workers) and not the employee themselves.

A number of researchers have investigated correlates of organisational citizenship behaviour. In

particular, job satisfaction and organisational commitment appear to be strongly related to organisational citizenship behaviour. According to Penner, Midili, and Kegelmeyer (1997:112), 'there is little question that the affective and cognitive components of job attitudes are causally related to [organisational citizenship behaviours]'. In their meta-analytic review of the extant literature, Podsakoff *et al.* (2000:532) observed that '… job attitudes … [including job satisfaction and organisational commitment] … appear to be more strongly related to [organisational citizenship behaviour] than the other antecedents'. More recently, Chu *et al* (2005) investigated the antecedents of organisational citizenship behaviour among hospital nurses in a Taiwan regional hospital, and found that job satisfaction and job involvement significantly influenced the nurses' organisational citizenship behaviour.

Job Satisfaction

Job satisfaction is '… an attitudinal variable that reflects how people feel about their jobs overall as well as about various aspects of them' (Spector, 2003:210). Locke (1976), cited in Brief (1998), defined it as 'a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences'. Brief (1998) notes that although as an attitude job satisfaction is multi-dimensional, most job satisfaction definitions are only concerned with its affective component.

Empirically, job satisfaction has been found to be correlated with a large number of other organisationally important variables, including the following: negatively with turnover or turnover intentions (Cotton and Tuttle, 1986; Tett and Meyer, 1993; Shaw, 1999; Lambert, Lynne and Barton, 2001; Lam, Baum and Pine, 2001; Van Dick *et al.*, 2004); negatively with lateness (Clark, Peters and Tomlinson, 2005); positively with health, well-being, and life satisfaction (Daley and Parfit, 1996; Faragher, Cass and Cooper, 2005; Rice, Near and Hunt, 1980; Schmitt and Pulakos, 1985; Kantak, Futrell and Sager, 1992); positively with job characteristics (Lee, McCabe and Graham, 1983; Voydanoff, 1980; Bhuian and Menguc, 2002; Thomas, Buboltz and Winkelspecht, 2004). Importantly – at least for our study – job satisfaction, as noted earlier, has been found to be a robust predictor of organisational citizenship behaviours.

Organisational Commitment

Informally, organisational commitment may be thought of as a measure of the devotion and loyalty that an employee feels towards her employing organisation. Mowday, Steers and Porter (1979), cited in Meyer and Allen (1991), defined it as 'the relative strength of an individual's identification with and involvement in a particular organisation'. Organisational commitment has also been defined as 'the totality of internalized normative pressure to act in a way that meets organisational interests' (Wiener, 1982:418).

Meyer and Allen (1991) proposed a three-component model of organisational commitment, which has been widely cited in the literature. This model distinguishes among affective, continuance, and normative commitment:

> '*affective commitment refers to the employee's emotional attachment to, identification with, and involvement in the organisation … Continuance commitment refers to an awareness of the costs associated with leaving the organisation. … Finally, normative commitment refers to a feeling of obligation to continue employment.*' (Meyer and Allen, 1991:67)

Affective organisational commitment has been found to be related to a number of organisationally important variables: turnover and turnover intentions (Griffeth, Hom and Gaertner, 2000); tardiness and absenteeism (Blau, 1986; Dishon-Berkovits and Koslowsky, 2002); job performance (Riketta, 2002). Importantly – at least for our study – organisational commitment, as noted earlier, has been found to be a strong predictor of organisational citizenship behaviours.

Research Model and Hypotheses

Figure 1 depicts the research model guiding this study. As intimated above, this study's thesis is that knowledge sharing is a type of organisational citizenship behaviour; as such, the two are expected to be positively correlated. Accordingly, the first hypothesis of this study is as follows:

H1: Knowledge sharing behaviour and organisational citizenship behaviour are positively correlated.

If knowledge sharing behaviour is a type of organisational citizenship behaviour, then not only should the two be correlated, but antecedents of one should also be antecedents of the other. Earlier, it was pointed out that job satisfaction and organisational commitment have been found to robustly predict organisational citizenship behaviour. Accordingly, it is hypothesised as follows:

H2: Job satisfaction positively influences organisational citizenship behaviour.

H3: Organisational commitment positively influences organisational citizenship behaviour.

H4: Job satisfaction positively influences knowledge sharing behaviour.

H5: Organisational commitment positively influences knowledge sharing behaviour.

Research suggests that job satisfaction and organisational commitment are strongly positively correlated. In their 1990 meta-analytic review of the then extant literature, Mathieu and Zajac, cited inin Spector (2003), reported a correlation of 0.49 between job satisfaction and organisational commitment. Similarly, in the 1996 meta-analysis by Brown, cited in Muchinsky (2006), the average correlation between job satisfaction and organisational commitment was 0.53. Consequently, it is hypothesized as follows:

H6: Job satisfaction and organisational commitment are positively correlated.

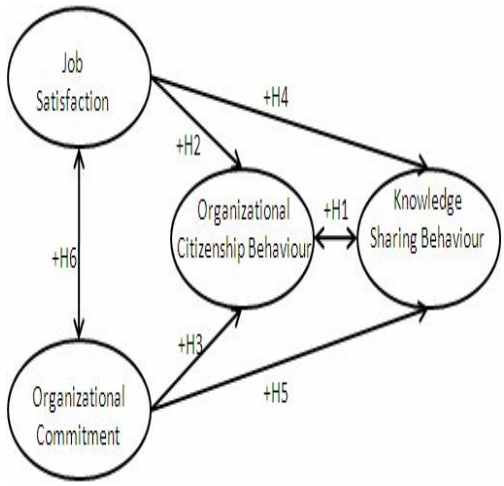

Figure 1: Conceptual framework indicating study hypotheses

Research Design

Research Approach

The study seeks to quantify relationships among the variables: *knowledge sharing behaviour, organisational citizenship behaviour, job satisfaction* and *organisational commitment.* As such, a cross-sectional survey was used to generate primary data that could be subjected to quantitative correlation and regression analytic techniques. For all variables, pre-existing instruments were used as they were , or modified as appropriate. All instruments were piloted at a junior community secondary school in Tlokweng in the outskirts of Gaborone, Botswana.

Research Method

The study specifically targeted teachers in senior secondary schools in Botswana, i.e. teachers in schools that offer the last two years of Botswana's five year secondary education, thereby preparing students for the Botswana General Certificate of Secondary Education examination, an equivalent of the University of Cambridge International General Certificate of Education (IGSE). There are 27 such schools in Botswana, scattered around the country. A primary concern of research in the social sciences is the issue of questionnaire response rates which are often extremely low. In a bid to bolster return rates, this study only focused on the nine schools in and around Gaborone. In all, 720 copies of the questionnaire were distributed; 283 were returned, giving a response rate of 39%, which was deemed acceptable. Gender-wise, respondents were fairly evenly distributed, with females numbering 147 and males 133. In all the analysis, listwise deletion was used to handle missing data.

Measuring Instruments

All constructs were measured using instruments sourced from the extant literature. All scales used a forced four-item scale consisting of the options "Strongly Disagree" (Score = 1), "Disagree" (Score = 2), "Agree" (Score = 3), and "Strongly Agree" (score = 4). For each construct, the summated score was obtained by calculating the mean score of all the items in the scale. Knowledge sharing was measured using the scale developed by Van den Hooff and colleagues (De Vries, Van den Hooff and De Ridder, 2006; Van den Hooff and De Leeuw van Weenen, 2004; Van den Hooff and De Ridder, 2004) as modified by Lin (2007). The scale measures two dimensions of knowledge sharing, namely: knowledge donating and knowledge collecting. Knowledge donating refers to 'communicating to others what one's personal intellectual capital is' while knowledge donating is concerned with 'consulting colleagues in order to get them to share their intellectual capital' (Van den Hooff and De Ridder, 2004:118). Lin (2007) modified this scale to produce a version in which no reference is made to departments within the company; this is particularly useful in school contexts where teachers are assigned to departments on the basis of the subjects they teach, raising the possibility of teacher belonging to more than one department. The full scale is shown here in Table 1.

Table 1: Knowledge Sharing Behaviour Scale [Modified from Lin (2007)]

When I've learned something new, I tell my colleagues about it
When they have learnt something new, my colleagues tell me something about it
Knowledge sharing among colleagues is considered normal in my school
I share information with my colleagues when they ask for it
I share my skills with colleagues when they ask for it
Colleagues in my school share knowledge with me when I ask them to
Colleagues in my school share their skills with me when I ask them to

Organisational citizenship behaviour was measured using the Individual Citizenship Behaviour Scale developed by DiPaola and colleagues (DiPaola, 2007). With items such as 'I try to help my colleagues any way I can', the scale is a self-reported measurement of an individual's organisational citizenship behaviour. For the purposes of the current study, some items in the original scale were modified, while others were dropped altogether. For instance, the item that read 'I sponsor extracurricular activities' was changed to read 'I volunteer to be involved in extracurricular activities': it was felt that since the study participants were not in general mother tongue speakers of English, they may find the use of the word 'sponsor' in this context confusing. As can be seen from Table 2, the final scale used in this study had 17 items, compared to the 21 in the original instrument.

Table 2: Individual Teacher Citizenship Behaviour
[Source: Modified from DiPaola (2007)]

I go out of my way to introduce myself to substitute teachers
I try to help substitute teachers any way I can
I try to help my colleagues any way I can
I volunteer to be involved in extra curricular activities
I give colleagues advanced notice of changes in my schedule
I volunteer to serve on committees
I take things as they come in school without complaining
I make it a point to arrive on time for work
I spend a lot of my own time helping students
I make a lot of suggestions to improve the overall quality of our school
I am conscientious about getting to appointments on time
I always make time to deal with parental concerns
I am considerate of my colleagues' time
I voluntarily attend important school functions
My free time is my own time
Too many of my colleagues don't take responsibility for their actions and decisions
I devote time to help new teachers

Job satisfaction and organisational commitment, too, were measured using pre-existing instruments. Job satisfaction was measured using the six-item scale (Agho, Price and Mueller, 1992) that is in fact a shortened form of the instrument developed by Brayfield and Rothe (1951). The Brayfield and Rothe scale has been used widely in the literature – even to measure teacher job satisfaction (Stempien and Loeb, 2002). Shown here in Table 3, the six-item version measures global job satisfaction. Organisational commitment was measured using Meyer and Allen's (1991) affective organisational commitment scale. The scale is shown here in Table 4, where the (R) indicates reverse-worded items. The decision to measure only affective – and neither continuance nor normative – organisational commitment was motivated by the realisation that as by Van den Hooff and De Ridder (2004:119) observe, 'affective commitment is positively related to individuals' willingness to commit extra effort to their work, [it is] the kind of commitment that can be expected to be related to willingness to donate and receive knowledge'.

Table 3: Shortened Brayfield and Rothe (1951) Job Satisfaction Scale
[Source: Agho, Price and Mueller (1992

1	I find real enjoyment in my job
2	I like my job better than the average person
3	I am seldom bored with my job
4	I would not consider taking another kind of job
5	Most days I am enthusiastic about my job
6	I feel fairly well satisfied with my job

Table 4: Affective Organisational Commitment Scale
[Source: Modified from Meyer and Allen (1991)]

1	I would be very happy to spend the rest of my teaching career in this school
2	I enjoy discussing my school with people outside it
3	I really feel as if this school's problems are my own
4	I think I could easily become as attached to another school as I am to this one
5	I do **not** feel like 'part of the family' at my school (R)
6	I do **not** 'feel emotionally' attached to this school (R)
7	This school has a great deal of personal meaning for me
8	I do **not** feel a strong sense of belonging to my school (R)

Research Procedure

It had initially been intended that at each school, a staff meeting would be arranged during which the study would be introduced, and the respondents asked to fill in the questionnaire. However, this was only possible at one school. At all the other schools, the head teachers preferred that the questionnaire be left with a contact person in the school, who would then distribute and collect the questionnaires on behalf of the researchers. In general, the school heads felt that an outsider distributing and collecting questionnaire in their schools would be too disruptive for their liking. Although these sentiments were unanticipated, they were entirely understandable; schools tend to be over-researched, with some indicating that they receive a questionnaire every fortnight! Indeed, when the first author arrived to seek permission to undertake the study at one of the schools, teachers were in the process of completing another questionnaire from a different researcher.

Statistical Analysis

In all cases, Cronbach's coefficient á was used to test the reliability of the various scales used in the study. The Pearson product moment correlation coefficient was used to test hypotheses H1 and H6, while multiple regression analysis was used to test hypotheses H2, H3, H4, and H5.

Results

Knowledge Sharing Behaviour Scale

Table 5 shows the means, standard deviations, and reliability analysis results for all the measuring scales used in this study. The table also shows the correlations amongst the various study constructs. The knowledge sharing behaviour scale used in this study was due to Lin (2007) and consisted of 7 items (see Table 1), the first three of which were intended to measure knowledge donating, while the last four were supposed to measure knowledge collecting. Item analysis of the the seven-items scale yielded a Cronbach's coefficient á of 0.82, with all the items strongly positively correlated with the scale total. The knowledge donating items on their own yielded a Cronbach's coefficient á of 0.70, while the knowledge collecting items on their own yield a Cronbach's coefficient á of 0.87. However, principal axis factoring with both the Eigenvalue > 1 rule and inspection of the scree plot revealed that the seven–item scale was, for the sample under consideration, uni-dimensional, explaining 76% of the variance in the data. Further statistical analysis was thus based on the seven–item uni-dimensional knowledge sharing scale with a coefficient á of 0.82. The reason for the uni-dimensionality of the scale might be that the differences in the items were too subtle for the respondents to notice: in particular, the use of the word "share" might have been construed as suggesting a bi-directional, rather than uni-directional, flow of knowledge and information, thus nullifying the distinction between knowledge donating and knowledge collecting.

Organisational Citizenship Behaviour Scale

When the organisational citizenship behaviour scale (see Table 2) was subjected to item analysis the

following became apparent. Firstly, item 7 negatively correlated with the rest of the scale items, suggesting that it was measuring something else not being measured by the other items. Secondly, item 15 appears to be reverse worded, especially when read in conjunction with all the other items. Nevertheless, even reversing it gave a rather low correlation: the problem here might be that some people read it as being reverse–worded, while others did not, so that in the end it did not measure anything. Dropping this item would improve the scale's Cronbach's coefficient á substantially. Thirdly, item 16 gave a rather low correlation figure, and dropping it would improve coefficient á substantially. This item differs from the other items in that it asks what the respondent thinks about his or her colleagues, while all the other items are about the respondent him–or herself. It was thus decided that items 7, 15, and 16 be dropped from the organisational citizenship behaviour scale. For the remaining items, principal axis factoring with both the Eigenvalue > 1 rule and the scree test revealed that the scale was uni-dimensional, and explained 72% of the variance in the data: this scale was used in the ensuing statistical testing of the various hypotheses. The scale had a high Cronbach's coefficient á of 0.86.

Job Satisfaction Scale

Item analysis indicated that dropping item 4 from the job satisfaction scale (see Table 3) would improve the scale's Cronbach's coefficient á from 0.77 to 0.79, while dropping item 3 would improve it to 0.81. Item 3 in the job satisfaction scale read: 'I am seldom bored with my job'. Because respondents were not mother tongue English speakers, it is possible that they might have been confused by the word 'seldom'. Item 4, on the other hand, included the word not: 'I would not consider taking another kind of job'. Although this item was not reverse worded, it differed from the other items, such as 'I find real enjoyment in my job', that did not include a negation. As such, respondents may have mistakenly misconstrued it as being reverse worded, and responded to it accordingly. Consequently, it was decided that both items 3 and 4 be dropped from the job satisfaction scale, leaving a four-item scale with a robust Cronbach's coefficient á of 0.86.

Table 5: Means, Standard Deviations, And Reliability and Correlation Analysis Results

		Mean	Std. Dev.	α	1	2	3
1	JOB	2.60	0.66	0.86			
2	AOC	2.65	0.55	0.79	0.45**		
3	OCB	3.05	0.40	0.86	0.14*	0.28**	
4	KSB	3.09	0.43	0.82	0.07	0.10	0.20**

Organisational Commitment Scale

When the organisational commitment scale (see Table 4) was subjected to item analysis, the results showed that item 4 in the scale pulled down Cronbach's coefficient á somewhat; dropping this item from the scale would raise coefficient á from 0.71 to 0.79. More significantly, this item exhibited a negative correlation (-0.18) with the rest of the scale items, suggesting that it was not measuring what the other items were measuring. The item read 'I think I could easily become as attached to another school as I am to this one', and might have been measuring a general personality characteristic, i.e. 'I am like that ... I get attached to schools, and it is not because of the school, that is the way I am'. The item was reverse worded to begin with, and was coded as such in the initial analysis; however, even when treating it as 'not reverse worded', its correlation with the other scale items, at 0.18, remained very low. Item 4 was thus dropped from the organisational commitment scale.

Hypotheses Testing

The Pearson product moment correlation was used to quantify the strength of the relationship between knowledge sharing behaviour and organisational citizenship behaviour. The correlation between these two constructs was statistically significant at the p = 0.01 level, with a Pearson correlation coefficient of 0.20. Thus, H1 was supported, albeit weakly.

Multiple linear regression was used to test the relationships between job satisfaction and organisational commitment on the one hand, and organisational citizenship behaviour on the other (see Table 6). The multiple correlation coefficient R was 0.28, indicating that less than 1% of the variance of organisational citizenship behaviour is accounted for by the linear combination of job satisfaction and organisational commitment. This figure is rather low, suggesting that, for the sample investigated here, taken together, job satisfaction and organisational commitment do not significantly influence organisational citizenship behaviour.

Table 6: Results of Hypotheses Testing

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.282[a]	.080	.073	.39039	.080	12.032	2	278	.000
2	.105[b]	.011	.004	.43245	.011	1.541	2	278	.216

Table 6 (a): Summary of regression models

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.668	2	1.834	12.032	.000[a]
	Residual	42.368	278	.152		
	Total	46.036	280			
2	Regression	.576	2	.288	1.541	.216[b]
	Residual	51.989	278	.187		
	Total	52.566	280			

Table 6 (b) ANOVA results from the regression analysis

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
(Constant)	2.484	.125		19.892	.000					
JOB	.006	.040	.009	.142	.888	.135	.008	.008	.795	1.257
AOC	.207	.048	.278	4.309	.000	.282	.250	.248	.795	1.257
(Constant)	2.852	.138		20.642	.000					
JOB	.018	.044	.028	.414	.679	.068	.025	.025	.795	1.259
AOC	.071	.053	.089	1.333	.184	.102	.080	.080	.795	1.259

Table 6 (c) Regression coefficients

(For model 1, job satisfaction and organisational commitment were used to predict organisational citizenship behavior; for model 2, job satisfaction and organisational commitment were used to predict knowledge sharing behavior)

It was interesting to note, however, that in the regression model, although job satisfaction was not a significant predictor of organisational citizenship behaviour, the influence of organisational commitment on organisational citizenship behaviour was statistically significant ($p < 0.001$). To further investigate the relationship between organisational commitment and organisational citizenship behaviour, job satisfaction was dropped from the regression model. While both R and R^2 remained unchanged at 0.282 and 0.077 respectively, the adjusted R^2 improved from 0.073 to 0.076. Furthermore, both the unstandardised and standardised coefficients also improved, the former from 0.041 to 0.421, and the latter from 0.278 to 0.282. These results indicate that although H2 was not supported, H3 was. At least, for the sample considered in the current study, job satisfaction and organisational citizenship behaviour appear to be unrelated, while organisational commitment positively influences organisational citizenship behaviour.

Multiple linear regression was also used to test the relationships between job satisfaction and organisational commitment on the one hand, and knowledge sharing behaviour on the other (see Table 6). The multiple correlation coefficient R was 0.105, indicating that approximately 1% of the variance of knowledge sharing behaviour is accounted for by the linear combination of job satisfaction and organisational commitment. This figure is very low, suggesting that, for the sample considered here, taken together, job satisfaction and organisational commitment do not significantly influence knowledge sharing behaviour. Furthermore, neither of the two predictors was statistically significant at the $p = 0.05$ level. Thus, hypotheses H4 and H5 were not supported, i.e. neither job satisfaction nor organisational commitment was related to knowledge sharing behaviour.

The final hypothesis H6 was concerned with the relationship between job satisfaction and organisational commitment. Pearson's correlation coefficient was used to quantify the strength of the relationship between these two variables. The hypothesis was supported, with a correlation coefficient of 0.45, $p<0.01$. The results of hypotheses testing appear in table 6.

Discussion

This study contributes to the growing body of literature that seeks to place knowledge management concepts such as knowledge sharing behaviour in the broader organisational behaviour literature, in the process helping the knowledge management discipline break away from the shackles of technology that were so evident in the early years of the discipline (see Wilson, 2002). The main thesis of the study is that knowledge sharing is a type of organisational citizenship behaviour, and that, as such: (i) the two should be strongly positively correlated, and (ii) predictors of the latter should also be predictors of the former. The study proposes a tentative model that seeks to explain how knowledge sharing behaviour can be fostered in organisational contexts, and also opens the way for research into how other factors that are known to be correlated to prosocial behaviour may influence organisational knowledge sharing.

The first research question sought to investigate the relationship between knowledge sharing behaviour and organisational citizenship behaviour. In a real sense, this question is the crux of the current study: the study posits that knowledge sharing behaviour is a kind of organisational citizenship behaviour, and the two should thus be correlated. The other two variables, job satisfaction and organisational commitment were brought in to buttress the arguments that knowledge sharing behaviour is a kind of organisational citizenship behaviour: if the hypothesis holds, then one would expect that predictors of organisational citizenship behaviour would also be predictors of knowledge sharing behaviour. As expected, knowledge sharing behaviour and organisational citizenship behaviour were significantly positively correlated, although only moderately so ($r = 0.20$). Both the magnitude and direction of the correlation do suggest that the two are in fact related, though perhaps not to the extent that one could conclude that knowledge sharing behaviour is a kind of organisational citizenship behaviour. Nevertheless, the study does suggest that the organisational citizenship behaviour construct has a place in knowledge sharing research: further research would be necessary to explore this relationship further. It would seem, though, that within the school environment, there would be value in

encouraging organisational citizenship behaviour in order to enhance – even if only moderately – knowledge sharing behaviour.

The second and third research questions focused on the relationships between job satisfaction and organisational commitment on the one hand, and organisational citizenship behaviour on the other. Specifically, it was hypothesised that both job satisfaction and organisational commitment would strongly predict organisational citizenship behaviour. As it turned out, job satisfaction was not related to organisational citizenship behaviour; organisational commitment, however, did appear moderately related to organisational citizenship behaviour. These findings go against the conventional wisdom according to which 'there is little question that the affective and cognitive components of job attitudes are related to [organisational citizenship behaviours]' (Penner, Midili and Kegelmeyer, 1997:112). Further research would be needed to clarify whether the results were just a fluke, or whether they generally hold among teachers – and other employees – in the Botswana context.

Other variables may also be moderating the relationships between the workplace attitudes investigated in this study – particularly job satisfaction – and organisational citizenship behaviour. According to Baron and Kenney (1986:1174), 'in general terms, a moderator is a qualitative (e.g. sex, race, class) or quantitative (e.g. level of reward) variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable'. For instance, the study by Foote and Tang (2008) found team commitment to be a significant moderator of the relationship between job satisfaction and organisational citizenship behaviour: while job satisfaction and organisational citizenship behaviour were significantly related, the relationship was found to be stronger when team commitment was higher. Moderation may also have been at play in the current study: it is plausible that among the participants of the current study some other variable or variables not directly investigated in the study – such as organisational culture, social norms, and team (in this context, department) commitment – moderated the relationship between job satisfaction and organisational citizenship behaviour. This would help explain the apparent lack of relationship between job satisfaction and organisational citizenship behaviour. Furthermore, moderation may also account for the moderate, rather than robust, correlation between organisational commitment and organisational citizenship behaviour: indeed, Cohen (2006) detected a moderating effect of culture on the relationship between organisational commitment and organisational citizenship behaviour.

The fourth and fifth research questions focused on the relationship between job satisfaction and organisational commitment on the one hand, and knowledge sharing behaviour on the other. Specifically, it was hypothesized that both job satisfaction and organisational commitment would strongly predict knowledge sharing behaviour. These hypotheses were predicated on the argument that knowledge sharing behaviour being a type of organisational citizenship behaviour, if job satisfaction and organisational commitment strongly predicted organisational citizenship behaviour (as the literature suggested), then they would also strongly predict knowledge sharing behaviour. As it turned out, both hypothesis H4 and hypothesis H5 were not supported: neither job satisfaction nor organisational commitment was related to knowledge sharing behaviour. Further research would be needed to clarify the relationships between job satisfaction and organisational commitment on the one hand, and knowledge sharing behaviour on the other, among secondary school teachers in Botswana.

As in the case of the relationship between job satisfaction and organisational citizenship behaviour, here, too, it would be important to keep the potential role of moderation in mind. Important antecedents of knowledge sharing behaviour reported in the literature include such variables as self-efficacy (Cabrera, Collins and Salgado, 2006), evaluation apprehension (Boardia, Irmer and Abusah, 2006), and trust (Wang, Lee, Lin and Zhuo, 2007). Thus, for instance, even in cases where job satisfaction is high, if self-efficacy is low, then it seems plausible that both knowledge donating and knowledge collecting would be compromised: while generally satisfied with her job, a teacher with low self-efficacy may be reluctant to either donate or seek knowledge for, among other things, fear of being considered incompetent by her colleagues. Similarly,

the opportunity to share would influence actual sharing: highly satisfied and committed teachers may be eager to share knowledge, but be denied to do so by a dearth of knowledge sharing opportunities. In general, all the factors identified in the literature review as important antecedents of knowledge sharing behaviour may potentially moderate the relationship between each of job satisfaction and organisational commitment and knowledge sharing behaviour. An important avenue of research, therefore, would be to investigate whether these factors do in fact moderate the relationships between workplace attitudes (job satisfaction and organisational commitment) and knowledge sharing behaviour.

In the case of the relationship between organisational commitment and knowledge sharing behaviour, as well as moderation, there is another dimension that must be borne in mind. Although in this study the focus was on organisational (i.e. school) commitment, teachers are employees not of the school, but of the Department of Secondary Education, and are often transferred from one school to another. Consequently, teachers might have found it difficult to answer the survey questions on commitment, where the seven items on commitment all asked participants to report their feelings in relation to this 'this school' or my 'school'. More generally, an important consideration to keep in mind is that, as Reichers (1985:471) persuasively argues, 'organisations are coalitions of entities' and that 'employees of organisations are themselves aware of the multiple sets of goals and values that different coalitions espouse'; as such commitment in the workplace may be directed at different targets. Indeed, according to Meyer, Becker and Vandenberghe (2004:993), a 'major development in commitment theory has been the recognition that commitment can be directed toward various targets, or foci, of relevance to workplace behaviour, including the organisation, occupation, supervisor, team, program, the customer and union'. For instance, in the study by Redman and Snape (2005:301) the co-workers, the union, the union representative, customers, and even the immediate boss were found to be important foci of commitment, separate from 'global' commitment to the organisation as a whole.

It is thus possible that while this study sought to measure 'organisational' commitment, respondents may have been thinking in terms of a different type of commitment, so that in the end the relationship being quantified was in fact not between organisational commitment and organisational citizenship behaviour. Thus, although teachers participating in this study generally appeared to be committed to their schools, their commitment may in fact have been directed at other targets, such as supervisors and the profession, and not necessarily their schools. Consequently, this study may have been unwittingly measuring the relationship between some of these other commitments and knowledge sharing behaviour. It would be interesting, therefore, to try and disentangle commitment among teachers, and determine which commitment in particular – if any – is related to knowledge sharing behaviour.

The sixth research question sought to investigate the relationship between job satisfaction and organisational commitment. In the extant organisational behaviour literature, a robust correlation is usually reported between these two variables; in their 1990 meta-analytic review of the then extant literature on the antecedents, correlates, and consequences of organisational commitment, Mathieu and Zajac (1990), cited in Spector (2003), reported a mean correlation of 0.49 between (global) job satisfaction and organisational commitment. This figure is quite similar to the 0.45 obtained in the current study, indicating that in the sample considered here, just as in samples considered elsewhere, job satisfaction and organisational commitment are robustly positively correlated.

Conclusions and Recommendations

Arguing that knowledge sharing behaviour is in fact a type of organisational citizenship behaviour, this study developed and tested a model linking together knowledge sharing behaviour and organisational citizenship behaviour to job satisfaction and organisational commitment, both of which have generally been shown to be strong predictors of organisational citizenship behaviour. Job satisfaction and organisational commitment robustly positively correlated, which is in agreement with results reported elsewhere in the literature. Surprisingly,

both job satisfaction and organisational commitment were not related to knowledge sharing behaviour. Furthermore, although correlation analysis suggested that both job satisfaction and organisational commitment were positively related to organisational citizenship behaviour, regression analysis indicated that only organisational commitment would be useful for predictive purposes. While, as predicted, knowledge sharing behaviour positively correlated with organisational citizenship behaviour, the correlation was only modest, and cannot thus be used to support the assertion that the former is a subset of the latter. Nevertheless, the existence and direction of the relationship is enticing, and further work exploring it would be worthwhile.

The results of this study have some important implications for organisational managers. While job satisfaction was not found to be related to either organisational citizenship behaviour or knowledge sharing behaviour, this may be an artefact of the sample considered here; as such, organisational managers should not be tempted to conclude that job satisfaction does not matter anymore. Organisational commitment positively correlated with organisational citizenship behaviour. This underscores the importance of nurturing the former in order to grow the latter; nevertheless, a word of caution is in order because – as indicated earlier – too strong a commitment to one school may prove problematic when a teacher is transferred from one school to another. This may be countered by focusing on increasing occupational commitment, so that even when a teacher is transferred to another school, because such an individual remains in the teaching profession, then the negative effects of commitment to the old school are mitigated. Furthermore, organisational citizenship behaviour and knowledge sharing behaviour were positively significantly correlated, suggesting that other antecedents of the former, such as organisational justice and leader supportiveness, may also be used to leverage the latter.

Science works by replication, and a study that investigates the relationships among knowledge sharing behaviour, organisational citizenship behaviour, job satisfaction, and organisational commitment under similar conditions to those of the current study would be invaluable. However, it is also important to remember that the bigger question is not so much whether organisational citizenship behaviour and knowledge sharing behaviour are related among Botswana secondary school teachers, but whether the two are related in organisational contexts in general. As such, it would be instructive to extend the work reported in this thesis by sampling people in other work environments, across different industries and cultures, in both the public and private sectors.

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Use of Scientific Information Sources by Policy Makers in the Science and Technology Sector of Nigeria

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Abstract

This study investigated how policy makers in Nigerian public agencies that have mandates for policy making and implementation in the science and technology sector access and use information sources in their activities. A questionnaire was used to collect data from 121 of the policy makers to find out the sources and types of information they use and their perceptions of the availability and accessibility of the sources. The policy makers reported that the most available sources were newspapers (88.6% of the respondents) and colleagues/ superiors (82.9%), while the most accessible sources were colleagues/superiors (70.0%). The most inaccessible information sources were student theses and dissertations (40%), reports from research institutes (37.1%) and books of abstract (35.7%). The results imply that soft information sources and personal contact are the most available and accessible information sources. The policy makers suggested that improved availability and accessibility of information produced in the research institutes and universities could help strengthen their policy making activities. This could be achieved through the building of local institutional repositories and databases of scientific research and publications, as well as joint conferences and workshops involving policy makers and scientists/researchers in the research institutes and universities.

Keywords

Science and technology, information sources, policy makers, information access, information use, Nigeria

Introduction

Making information sources readily available and accessible to policy makers in public institutions could significantly increase the effectiveness of public policies, such policies being vital elements in development efforts. Well thought out policies are central to achieving key national goals such as alleviating poverty, raising living standards, creating good jobs, ensuring security, strengthening education, as well as improving public health and protecting the environment (Aiyepeku, 1983). Nevertheless, the utilisation and impact of information in policy making are universally often difficult to measure objectively. Moreover, policy-relevant research seldom has an immediate or direct impact on government decisions, especially in most developing countries (Porter and Hicks, 1996).

About a decade ago, Adeya (2000) noted that the use of scientific and other information sources by policy makers in Africa was very low despite increasing global consciousness that information is a *sine qua non* for socio-economic development. In Nigeria, Olembo (2002) has shown that there is a gap between the worlds of policy makers and researchers because research outputs from research institutes and universities are either

not available or not accessible to policy makers. Onatola (2004) has also noted that the resultant low integration of relevant locally produced scientific information sources into national policies could be considered one of the limiting factors in most development plans.

Olomola (2005) showed that in Nigeria, although the role of research in policy decision process seems to have been recognised, research input into policy making processes is rather limited. He observed that Nigerian policy makers take several decisions without research input while several research studies that have no policy relevance are being conducted in the universities and research institutions. Policy makers in the public service generally rely so much on consensus information such as in-house memoranda and committee reports (Aiyepeku, 1983), just as they often use information that comes in the form of directives from the government. Colleagues or superiors also constitute veritable sources of scientific information to workers. These sources have the advantages of reliability, availability and relative ease of accessibility; and they provide information that could be readily used without much further processing. Personal contacts with researchers, research institutes or universities with whom policy makers have established either personal or formal relationship also provide useful information.

Information sources exhibit different attributes that make them desired or avoided by policy makers. In-house memoranda or colleagues, for instance, may serve as quick sources of information for the policy makers. Meta information sources, such as abstracts and indexes, usually serve window-shopping purposes, and policy makers might not be keen to use them either due to lack of the ability of time to use them or the means to acquire the relevant sources listed in the indexes and abstracts. Moreover, the dwindling library acquisition and subscription budgets often mean that most of the sources listed in meta sources might not even be available from the institutional or local libraries.

Science and technology policies in Nigeria are made in the Federal Ministry of Science and Technology, which is also the supervising ministry in the sector, as well as in two research institutes affiliated to the Ministry, namely: National Information Technology Development Agency (NITDA) and National Agency for Engineering Infrastructure (NACENI). In addition, there are about eighteen research institutes mandated to carry out research and provide research and development information and products to the decision-makers in both the public and the private sectors.

Djenchuraev (2003) described scientific and technical information (STI) broadly as information derived primarily from research or researchers, and from the development and monitoring activities of scientists and engineers. Hard research -based sources such as reports from research institutes, learned journals, students' theses and dissertations, as well as books, monographs and conference proceedings constitute sources from which the policy makers could extract STI. Meta sources such as abstracts, indexes, subject specialists or authorities also provide information that could guide policy makers. Some of these sources could be obtained from the institutional libraries in the ministry and science and technology institutes and agencies. In the digital era, it is expected that some of the required STI would become accessible through the Internet.

The availability and accessibility of information sources might not be considered relevant research issues in developed countries where the information resources required to perform various policy making tasks are available and where infrastructure for accessing the resources is available. The same does not apply to Nigeria and probably many other developing countries, and these differences underlie the concepts of information rich and poor, and the digital divide. In the developing countries, factors such as location of the facilities, ability to use the sources, time and organisational regulations, and forms of the sources, among others may pose obstacles to using available information sources. In the specific context of Nigeria, Aguolu and Aguolu (2002) have shown that the existence of information sources does not guarantee that they will be accessible to particular users.

Literature Review

Science and Technology (S&T), Science and Technology Information (STI) Policies

Science is defined as generalisable and replicable knowledge of nature, usually resulting from basic science performed in universities or institutions of near status, and reproduced in refereed and published papers (UNECA, 1997). Science also refers to any body of knowledge created through formal processes of research. Technology, on its own part, refers to the knowledge of (products, processes, services) usually resulting from applied research, development and related activities in business firms and other institutions, and embodied in the production of the artefacts themselves. In other words, technology refers to the application of science with the aim of making a difference to the world around us (UNECA, 1997). Musoke (2002) suggests that technology is everything – equipment, knowledge, including information about all kinds of skills, processes and products, plus institutional and organisational know-how. This means that science and technology (S&T) are sometimes inseparable concepts-new scientific knowledge may lead to technological development, while a technological need also may prompt scientific investigation. Science and technology help humans to understand and conceptualise their world and fashion out tools and means by which humans go about their daily lives and satisfy basic needs.

Scientific information derives primarily from research, development, and monitoring of the activities of scientists and engineers and other individuals supporting their work (Djenchuraev, 2003). Nwagwu's (2006) definition of STI as "all information developed from research undertakings in all science and technology fields" somewhat broadens this definition. This broad view of science and technology information permits an expanded understanding of sources of information that are useful to the policy makers.

A policy could be defined as a specific decision or set of decisions designed to carry out a course of action (Mudenda, 1989). It could also be viewed as an official statement with a specific purpose, a set of objectives, defined goals and outcomes, and a set of criteria for choosing among competing alternatives (Abdalla, 2003). Policy making involves those in positions of authority making choices on behalf of their patrons within the sector they supervise. The outcomes of policy making are in many forms, ranging from national policies made by the government to professional guidelines by professional bodies. Although, this usage of the terms, policy and policy making, appears very broad, but it has advantages in the study of knowledge utilisation, and has also informed a series of such studies (Buxton and Hanney, 2000; Hanney and Packwood 2000).

Evolution of S&T and STI in Nigeria

The development of science and technology sector in Nigeria can be elucidated by an overview of the evolution of the supervising ministry- the Federal Ministry of Science and Technology. The Ministry in its present form started as the Nigerian Council for Science and Technology (NCST) in 1970, and became the National Science and Technology Development Agency (NSTDA) in 1977. In 1980, the civilian government of Shehu Shagari (1979-1983) created the Federal Ministry of Science and Technology (FMS&T), which absorbed the functions of NSTDA. However, a change in government through a military *coup d'etat* in 1983 brought in the General Muhammadu Buhari (1983-1984) government which merged the Federal Ministry of Science and Technology with the Federal Ministry of Education to form the newly created Federal Ministry of Education, Science and Technology. The General Ibrahim Babaginda government (1984-1993) restored the independent status of Ministry of Science and Technology in 1985, a status the Ministry enjoys till date.

The mandate and functions of the FMS&T have been outlined by Chidi (2007) as follows: initiation, formulation, monitoring, and review of the national policy on science and technology issues, including harvesting research and other information from all stakeholders. Nigeria's first National Science and Technology Policy was formulated in 1986 on the realisation that overall national development could only be sustained through the effective application of scientific and technological skills for the production of goods and services. The FMS&T has recorded some achievements in the past few years, including investment in the launching of Nigeria Sat-1, launched in September 2003. The Ministry has also recently initiated a linkage framework with research institutions and stakeholders, which arises from a growing realisation

that research information is critical to science and technology policies and that increased access and utilisation of information will definitely strengthen the sector's activities.

Sources and Uses of Scientific Information to Policy Makers

There are many sources of information to policy makers. Adams and Hairston (1995) identified textbooks, published scientific papers, conference proceedings, computer models, position papers from professional or advocacy groups, government agency staff, industry employees, consultants, or people with practical experience and "conventional wisdom" as common sources of information for policy makers. Aiyepeku (1983) studied the perception and utilisation of information by policy makers in Nigeria, and discovered that the most important source of information for the Nigerian policy maker is the confidential file where the well-known in-house memoranda are contained. According to him, more than 90% of the respondents used 'personal sources', suggesting a heavy dependence on 'opinion leaders' and 'colleagues'. The study also showed that policy makers identified timeliness and availability as two most important factors that enhanced their utilisation of information.

There are diverse factors that affect the use or non-use of information sources by policy makers. Schwartz (1983) has shown that finding information that is relevant to solve a problem in developing countries is not easy, because of the difficulty in identifying, locating, retrieving and understanding the information. Glover (2000) pointed out that factors such as the design and dissemination of research, quality of the research, including the reliability of its methodology, have an important bearing on research report credibility and impact. According to Narcise *et al* (2002), use of information is limited by factors like inadequate technical capacity with regard to human, equipment and financial resources resulting to significant gaps in scientific knowledge; profusion of data that is not evaluated optimally; incomparable and/or unreliable data; lack of mechanisms for information sharing and integration and reluctance of institutions to share data. Others are failure to package information into understandable forms for managers and decision-makers, failure to translate information to management actions and decisions, and limited understanding of the value of information by some local leaders.

An interesting finding was also made by Abdalla (2003) when he showed that factors like cultural values, attitudes, tradition-bound behaviour, and fear of ostracisation, power relations and vested interests may negatively influence policy makers, causing them to stick to existing routines of actions rather than make informed but risky decisions. Recently, Chandrika (2007) showed that factors such as relevance of research findings, timeliness, quality and accuracy, objectivity of research documentation and simplicity of language of research findings encourage, to a great extent, the use of research reports by policy makers for decision-making.

Methodology

A sample survey research design was used to collect data from the senior staff of the Federal Ministry of Science and Technology (FMS&T) and the two policy making agencies under the ministry, namely: National Information Technology Development Agency (NITDA), and the National Agency for Science and Engineering Infrastructure (NASENI). From the staff records which were obtained from the directors of personnel in the three organisations, a sample frame of policy makers who had at least a first degree or its equivalent numbering 221 was constructed and a random sample of 121 was selected. Data was collected using a questionnaire and an oral interview. The questionnaire was administered personally by the second author and her assistants, while the oral interviews were conducted by the first author.

The questionnaire was aimed at eliciting information on (i) personal background of the respondents, (ii) types of sources used (iii) perceptions about availability, accessibility and uses of information sources and (iv) the associated constraints.

The questionnaire was subjected to face validation among scholars at the Africa Regional Centre for Information Science, University of Ibadan. The scholars noted the possibility of

respondents confusing the constructs of availability and accessibility, which led to operational definition of the two terms being provided in the final questionnaire. Moreover, the administration of the questionnaire by the researchers themselves enabled them to clarify information about some of the variables, as needed.

Regression analysis was employed to gauge whether the availability or accessibility of information sources was a significant predictor of their use, as well as whether perception about availability and accessibility can be explained by the demographic characteristics of the respondents, placing our significance level at $p<0.05$.

Results

Background Information

One hundred and twenty-one copies of the questionnaire were distributed, and all were returned. This complete return rate was made possible by the readiness of the policy makers to participate in the study, as well as personal follow up mounted by the authors.

Table 1 summarises the demographic and organisational characteristics of the respondents. The respondents included personnel from the following departments: Administration and Supply (10.0%), Finance and Accounts (15.7%), Planning, Research and Statistics (8.6%), Physical and Life Sciences (17.1%) and Chemical Technology and Energy Research (11.4%). Others are Technology Acquisition Assessment (8.6%), Science and Technology Promotion (17.1%) and Information and Communication Technologies (7.1%).

The sample also included mainly persons above 50 years (55.7%), followed by those who are less than 40 years (37.2%). Majority of the policy makers had spent less than 10 years in employment. More than half possessed first degree; about 25% possessed master's degrees while less 7% had doctoral degree. Finally, out of every ten policy makers, as many as eight were males.

Table 1: Organisational and Demographic Characteristics of Respondents (N=121)

Variable	Measurement	Frequency	%	Mean
Department	Administration and Supply	12	10.0	
	Finance and Accounts	19	15.7	
	Planning Research & Policy Analysis	10	8.6	
	Physical and Life Science	21	17.1	
	Chemical Technology & Energy Research	14	11.4	
	Technology Acquisition & Assessment	10	8.6	
	Science and Technology Promotion	21	17.1	
	ICT	9	7.1	
	Not indicated	5	4.4	
Age	Above 60 years	0	0.0	42.19
	50-60 years	67	55.7	
	40-50 years	10	7.1	
	Less than 40 years	44	37.2	
Working experience	Below 10 years	64	52.9	14.5
	10-15 years	9	7.1	
	15-20 years	21	17.1	
	20-25 years	16	12.9	
	Above 25 years	11	10.0	
Education qualification	Bachelor's degree	73	60.0	
	Master's degree	30	25.7	
	Doctoral degree	9	7.1	
	Diploma	5	4.3	
	Others	4	2.9	
Gender	Male	117	81.4	
	Female	4	8.6	

Types/Forms of Information Sources Consulted

Almost all of the policy makers (95.7%) affirmed that they consulted information sources during policy decision making.

The policy makers were then asked to indicate which of seventeen listed information sources they consulted. The result is shown in Table 2. Each of the sources received affirmative responses from at least 55% of the respondents, although colleagues/ superiors were reportedly the most consulted (92.6%). The next three sources of information, namely: in-house memoranda, government opinions, and committee were either job-related, forms of government opinions or information arising from consensus, and each was reportedly used by not less than 76% of the respondents. Information developed from formal research institutions or research-related activities and institutions constituted the next seven sources, and they were reportedly used by not less than 60% of the respondents. The Internet, student theses and dissertations, and meta-information sources such as subject specialists and indexes are the least used each by less than 60% of the respondents.

Table 2: Types of Information Sources Consulted (N=121)

Information Sources	Yes	%
Colleagues or superiors	112	92.6
In-house memoranda	97	80.2
Government opinions	94	77.7
Committee	92	76.0
Newspapers	89	73.6
Report from research institutes	87	71.9
Books and monographs	85	70.2
Research libraries	81	66.9
Conference proceedings	79	65.3
Researchers	78	64.5
Learned journals	75	62.0
Internet	72	59.5
Books of abstract	72	59.5
Subject specialists or authorities	70	57.9
Students thesis and dissertation	70	57.9
Indexes	67	55.4

Frequency of Use of Information Sources

The study inquired from the respondents the frequency of use of the different sources, and they selected from a list of the seventeen sources whose frequency of use was measured with very often, often, not often or not at all. Table 3 shows the result. Colleagues or superiors retained the first position with about 79.0% reporting that they consulted them very often. The Internet moved up many ranks ahead of other items in the list reportedly consulted very often by 72.9% of the respondents, followed by in-house memoranda (68.6%) and government opinions (62.9%).

Use of reports from research institutes and researchers came relatively very low in the list, with 58.6% and 55.7% reporting consulting them respectively. Books and monographs (47.2%), committees (47.1%) and research libraries (41.4%), each constituted sources of information used very often by less than half of the policy makers. Learned journals, subject specialists and periodicals also shared this position. Among the sources used the least were indexes (14.3%) and students' theses and dissertations (15.7%). Following this response, the perception about availability and accessibility of the information sources was investigated.

Table 3: Frequency of Consultation of Information Sources (N=121)

Information Sources	Very Often	Often	Not Often
Colleagues or superiors	78.6	4.3	2.9
Internet	72.9	14.3	1.4
In-house memoranda	68.6	18.6	1.4
Government opinions	62.9	15.7	2.9
Newspaper	62.8	24.3	2.9
Report from research Institutes	58.6	12.9	7.1
Researchers	55.7	17.1	2.9
Books and monographs	47.2	22.9	4.3
Committee	47.1	18.6	2.9
Research libraries	41.4	14.3	8.6
Conference proceedings	40.0	20.0	8.6
Learned journals	40.0	11.4	8.6
Subject specialists or authorities	40.0	10.0	7.1
Books of abstract	31.5	20.0	10.0
Students thesis and dissertation	15.7	25.7	20.0
Indexes	14.3	18.6	14.3

Availability and Accessibility of Information Sources

Table 4 revealed that the most available source was newspapers (88.6%), followed by colleagues or superiors (82.9%) and the Internet (81.4%). At least 50% of the respondents reported that government opinions, in-house memoranda, and reports from research institutes, conference proceedings, researchers and learned journals were also available. The least reportedly available sources were books of abstract (30.0%), indexes (28.6%) and students' theses and dissertations (20.0%).

Table 4: Availability of Information Sources (%)

Sources Consulted	Available	Not available	Don't Know	No Response
Newspapers	88.6	11.4	0.0	0.0
Colleagues or superiors	82.9	10.0	1.4	5.7
Internet	81.4	5.7	0.0	12.9
Government opinions (publications)	74.3	25.7	0.0	0.0
In-house memoranda	72.9	5.7	1.4	20.0
Reports from research institutes	71.4	28.6	0.0	0.0
Conference proceedings	61.4	28.6	1.4	8.6
Researchers	52.9	18.6	11.5	17.0
Learned journals	51.4	21.4	11.4	15.8
Committee	48.6	14.3	11.4	25.7
Books and monographs	47.1	2.9	31.4	18.6
Research libraries	47.1	11.4	0.0	41.5
Subject specialists or authorities	44.3	7.1	22.9	25.7
Books of abstract	30.0	38.6	1.4	30.0
Indexes	28.6	30.0	21.2	20.2
Students theses and dissertations	22.9	29.9	25.8	20.0

Exploring further, the perception of the respondents about the accessibility of these information sources was also examined, i.e., whether the respondents considered the sources as accessible to a large extent, low extent or not accessible. Table 5 shows that the sources that were reportedly most accessible to a large extent were colleagues or superiors, followed by newspapers and in-house memoranda (55.7%) each, and then the Internet (54.3%). The least accessible information sources were student theses and dissertations (40.0%), reports from research institutes (37.1%), and government opinions and books of abstract (35.7%) each. Others were learned journals (25.7%), indexes and books\monographs (22.9%) each

Table 5: Accessibility of Information Sources (%) (N=121)

Information sources	Large extent	Low Extent	Not Accessible	Don't Know
Colleagues or superiors	70.0	11.4	2.9	15.7
Newspapers	55.7	34.3	0.0	10.0
In-house memoranda	55.7	12.9	8.6	22.8
Internet	54.3	31.4	2.9	11.4
Government opinions (Publications)	40.0	35.7	2.9	21.4
Committee Reports	37.1	20.0	4.3	38.6
Researchers	35.7	22.9	5.7	35.7
Report from research Institutes	34.3	37.1	8.6	20.0
Conference proceedings	31.4	24.3	21.4	22.9
Subject specialists or authorities	25.7	31.4	10.0	32.9
Books and monographs	24.3	25.7	22.9	27.1
Learned journals	21.4	28.6	25.7	24.3
Research libraries	18.6	45.7	12.9	22.8
Indexes	17.1	27.1	22.9	32.9
Students thesis and dissertation	10.0	22.9	40.0	27.1
Books of abstract	7.1	35.7	15.7	41.5

Constraints on the Use of Science and Technology Information

What are the factors the policy makers perceive as constraints to their use of these information sources? Table 6 shows that the most frequently indicated constraint was inadequate packaging of the information (54.5%), information not being timely (53.7%), inadequate sharing and integration of information (53.7%), and problems of locating (51.3%) and retrieving the information materials (51.1%). The least frequently indicated problem was inadequate understanding of received information (39.7%) and problems with identifying information materials (43.0%). As many as two-thirds of the policy makers reported having problems with the relevance of the S&T reports to their policy needs.

Table 6: Constraints of Use of Scientific Information

	Frequency (Yes)	Percentage
Identifying	52	43.0
Locating	62	51.3
Retrieving	62	51.2
Understanding the information received	48	39.7
Quality of the research	59	48.8
Lack of sharing and integration	65	53.7
Information packaging	66	54.5
Relevance of research findings	55	45.4
Timeliness	65	53.7

Table 7 is the result of a regression analysis showing how each of the demographic characteristics of the respondents predicted the frequency of use of the sources. The table shows that only use of books of abstracts could be significantly predicted by the age of the respondents. The table also shows that neither age nor working experience was a significant predictor of use of any of the sources, although educational qualification predicted the frequency of use of books and monographs, learned journals, colleagues and superiors and Internet.

Table 7: Regression Analysis of Frequency of Use of Information Sources by Age and Working Experience

	Age			*Working Experience*			*Educational Qualification*		
	B	**SE**	**p**	**B**	**SE**	***P***	**B**	**SE**	**p**
Newspaper	0.071	0.065	0.279		0.027	0.325	-0.006	0.024	0.811
Books and monographs	-0.148	0.195	0.450		0.077	0.140	-0.071	0.069	0.303
Conference proceeding	-0.100	0.151	0.513		0.062	0.125	0.149	0.059	0.015
Learned journals	-0.611	0.537	0.263		0.234	0.214	0.578	0.217	0.011
Colleagues and superiors	-0.110	0.109	0.318		0.044	0.296	0.165	0.039	0.000
Government opinion	-0.087	0.095	0.361		0.038	0.645	0.64	0.033	0.059
Students	0.200	0.230	0.391		0.100	0.166	0.066	0.088	0.455
thesis/dissertation	-0.264	0.163	0.115		0.064	0.680	0.189	0.063	0.005
Committee reports	0.082	0.229	0.721		0.099	0.390	0.029	0.065	0.657
Libraries	-0.149	0.255	0.563		0.112	0.992	-0.083	0.080	0.309
Indexes	-0.623	0.270	0.026		0.125	0.297	-0.081	0.078	0.307
Books of abstracts	0.002	0.115	0.988		0.050	0.644	0.044	0.047	0.351
Researchers	-0.253	0.165	0.132		0.064	0.826	0.130	0.054	0.021
Books and monographs	0.066	0.106	0.534		0.044	0.343	0.008	0.035	0.826
Research reports	-0.110	0.215	0.613		0.094	0.973	0.004	0.064	0.949
Subject specialists	-0.051	0.087	0.561		0.036	0.128	0.134	0.034	0.000
Internet									

Table 8 provides further information on how the reported use of each of the information sources by the policy makers is predicted by the policy makers' perception of the availability or accessibility of the sources. The table shows that there is a significant relationship among the perceived availability of newspapers, colleagues, research libraries and research reports from research institutes and use of the sources ($p < 0.025$). Furthermore, the accessibility of almost all of the seventeen sources had significant relationships with their frequencies of use. The exceptions were books and monographs, colleagues/superiors, research libraries, indexes, books of abstract and reports from research institutes.

Table 8: Availability and Accessibility of Sources as Predictors of the Use of the Sources(N=121)

Sources	**Availability**			**Accessibility**		
	B	**Se**	**P**	**B**	**Se**	**P**
Newspapers	1.409	0.606	0.024	1.213	0.160	0.000
Books and monographs	0.246	0.461	0.597	0.351	0.286	0.227
Conference proceedings	0.314	0.270	0.253	0.575	0.156	0.001
Learned journals	4.495E-2	0.065	0.492	0.680	0.145	0.000
Colleagues or superiors	1.4	0.29	0.00	4.545E	0.1	0.816
Students thesis and dissertation	-1.128E	0.375	0.976	0.835	0.259	0.003
Government opinions (p)	1.590E	0.373	0.966	0.849	0.163	0.000
Committee	-0.298	0.200	0.145	1.556	0.141	0.000
In-house memoranda	-0.115	0.363	0.725	0.757	0.202	0.000
Research libraries	2.021	0.294	0.000	-0.194	0.234	0.413
Indexes	1.427	0.337	0.000	5.4E-2	0.215	0.803
Books of abstract	-0.275	0.316	0.391	0.648	0.281	0.028
Report from research institutes	1.357	0.416	0.002	0.376	0.190	0.053
Subject specialists or authorities	0.346	0.299	0.256	0.821	0.184	0.000
Researchers	-0.118	0.327	0.720	0.965	0.158	0.000
Internet	1.121	0.333	0.043	0.102	0.113	0.001

Discussion

Colleagues, superiors and personal contact sources were reportedly used more than other sources, a finding that is in consonance with Aiyepeku (1983). This is probably because policy making often requires information that is easily available and accessible, as well as information that may not require further processing or validation to use. Information reported in academic sources is not as heavily used as personal contacts, a finding that is popular in the literature (Oh, 1996). Internet sources are also not often used for policy making purposes, probably due to its information authentication weaknesses. Moreover, it might be speculated that the Internet might have a low policy-relevant content from Nigeria, a situation that could make the resource less useful to the policy makers. In the Nigerian public service, much of the policy-relevant content is created or stored offline and Web-driven networks are not popular. Meta sources such as indexes and books of abstract, which refer the information seeker to other information sources that might either not be available or not be accessible, are also not very much used. Mcharazo (2008) observed that meta sources sometimes merely serve window shopping purposes, and that targeted users might not have the requisite skill to use them. Practically, meta resources are not popular information resources in Nigeria, and the observed poor state of libraries in the ministries and poor collection management and literature control at the national level support this result. Existing indexes might be pointing to information materials that do not exist in the local libraries.

The heavy reliance on colleagues as sources of information by policy makers is understandable. A director in the Ministry of Science and Technology said during an interview that those who had worked in the ministry for long periods, or served in sensitive positions, or have access to privileged connections are crucial in getting the work done, and that the younger policy makers must often depend on the wealth of knowledge of these senior ones. However, it is not unexpected that personal contacts could provide uncritical and non-verified information, although they are easy to access, available, and yield ready-to-use information that might not require further processing before use. Reliance on personal contacts might also highlight the possible strong influence of some influential individuals in government, business or politics in matters of public policy.

The findings of the study show that the research institutes supervised by the MS&T do not seem to constitute major sources of information for the policy makers. A director in NASENI observed that policy makers prefer research information developed from the projects they commissioned themselves, which may be carried out by their own staff or in collaboration with personal contacts in the universities and research institutes. He also observed that research scientists often embark upon research not necessarily because they want to produce information relevant for policy making, but rather because the nature of their job requires that they do research. Even when the research results from the research institutes and universities are very relevant to an issue of national concern, such results might not be pertinent to national priorities at the time they are published. He noted further that most research reports also do not incorporate the wide range of social, legal, institutional and economic concerns which might be critical in integrating research findings into public policies. The reports are often too technical or quantitative, and are usually evaluated by academics and not by policy makers. All these factors, which provide support for two-communities hypothesis (Caplan, 1979), likely explained the very low use of the research from research institutes and universities by the policy makers.

The frequency of use of newspapers in this study is lower than expected. Newspaper content could rightly be considered a reflection of the pulse of the public and other stakeholders and interest groups and could be a great source of awareness information for policy makers. Hanney and Packwood (2000) have suggested that newspapers should report latest scientific findings from both local and global research before they could be good sources of policy information. Further studies are required to examine the relevance of the content of Nigerian newspapers to public policy. For instance, do they contain syntheses of scientific findings from universities and research institutes in Nigeria?

The study also found that the Internet is readily available and is frequently used in the ministry. However, the policy makers reported consulting Internet-based sources less than they did personal contacts. This might imply that the Internet is not necessarily being used to search for policy making information, but for other purposes. In the recent years, there has been some concern about the need to monitor the use of Internet in the workplace to avoid the possible negative effect of the misuse of the Internet on productivity (Wagner, 2008). Further studies are required to examine the purposes that the Internet serves for public servants, given the increasing implementation of the infrastructure in Nigerian public organisations.

Finally, of all the information sources, committee reports, books and monographs, research libraries, subject specialists or authorities, books of abstract, indexes, and students' theses and dissertations were the least reportedly available. This is related to Ochai's (1987) study which reported on the ailing state and low level of use of special libraries in the country. Nwagwu (2006) has also reported a lack of bibliographic control services in the country, highlighting the adverse consequences of this on access to information.

Conclusion and Recommendations

The information sources used by public policy makers in the science and technology are wide ranging, although information from institutional and personal contact sources appear to be used more often than information from other sources. Information from scientific research in research institutes and universities is in low use. Policy makers reported inadequate packaging, lack of information sharing and integration, and difficulty in locating and retrieving information items as the most very frequently experienced serious constraints to their use of S&T information. These findings suggest that policy makers in the S&T sector have some ideas about the information needed to coordinate the sector, but have difficulty in finding the most appropriate information materials for policy making purposes. These findings also underscore the need for meta information sources, such as indexes and books of abstract, as well as access to adequately packaged and relevant information for the policy makers.

The FMS&T has already formulated a policy on linkage between stakeholders and information producers in the sector which, if implemented successfully, will help solve the problem of identifying and locating information. The findings of this study also highlight the need for institutional repositories in the ministry, research institutes and universities, which can be networked and made accessible to policy makers and other users. Also needed are joint conferences and workshops that bring together and stimulate greater interactions among stakeholders in the sector.

The National Planning Commission also has a role to play in collating research studies from different ministries periodically, identifying suitable research components, and together with the relevant ministries, design mechanisms for joint implementation. There is also need for increased access to computers and the Internet across the rank and file of the officers in the Ministry in order to increase options for information searching and dissemination among policy making members of staff.

Finally, as a follow up on this study, more studies are required to establish, among others, the potential value of each of the information sources for policy making purposes in the sector. In particular, there is a clear need for studies that investigate the nature of research activities that go on in the research institutes as well as strategies to synchronise activities within the information needs of policy makers. In the same policy direction,an evaluative content analysis of Nigerian newspapers might provide useful insight on the relevance, quality and authoritativeness of their contents for science and technology policy making purposes.

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Perceptions by Undergraduate Students of the Environmental Conditions and Resources Availability in Selected University Libraries in Nigeria

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Abstract

The availability of adequate library resources and favourable environmental conditions in the libraries are critical factors that promote the effective use of resources in the libraries. It is from this perspective that this paper evaluated and assessed the extent to which environmental factors such as noise, ventilation and physical facilities, as well as resources availability influence the use of university libraries by undergraduate students in Nigeria. The survey research method was used to sample 1,453 undergraduate students from six selected Nigerian universities for the study. A questionnaire was the main data collection instrument, and descriptive statistics such as frequency and percentage tabulation were used in analysing the data. Results showed that environmental factors and resources availability have significant effects on the undergraduate students' use of the university libraries. The majority of the respondents expressed the need for improved environmental factors such as good ventilation, improved physical facilities and noise control in the reading areas. They also expressed the need for adequate and current library materials and information and communication technology equipment and systems in Nigerian university libraries. The findings of the study highlight the imperative for managers of Nigerian university libraries to conduct regular surveys and evaluation of their library resources and the environmental conditions under which the resources are made available for use.

Introduction

The main objectives of universities are to promote learning by students and improve human knowledge through research. A university library is the focal point of academic and research activities in the university. The objectives of a university library should support those of its parent institution and as universities worldwide seek more or less similar general objectives, the objectives of a university library invariably focus on providing information resources and conducive resource use environments in order to promote teaching, learning and research in their parent institutions.

A fundamental responsibility of a library is to procure and provide various information resources for its users. In a university library setting, the users include students, faculies, university administrators and visitors. It is usually expected that there should be adequate library resources – material (books, journals, etc), technological (processes, technology, etc), human and financial. In the first place, adequate material resources imply a well balanced collection

that meets the needs of all subjects or courses offered in the university. After all, the "availability of learning resources means (sic) ensuring their presence in Nigerian universities for immediate use" (Aguolu and Aguolu, 2002). It has been empirically demonstrated that there is a strong correlation between the size of university library collections and excellence of universities. In an assessment of the quality of American postgraduate education in the USA, the American Council on Education had noted that the adequacy of a university library collection is an index to the quality of its postgraduate study and research. It also noted that all American universities that were rated "distinguished" also "had their libraries rated "distinguished" (Carter, 1966).

Furthermore, the actual use made of a library's resources depends on the resources made available to users in the library. If the resources are not adequate for the needs of the users, it is not likely that the library will be heavily used. The generally accepted core functions of a university, according to Bolanle (1978), are to cater for the teaching of the students and for the research interests of the faculty. In order to fulfil these functions, universities rely on their libraries for the appropriate and adequate acquisition, conservation and provision of the materials required for their academic programmes. In turn, the appropriate and adequate resources would definitely attract the students to use the resources (Steele and Guha, 2000; Adebimpe and Adeniran, 2001; Edoka and Okafor, 2002; Aliyu, 2004; and Nieuwenhuysen, 2004).

The physical environment conditions of a library are essentially also resources that a library can count upon as either sources of strengths or sources of weaknesses. Environmental factors, namely: ventilation, noise and physical facilities of a library such as library furniture and lighting, are variables that are likely to influence the use of the library. Students, who dominate the user populations of academic libraries, will be encouraged to use the libraries if the library environment is conducive to intensive study and learning. Of particular focus here are the following environmental factors: ventilation, noise and physical facilities. Good ventilation should always be provided in the university libraries. Hence, Harvey (1993) admonishes librarians to carry out periodic environmental surveys in order to ensure that there is always good air circulation around the reading areas. Nock (1998) also believes that just as vision is important to learning through reading, so also is a wholesome auditory environment which is required for concentrated reading and study. To be able to concentrate on tasks in a library such as reading and writing, there is need for the control of noise, as it is generally agreed that noise and other distractions are fundamental obstacles to learning in a library.

Another important environment requirement in a library is adequate and appropriate lighting of the reading and stack areas of the library. Just as a dark room discourages entry, dark reading and stack areas in a library discourage most people, quite apart from the fact that some people are phobic of dark places.

Therefore, an ideal learning environment can be described as that in which all the learning enabling factors such as adequate ventilation, noise-free reading areas, adequate lighting and adequate furniture are provided. Nwalo (2001) had found out that environmental factors such as lighting, ventilation, reading space, conveniences and user-friendly policies have great effects on library effectiveness. Therefore, anyone trying to measure library effectiveness needs to take into consideration the environmental factors, which Nwalo (2001) referred to as "operational climate."

Thus, for effective learning to take place a conducive atmosphere is highly needed. Where a conducive atmosphere such as good lighting system, adequate ventilation and noise-free environment is not properly incorporated into a university library, this would negatively affect the users and deter learning. There is no gainsaying the fact that any learning environment must be functional in design and inviting in appearance. Library use is encouraged by adequacy of learning resources and serenity of the environment.

The preceding background information shows clearly that poor environmental factors and inadequacy of library resources could result in low level of use of the Nigerian university libraries by the students. Many studies have highlighted the outdated and inadequate resources available in Nigerian university libraries as a result of many years of underfunding of library acquisition budgets. The authors of this paper are also aware, through visits at different times to some Nigerian university

libraries, that the environmental conditions in some of the libraries are often not conducive to learning ad study. Accordingly, the study, from which this paper is developed selected some Nigerian university libraries for survey in order to ascertain the effect of the interplay of environmental factors and resources availability on undergraduate students' use of the libraries.

Literature Review

Studies have shown that some environmental factors such as, good ventilation, level of noise and physical facilities of the library such as furniture and illumination can influence students' use of library (Nock, 1998). Pierce (1980) revealed that, "it is important that study chairs be large enough for the comfort of today's users, many of whom are larger than their parents." In the same vein, Harvey (1993) stresses that in every learning environment adequate furniture is necessary for effective learning to take place. Adequate illumination of libraries which, according to Idachaba (1998), could be derived from natural light or an electric light sources is a crucial requirement in libraries. Without adequate lighting, a library cannot perform its functions, particularly when it is expected to open to users at night, as in the case of university libraries.

Good ventilation is a vital factor necessary for adequate reading and learning to take place in any university library. Therefore, functional air conditioners, ceiling fans and windows for proper ventilation in the libraries are necessary provision therein. In other words, it is important to keep an eye on the quality of air inside the library where the students spend most of their time searching for information. This effort would facilitate the students' understanding of their studies (Edwards, 2002 and Rmnathan, 2007).

Sound which is not wanted or unpleasant to the ear is called noise (Nelkon and Parker, 1995). Duncan (2000) describes noise as "unwanted sounds." Noise-free atmosphere is required for any serious academic work. This is why Shane (2007) stresses that the best sound for study is silence, especially when one needs to really concentrate. Noise has a negative effect on the students' ability to learn (Dawson, 2003).

In Nigeria, some studies have analysed and revealed the status of environmental factors and library resources in some federal university libraries. Nock (1998) observed that about 53.2 % of the respondents indicated that the reading areas of the library are inadequate, although as many as 46.3 % disagreed. However, Oyedum (2006) found out that 81.4 % of her study's respondents were dissatisfied with the reading areas of their university library, while only 18.6 % were satisfied, and that only 16.4 % of the respondents indicated that the library seats were good for reading, and only 21.4 % of the respondents indicated that the library was adequately illuminated for reading. Furthermore, 50.0 % of the respondents indicated that students' discussions in the library distract their attention, and that only 28.6% of the respondents stated that the ventilation of the library was adequate. Earlier, Nock (1998) had reported that 65.8 % of respondents in a survey indicated that generally the library was not comfortable for reading.

In a recent study, Ntui (2009) assessed the level and causes of environmental noise at the University of Calabar and concluded that noise levels in the library exceeded acceptable standards for educational institutions, constituted a serious distraction to library users, and compromised the effectiveness of study and learning processes in the library. The situation in the UNICAL library typifies what exists in most Nigerian libraries, and the library managers are often either not aware or not much worried about or powerless to do much to solve the problem.

Libraries with appropriate and adequate collections of resources will tend to be patronised and used more than libraries that lack them. Some studies of library resources availability seek to assess the nature, adequacy and balance of academic library collections in relation to the programmes of their parent universities. These perceptions may however be right or wrong. For instance, in a study of the availability of resources in university libraries, Unomah (1988) found out that students' unfamiliarity with the available library resources and their errors while searching for resources accounted for about 18.2 % of the purported unavailability of resources in the libraries.

Other studies aim to assess users' subject perceptions of the adequacy of the resources. Some studies have also revealed low patronage and use of the resources in some Nigerian university libraries. For example, Idiodi and Igbinosa (2003) stated that

library patronage was low at the University of Benin, Nigeria because only 20 % of the readers used the library and its resources the ways they are expected to be used, while 5.36 % of the readers did not use the resources of the library at all. These findings corroborate that of Bello (2000) at the University of Abuja, which revealed that 47 % of the users were irregular users, while about 5 % never used the library at all.

Previous studies have concentrated on identifying the low level of use of university libraries in Nigeria. However, not much attention has been given to the factors that are likely to be responsible for the low use of the libraries by the students. This study, therefore, investigated the status of environmental factors such as noise, ventilation and physical facilities and resources availability in Nigerian university libraries as perceived by undergraduate students. The study aimed to achieve the following objectives:

(a) To investigate undergraduate students' perceptions of the environmental factors such as noise, ventilation, physical facilities in federal university libraries in Nigeria.
(b) To investigate the undergraduate students' perceptions of resources availability factors in federal university libraries in Nigeria.
(c) To identify and recommend ways of improving the environmental factors and resource availability conditions in university libraries in Nigeria.

Methodology

The descriptive survey research was used to collect data in the study. The stratified and purposive sampling techniques were used to select six universities from the population of Nigerian universities, owned by the Federal Government, that had been stratified by the time period they were established – two each from the 'first generation' universities (established between 1948 and 1969), 'second generation' universities (established between 1970 and 1979) and 'third generation' universities (established from 1980s to date). The universities are: University of Ibadan (UI) and Ahmadu Bello University, Zaria (ABU) – first-generation universities selected from the South-West and North-West zones respectively; University of Jos (UNIJOS) and the University of Maiduguri (UNIMAID) – second-generation universities selected from North-Central and North-East zones, respectively); and University of Uyo (UNIUYO) and University of Abuja (UNIABUJA) – third-generation universities selected from the South-South zone and the Federal Capital Territory, respectively. Thus, the South-East zone is the only one that did not have a representative university in the sample of universities.

Furthermore, six academic faculties and two academic departments in each of the six faculties were selected from each of the universities. The faculties are Arts, Education, Engineering/ Technology, Law, Science and Social Sciences. In order to ensure balanced representation of the undergraduate students in the universities, the students selected for the questionnaire survey were proportionately selected from each university based on their faculties, departments and levels of study. The students were selected for the study through random sampling methods from the following departments: Physics, Biochemistry, Chemistry, Mathematics, Economics, Mass Communication, Theatre Arts, Music, History, English, Public and International Law, Library, Archival and Information Studies, Vocational and Technical Education, Private and Business Law, Physical and Health Education, Sharia Law, Political Science, Science and Technology Education, Special Education, Religious Studies, Archeaology and Anthropology, Communication and Language Arts, Computer Science, Statistics, Teacher Education, Human Kinetics and Health Education, Creative Arts, Chemical Engineering, Electrical Engineering, Mechanical Engineering, Civil Engineering, Food Technology, and Agricultural Engineering. The sub-sample sizes for the six universities were: UI (202 students), ABU (199), UNIJOS (342), UNIMAID (355), UNIUYO (206) and UNIABUJA (149), giving a total sample of 1,453 students.

Questionnaire, interview and observation instruments were used to collect data for the study. Questions elicited information on the students' perceptions of the nature and the effects of different library environmental and resources availability factors on their use of their university libraries. The university librarians of the universities selected for the study were interviewed to obtain information on collection sizes and currency and the physical facilities available in their libraries. Direct

observations were also undertaken by the researchers to assess the available physical facilities and the shelving patterns in the university libraries.

Data Analysis

In order to be able to assess the students' perceptions of the levels of resource availability and environmental variables, as well as their perceptions of how these variables affect their use of their university libraries, the questionnaire asked the students to indicate levels of agreement or disagreement with various statements concerning the variables. The students were asked to use 4-point Likert type response scales, labelled and coded as follows: 1 (Strongly Disagree), 2 (Disagree) 3 (Agree) 4 (Strongly Agree).

The average of the frequency of SA (4) and A (3) options as well as that of D (2) and SD (1) options in each of the universities selected for the study were calculated and used to present the results. The results are presented in Tables I to IV

Noise

Noise

The respondents were requested to indicate whether the library reading rooms are normally quiet. Just above half (56.3 %) of the respondents agreed or strongly agreed that the reading rooms in their university libraries were normally quiet, while 43.6 % of them disagreed. Although the majority agreed that the reading rooms were usually quiet, it was only a narrow majority, and too high a proportion felt otherwise. From the table, the main sources of distracting noises in the reading rooms are noisy fans (with 81.1 % of the respondents disagreeing or strongly disagreeing that they are not noisy), noise from chairs when moved (with 79.3 % of the respondents disagreeing or strongly disagreeing that they are not noisy), and talk within the library (with 66.9 % of the respondents disagreeing or strongly disagreeing that they are not noisy). Less than about a quarter of the respondents perceived distracting noise from other sources such as mobile phones, footsteps and discussions by library users.

Table 1: Students' Perceptions of Noise in their Libraries

S/N	Statements	N	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	$\overline{X}$	Standard Deviation
1	The university reading rooms are normally quiet	1,453	159 (10.9)	660 (45.4)	416 (28.6)	218 (15.0)	2.52	.87
2	Library users don't discuss in the library	1,453	277 (19.1)	808 (55.6)	263 (18.1)	105 (7.2)	2.86	.80
3	Readers are not distracted by the footsteps of other users	1,453	376 (25.9)	796 (54.8)	210 (14.5)	71 (4.9)	3.01	.77
4	The library fans are not noisy	1,453	68 (4.7)	207 (14.2)	947 (65.2)	231 (15.9)	2.07	.69
5	The library staff don't disturb the library users with their discussions	1,453	139 (9.6)	343 (23.6)	777 (53.5)	194 (13.4)	2.29	.81
6	GSM phone calls do not disturb in the university library	1,453	645 (44.4)	569 (39.2)	175 (12.0)	64 (4.4)	3.23	.82
7	The reading chairs are not noisy	1,453	89 (6.1)	211 (14.5)	936 (64.4)	217 (14.9)	2.11	.72
Note: Values in parentheses are the row percentages.								

Space and Ventilation

Table 2 summarises the students' perceptions about the adequacy of space and ventilation in the university libraries. Due to the nature of the data, the totals and percentages are reported for the combination of 'Agreed' and 'Strongly Agreed' responses on the one hand, and 'Disagreed' and 'Strongly Disagreed' responses on the other.

From the table, only slightly less than three-quarters (i.e. 27.5 %) of the respondents agreed that the university library was spacious enough to accommodate most users. Similarly, even higher proportions of the respondents agreed that the library is built to allow for proper ventilation (80.2 %), and that The library windows were properly placed for natural ventilation (78.3 %). These results show that most of the respondents agreed that the university library buildings were correctly designed to allow for adequate ventilation.

Slightly less than two-thirds of the respondents agreed that the temperature in the library was suitable for reading most times (61.9 %) and that the ceiling fans in the libraries were always functional and noiseless (64.6 %). These are not not unexpected in view of the usually unreliable electricity supplies from the public utilities, which usually necessitates the constant use of electricity generators to supply electricity to most university libraries in the country. However, the electricity generators often are not used to power the air-conditioners in the libraries. Accordingly, it is not surprising that as many as 67.9 % of the respondents disagreed that their library's air conditioners make the environment conducive.

Table 2: Students' Perceptions of Status of Ventilation in the University Libraries

SN	Ventilation Factors	N	Agreed and Strongly Agreed	Disagreed and Strongly Disagreed	$\overline{X}$	Standard Deviation
1	The library is spacious enough to accommodate most users	1453	1053 (72.5)	400 (27.5)	3.02	1.37
2	The library is built to allow for proper ventilation	1453	1165 (80.2)	288 (19.8)	3.32	1.21
3	The library temperature is suitable for reading most time	1453	899 (61.9)	554 (38.1)	2.87	1.35
4	The ceiling fans in the library are always functional and noiseless	1453	938 (64.6)	515 (35.4)	2.86	1.47
5	The library's air conditioner makes the environment conducive for reading and assimilation	1453	467 (32.1)	986 (67.9)	1.76	1.74
6	The library windows are properly placed for natural ventilation	1453	1137 (78.3)	315 (21.7)	3.31	1.3

Illumination and Furniture

In respect of illumination, Table 3 shows that 61.6 % of the respondents agreed or strongly agreed that the library was adequately illuminated. Furthermore, only 18.6 % of them agreed or strongly agreed that the lighting was (too) bright for reading, which also confirms that the level of illumination is fine with most of the respondents. However, only 24.7 % of the respondents agreed or strongly agreed that the lighting system did not produce heat, suggesting that the lighting system was perceived rightly or wrongly by the respondents as one of the potential causes of uncomfortable temperature in the university libraries.

The table also shows that 85.4 % of the respondents disagreed or strongly disagreed that the reading tables were adequate (in number), 84.2 % of them disagreed or strongly disagreed that the

chairs were kept neat (do not stain users' clothes, and 73.8 % disagreed or strongly disagreed that the reading chairs were comfortable (covered with foam cushion). These findings in respect of the comfort of the reading chairs is contrary to those of Nock (1998) who found out that 66.2 % of the respondents in that study indicated that the university library seats were good. It is possible that university library users have become more sophisticated in terms of their expectations of adequate seating facilities in the libraries.

Table 3: Students' Perceptions of the Adequacy of Physical Facilities in the University Libraries

S/N	Statements	N	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	$\bar{X}$	Standard Deviation
1	The library chairs are adequate for reading because they are covered with foam	1,453	109 (7.5)	271 (18.7)	714 (49.1)	359 (24.7)	2.08	0.85
2	The library's reading tables are adequate for reading	1,453	44 (3.0)	168 (11.6)	878 (60.4)	363 (25.0)	1.92	0.69
3	The lighting system of the library is bright for reading	1,453	43 (3.0)	227 (15.6)	887 (61.0)	296 (20.4)	2.01	0.69
4	The lighting system does not produce heat	1.453	46 (3.2)	313 (21.5)	810 (55.7)	284 (19.5)	2.08	0.72
5	There is a library standby power supply system	1,453	208 (14.3)	450 (31.0)	525 (36.1)	270 (18.6)	2.41	0.94
6	The reading chairs do not dirty users' dresses	1,453	58 (4.0)	172 (11.8)	898 (61.8)	325 (22.4)	1.97	0.7
7	The reading chairs and tables are comfortable for reading purposes	1,453	49 (3.4)	156 (10.7)	927 (63.8)	321 (22.1)	1.95	0.67
8	The library is always well illuminated	1,453	56 (3.9)	839 (57.7)	413 (28.4)	145 (10.0)	2.55	0.72

Note: Values in parentheses are the row percentages.

Resources Availability

The respondents were also asked to indicate their levels of agreement or disagreement with some statements concerning the adequacy of information materials in their libraries. Table 4, which summarises the results, reveals that about two-thirds (67.5 %) of the respondents agreed or strongly agreed that they were satisfied with the subject coverage of the information materials in their university libraries. A similar proportion of them (69.7 %) also agreed or strongly agreed that the materials were current. However, only 27.2 % of the respondents agreed or strongly agreed that the loan period for borrowed materials was fine, and this factor along with others probably explains why only 14.2 % of the respondents agreed or strongly agreed that the materials were adequately accessible to them.

Table 4: Students Perceptions of Resources Availability in the University Libraries

S/N	Statements	N	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	$\overline{X}$	Standard Deviation
1	Your level of satisfaction as regards the subject coverage of the library materials in your area of specialization is high	1,453	117 (8.1)	863 (59.4)	342 (23.5)	131 (9.0)	2.66	.75
2	The materials you have consulted in your university library are current	1,453	150 (10.3)	863 (59.4)	343 (23.6)	97 (6.7)	2.73	.73
3	The information materials in your library are accessible to users	1,453	23 (1.6)	183 (12.6)	1081 (74.4)	166 (11.4)	2.04	.54
4	The library's book loan duration of your university library is satisfactory	1,453	101 (7.0)	294 (20.2)	837 (57.6)	221 (15.2)	2.18	.77

Note: Values in parentheses are the row percentages.

Discussion

The literature review shows that adequate library resources and good environmental conditions such as good ventilation, adequate physical facilities and noise control are required to boost and sustain patronage and use of the services provided by university libraries to its users, who are mostly undergraduate students. Conversely, patronage and use of the libraries by students cannot be sustained or improved if the libraries lack adequate information materials or environments conducive for in-library reading and study by users.

This study has provided findings in respect of the status of library resources and environmental conditions in six federal government university libraries, as perceived by its main users- the undergraduate students. Hence, undergraduate students' perceptions of the quality of the resources, facilities and services are crucial instruments and indicators for gauging the quality of the services, although it must be admitted that some students' perceptions could be very far from reality. However, in service provision, the customer is king, and the majority of such customers cannot be wrong or taken for granted.

The findings of this study can be used by university library managers in Nigeria to improve their understanding of the perceptions of their student users, and thereby implement appropriate strategies towards solving some of the identified weaknesses in their library resources and environmental conditions identified by the study. For instance, the study revealed that noise from conversations by library staff is perceived as prevalent and distracting by the majority of the student users of the university libraries. Generally, majority of library users usually visit the libraries in order to read in a quiet environment where there are no distractions. Shane (2007) had stressed, rightly, that the best sound for studying is silence, especially when one needs to really concentrate. Thus, all types of noise would have negative effect on the users' ability to learn in the libraries, as findings of Evans (1997) also confirm. Therefore, the management of the Nigerian university libraries should always strive to reduce or minimise level of noise in their libraries. Policies prohibiting noise-making should also be enforced not only among users, but also among library staff. The library staff should themselves avoid discussing loud in the library.

Rmnathan (2007) has emphasised the importance of keeping an eye on the quality of air inside the library where the students spend most of their time searching for and interacting with information materials. Godd air quality and ventilation would motivate students to use library and its resources more. The study revealed that, in the Nigerian university libraries surveyed, adequate reading spaces and functioning library fans and adequate ventilation are in place to facilitate study by students in the libraries. However, the air conditioners available in the selected universities for the study were not functioning properly and this can contribute to low use of the libraries. Information obtained from the oral interviews with the university librarians, as well as the researchers' observations confirmed the respondents' reports that the air conditioners in the libraries were not functioning properly which, coupled with the periodic congestions in the reading areas of the libraries, is likely to reduce the level of air quality and users' comfort in the libraries. These conditions can adversely affect patronage and use of the libraries.

Pierce (1980) had noted that "it is important that study chairs be large enough for the comfort of today's users." In most of Nigerian university libraries, the reading chairs and tables are neither comfortable nor adequate for reading purposes. This general observation is corroborated by the findings of this study in respect of the selected universities. The interviews with the university librarians revealed that the seating capacity of their libraries is poor and inadequate for the populations of students in their universities.

This study revealed that the lighting systems of the Nigerian university libraries are not suitable for reading purposes. The researchers themselves also observed that the reading areas of most of these libraries are not illuminated brightly enough. Most of the electrical lighting fixtures are not functioning properly, either because of the fixtures or the flourescent tubes need to be replaced. These problems can also cause students to avoid use of the libraries.

Adebimpe and Adeniran (2001) have maintained that the establishment of school/college libraries where educational resources are preserved has a positive correlation with educational quality at school/college levels. Anderson and Miller (1983) stressed that in order for a library to be most functional, the resources that it provides should correspond as closely as possible with the information needs of its users, as the user is the very reason for the existence of the library. Where there is adequate library stock, students will develop the habit of reading both for pleasure and for the purpose of gathering information for themselves. Whitmore (2001) had also reported that among more than 643 students that she surveyed, students satisfied with campus library facilities also reported greatest satisfaction with their progress.

Fortunately, in the Nigerian university libraries studied, the majority of the students perceived that the subject coverage and currency of the library materials in the students' areas of specialisation was adequate. However, majorities of them also indicated that the library materials in their university libraries were not adequately accessible to users and that their libraries' book loan duration was not satisfactory. These factors could cause low use of the university libraries. Certainly, in every university system, there is always the need for adequate and readily accessible library resources such as current journals, textbooks and good ICT and Internet access facilities for accessing information within and outside the library. In other words, adequate print and electronic resources should be provided in Nigerian university libraries in order to attract undergraduate students to use the libraries

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Conclusion and Recommendations

In conclusion, undergraduate students need to be motivated to use the libraries of their universities more. This can be achieved by ensuring the availability of quality library information materials through purchases and subscriptions to both print and online materials, and ensuring library environments that enable effective reading, study and learning. This would, in turn, assist the students to gain mastery of their subjects of specialization, and enable the universities to achieve their core functions of promoting learning and knowledge.

On the basis of the specific findings of this study, the following recommendations are made:

- The managements of federal universities should endeavour to provide silent and functioning ceiling fans and air conditioners in the university libraries to reduce noise and improve ventilation.
- The library staff in federal university libraries should avoid conversations near the reading areas of the library.
- Adequate physical facilities such as reading chairs and tables and good lighting systems should be provided by the university libraries in order to attract and sustain students' use of the university libraries for reading and study.
- Apart from ensuring that library information materials are current and adequate in numbers, operational library policies should be reviewed in order to improve access by students to the materials. For instance, there may be need to increase the time duration of book loans for students.

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Professional News

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News

National Assembly Passes FOI Bill again

The Nigerian National Assembly, made up of two chambers- House of Representative and Senate, has passed the Freedom of Information (FOI) Bill. It is now awaiting the harmonisation of the two chambers before it will be presented to His Excellency President Goodluck Jonathan for his assent. It will be recalled that the former National Assembly passed the bill after much foot dragging. Unfortunately, the required assent was not given before the end of the administration of President Olusegun Obasanjo, hence the present sojourn of the bill in the National Assembly. Feelers from the Presidency are that the President would assent to the bill once it is presented to him. Some countries in Africa- South Africa, Uganda, Angola and Zimbabwe have enacted the FOI bill.

Libraries get a Boost

The Nigerian President, His Excellency, President Goodluck Jonathan, launched the"Bring Back the Book" campaign recently. The aim of the campaign is to improve the reading culture of Nigerians, aimed at having a knowledge society. The campaign was launched on December 20, 2010. Since then, many stakeholders, including librarians in Nigeria, have been holding seminars, public lectures and workshops on how they can benefit from the unprecedented interest of a Nigerian President in improving the reading culture of Nigerians.

Forth Coming Conferences

Second Session of the Committee on Development InformationScience and Technology (CODIST- II). Addis Ababa, (UNCC-AA) Ethiopia, 2 to 5 May 2011. Organised by the United Nations Conference Centre Addis Ababa, (UNCC-AA) Ethiopia. Theme: Innovation for Africa's Industrial Development. For further information contact:ww.uneca.org/codist

African Library Summit 2011, Muldersdrift, Johannesburg, Guateng, South Africa, 11-13 May, 2011. Organised by the University of South Africa (Unisa) library and the IFLA Regional Office for Africa and IFLA. Africa Section .For further information contact: http://www.cvent.com/EVENTS/Info/Summary.aspx?e=50a1a753-e739-4261-9ba3- bca44e41d9cd